Climate Action Plan

CITY OF
LA MESA
JEWEL of the HILLS

Adopted by La Mesa City Council
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Acronyms & other abbreviations

Acronyms	Definition
AB	Assembly Bill
ARB	California Air Resources Board
ARRA	American Recovery and Reinvestment Act
BMP	best management practice
C&D	construction and demolition
CalRecycle	California Department of Resources Recycling and Recovery
CAP	Climate Action Plan
CCA	community choice aggregation
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CH_4	methane
CO_2	carbon dioxide
CNG	compressed natural gas
CSE	Center for Sustainable Energy
CSI	California Solar Initiative
EIR	environmental impact report
EO	Executive Order
EPA	U.S. Environmental Protection Agency
EPIC	Energy Policy Initiatives Center
EV	electric vehicle
FY	fiscal year
GHG	greenhouse gas
GWP	global warming potential
ICLEI	ICLEI Local Governments for Sustainability
IPCC	International Panel on Climate Change
kWh	kilowatt hour
LCFS	Low Carbon Fuel Standard
LED	light emitting diode
LEED	Leadership in Energy & Environmental Design
LPG	liquefied petroleum gas
MPO	Metropolitan Planning Organization
MT CO_2e/yr	metric tons of carbon dioxide equivalent per year
MW	megawatt
N_2O	nitrous oxide
OPR	Office of Planning and Research

Acronyms	Definition
PACE	property-assessed clean energy
PEV	plug-in electric vehicle
PPA	power purchase agreement
PV	photovoltaic
RES	Regional Energy Strategy
RPS	Renewables Portfolio Standard
RTP	Regional Transportation Plan
SANDAG	San Diego Association of Governments
SB	Senate Bill
Scoping Plan	Climate Change Scoping Plan
SCS	Sustainable Community Strategy
SDAPCD	San Diego Air Pollution Control District
SDG&E	San Diego Gas and Electric Company
sq. ft.	square feet
SRTS	Safe Routes to School
TCR	The Climate Registry
TDM	transportation demand management
TOD	transit-oriented development
UWMP	Urban Water Management Plan
VMT	vehicle miles traveled
yr	year

Glossary

AB 32 and SB 32: Assembly Bill 32 (AB 32) was adopted in 2006 and codified California's 2020 GHG target as a return to 1990 emissions levels. Senate Bill 32 (SB 32) was adopted in 2016 and codified California's 2030 GHG target as 40% below 1990 levels. Executive Order S-3-05 has set a long-term term GHG target for 2050 to achieve emissions levels of 80% below 1990 levels.

CCA: A community choice aggregation (CCA) district allows cities and counties, either individually or collectively, to supply electricity to customers within their borders. Unlike a municipal utility, a CCA does not own the transmission and delivery systems, but is responsible for providing electricity to its residents and businesses. The CCA may own electric generating facilities, but more often, it purchases electricity from private electricity generators. A primary benefit of a CCA is that the participating jurisdictions can determine the amount of renewable energy contained within the generation portfolio.

GHG: Greenhouse gases (GHG) are gases that absorb and emit thermal radiation or heat. When present in the atmosphere, these gases trap radiation in the form of heat, causing a warming process called the greenhouse effect. The primary GHGs analyzed in a local GHG inventory include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O).

RPS: The Renewables Portfolio Standard is a collection of legislation in California that describes increasing requirements for the provision of electricity from renewable sources. The RPS currently requires utility companies to provide 33% of their electricity portfolio from RPS-compliant sources by 2020 and 50% by 2030. RPS-compliant sources include wind, solar, geothermal, biomass, and small hydroelectric.

MT CO_2e per capita: A unit of emissions efficiency measurement that describes metric tons of carbon dioxide emissions equivalent generated per capita; the CAP's 2035 and 2050 GHG targets are expressed as per capita targets based on guidance to local governments provided in the California Air Resources Board 2017 Climate Change Scoping Plan Update.

VMT: Vehicle miles traveled (VMT) is a measurement of miles traveled per vehicle within a specific boundary over a specific time period. In GHG inventories, a community's total VMT is often closely associated with its total transportation sector emissions. As more travel occurs within the community, more vehicle emissions are generated.

ZNE: Zero-net energy (ZNE) generally describes a building in which the total amount of energy used by the building annually is equal to the amount of renewable energy generated on site. In this way, the building only consumes as much energy as it can produce, and since the on-site generation is emissions-free, the building generates zero-net energy emissions or is energy-neutral.

Executive Summary

The City of La Mesa's Climate Action Plan (CAP) describes the 2010 greenhouse gas (GHG) emissions baseline and forecasted emissions for 2020 and 2035, and identifies the achievable, measurable strategies and actions that the City of La Mesa will implement to reduce emissions. By seeking to reduce emissions to 15% below 2010 levels by 2020 and 53% below the 2010 levels by 2035, the Plan addresses a commitment by the City of La Mesa to reduce greenhouse gas consistent with state goals and guidance.

At its basic level, this CAP represents a roadmap by which La Mesa can reduce its contributions of GHG emissions through the development and implementation of strategies that mirror the City's goals, values, and priorities. Increasingly throughout California, communities are developing and implementing CAPs to support the State's broad climate protection efforts. CAPS also allow agencies to advance local initiatives to improve community health and safety, reduce transportation and utility related emissions, facilitate locally beneficial development projects, and enhance collaboration on regional planning strategies.

This CAP is a long-range plan to reduce GHG emissions from community activities and municipal operations within the City of La Mesa in order to support the State's efforts under Executive Order S-3-05, SB 32, and AB 32 and to mitigate climate-related impacts.

In 2013, the City of La Mesa completed a comprehensive update to its General Plan, which included a General Plan mitigation measure to adopt a Climate Action Plan. The Greenhouse Gas Mitigation Measure specifically required the City to develop and implement this plan for reducing GHG emissions to conform to California Environmental Quality Act (CEQA) Section 15183.5 and established a target to reduce emissions by 15% compared to baseline levels by the year 2020. This CAP demonstrates how the City will achieve this 2020 target. Further, the CAP provides a 2035 target (based on the State's reduction goals of 40% of 1990 levels by 2030 and 80% respectively by 2050) consistent with the City's General Plan horizon year. This CAP implements the requirements of this mitigation measure and is consistent with guidance from the State efforts to reduce greenhouse gas emissions.

Plan Outline

A summary of the plan is as follows:

- Chapter 1, *Planning for Climate Change,* provides an overview of California's Climate Planning efforts, the purpose and approach of La Mesa's CAP, its relationship to CEQA, and discusses social equity and environmental justice.
- Chapter 2, *Greenhouse Gas Emissions*, provides an inventory of greenhouse gas GHG emissions in the City in 2010 and forecast of GHG emissions to 2020 and 2035, emissions reduction targets, 2050 emissions planning, and CEQA guidelines for project tiering.
- Chapter 3, *Emissions Reduction Measures*, describes emissions reduction strategy areas to reduce GHG emissions by 2020 and 2035 to meet its reduction targets, the approach to

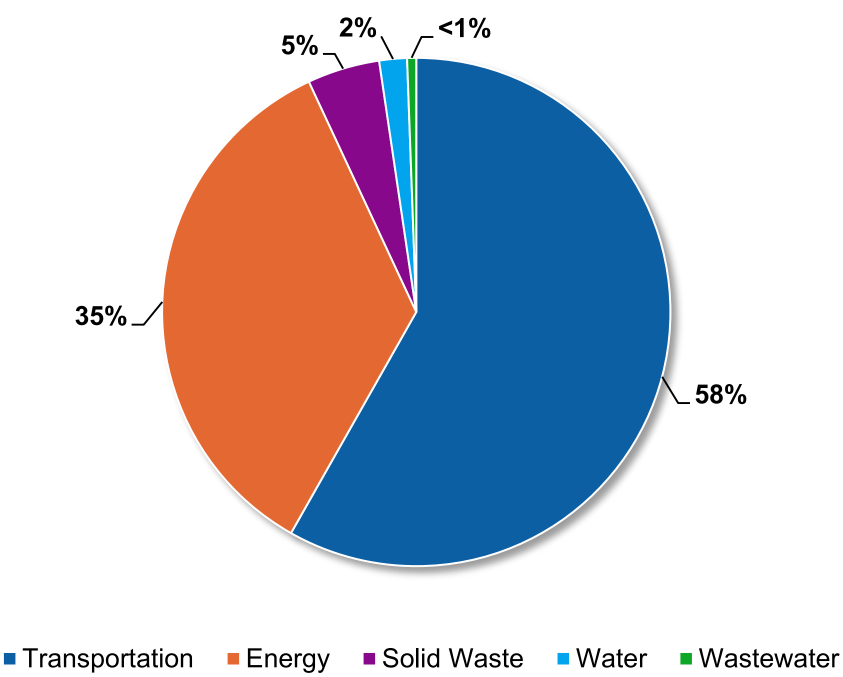
reduction measures, reduction measure structure, reduction strategies by emissions sector, CAP implementation strategies, progress toward target achievement, and long-term emissions planning.

- Chapter 4, *Benchmarks and Implementation*, describes implementation and monitoring of the CAP, and plan evaluation and evolution of the CAP document, and provides funding sources, and a summary conclusion of the CAP.
- Appendix A, *Emissions Inventory and Forecast Methodology*, describes the emissions sectors, data sources, and methodology used to prepare the CAP's 2010 baseline emissions inventory and the 2020 and 2035 emissions forecasts.
- Appendix B, *Reduction Quantification Methodology*, describes the assumptions and methodology used to estimate emissions reductions associated with implementation of the local CAP measures described in Chapter 3.
- Appendix C, *Cost-Effectiveness and Benefit Cost Analysis, and Implementation Cost Report*, summarizes the findings for the La Mesa CAP benefit-cost analysis conducted by the Energy Policy Initiatives Center (EPIC) of the University of San Diego.

Baseline Emissions and Reduction Strategies

The City's 2010 greenhouse gas emissions baseline is shown in the pie chart below, a summary of measures and quantified reductions and the City's GHG reduction targets for 2020 and 2035 are shown in the following tables.

2010 Baseline Emissions by Sector



2020 and 2035 Emissions Reduction Targets		
	2020 (MT CO_2e/yr)	**2035 (MT CO_2e/yr)**
Emissions Forecast (including statewide reductions)	376,142	341,047
La Mesa Emissions Reduction Target	**359,271**	**237,640**
Local Action Reductions Needed to Achieve Target	**16,871**	**103,407**

Summary of Measures and Quantified Reductions					
		2020		**2035**	
Reduction Strategies and Measures		**MT CO_2e/yr**	**% of Local Reductions**	**MT CO_2e/yr**	**% of Local Reductions**
ENERGY					
E-1	Building Retrofit Program	4,200	25%	17,810	15%
E-2	Shade Tree Program	<1	<1%	10	<1%
E-3	Municipal Energy Efficiency Goal	30	<1%	60	<1%
E-4	Public Lighting	170	1%	170	<1%
E-5	Solar Photovoltaic Program	2,350	13%	4,660	4%
E-6	Solar Hot Water Heater Program	30	<1%	30	<1%
E-7	Solar Ready Construction	*Supporting*			
E-8	Zero Net Energy Construction	-	-	8,470	7%
E-9	100% Clean Energy CCA Program	-	-	37,240	32%
	Energy Subtotal	**6,780**	**40%**	**68,450**	**59%**
TRANSPORTATION and LAND USE					
T-1	Bicycle and Pedestrian Infrastructure Development	50	<1%	50	<1%
T-2	Bicycle Safety Program	*Supporting*			
T-3	Transportation Demand Management Program	2,152	12%	2,720	2%
T-4	Mixed-Use and Transit-Oriented Development	1,890	11%	19,750	17%
T-5	Alternative Refueling Infrastructure Development	150	1%	550	<1%
T-6	Municipal Fleet Transition	10	<1%	10	<1%

Summary of Measures and Quantified Reductions					
		2020		2035	
Reduction Strategies and Measures		MT CO_2e/yr	% of Local Reductions	MT CO_2e/yr	% of Local Reductions
	Transportation Subtotal	**4,252**	**25%**	**23,080**	**20%**
WATER					
W-1	Urban Water Management Plan Programs	450	3%	1,590	1%
W-2	Water Sensitive Landscape Design and Irrigation	*Supporting*			
W-3	Pure Water Program	*Supporting*			
	Water Subtotal	**450**	**3%**	**1,590**	**1%**
SOLID WASTE					
SW-1	Food Scrap and Yard Waste Diversion	2,010	12%	-	-
SW-2	Construction and Demolition Waste Diversion Program	3,340	20%	-	-
SW-3	75% Waste Diversion Goal	-	-	17,050	15%
	Solid Waste Subtotal	**5,350**	**32%**	**17,050**	**15%**
GREEN INFRASTRUCTURE					
GI-1	Urban Forest Master Plan	50	<1%	-	-
GI-2	Expanded Urban Forestry Program	-	-	6,300	5%
	Green Infrastructure Subtotal	**50**	**<1%**	**6,300**	**5%**
TOTAL		**16,876**	**100%**	**116,470**	**100%**

TARGET ACHIEVEMENT		
Reduction Target	15% below baseline[1]	3.46 MT CO_2e per capita
Reduction Target	359,271 MT CO_2e/yr	**237,640** MT CO_2e/yr
Reductions Needed	16,871 MT CO_2e/yr	**103,407** MT CO_2e/yr
Reductions Estimated[2]	16,876 MT CO_2e/yr	116,470 MT CO_2e/yr
Estimated Achievement Level[2]	**15% below baseline**[1]	**53% below baseline**
Estimated Mass Emissions Level[2]	**359,266 MT CO_2e/yr**	**224,577 MT CO_2e/yr**

Source: AECOM 2017

Notes: MT CO_2e = metric tons of carbon dioxide equivalent

[1] 2010 baseline level: 422,672 MT CO_2e/yr = 7.37 MT CO_2e/yr per capita

[2] Estimates and assumptions are conservative and based on the best available data at the time of CAP development, and could underestimate the actual potential for GHG emissions reductions compared to what may actually occur.

CHAPTER 1

Planning for Climate Change

Incorporated in 1912, the City of La Mesa is a substantially built out city. Some 95% of the developable land has been improved with structures. The City is a little over 9 square miles in size and is one of the most compact communities in the region. And much of the development has occurred along and near to transportation corridors. La Mesa is well served by freeways including Interstate 8, State Route 94 and State Route 125 and well served by public transportation with seven bus routes and five trolley stations. This infrastructure helps minimize the length and duration of vehicle trips.

The City of La Mesa has a history of planning for healthy communities, promoting efficient resource use, and incorporating sustainability principles into municipal operations. The City has developed numerous planning documents and has taken actions to improve the quality of life for La Mesa residents and support broad community sustainability goals. These planning documents include development of a Sidewalk Master Plan; Ready, Set, Live Well Community Wellness Initiative; Parks Master Plan; Bicycle and Alternative Transportation Plan; and the Urban Trails Mobility Action Plan that have led to development of urban walking trails, participation in the Safe Routes to Schools program, and increased access to City parks.

The City of La Mesa has a history of building smart growth projects. The City's planning efforts for infill transit oriented development have been ongoing since the late 1980s when the trolley first came to La Mesa. The Mixed-Use Overlay Zone was established in 2009 to promote the revitalization of La Mesa's transit corridors by increasing housing options close to transit. The Mixed-Use Overlay Zone standards and design guidelines facilitate the development of pedestrian areas and streetscape improvements that create a more walkable and attractive pedestrian environment, implementing related goals and policies of the General Plan. La Mesa has oriented its policy and regulatory framework in a way that promotes future low-vehicle miles traveled (VMT) development and the City has experienced successful infill, mixed-use, relatively compact, transit-oriented development. The City's policies and efforts to reduce VMT are applied to a supportive local context. General Plan policies support compact, transit-oriented development along the City's transit corridors and around transit hubs. General Plan buildout anticipates development to occur along existing bus routes and near trolley stations. In addition, La Mesa has the third highest population density of any city in the entire San Diego region (see Table 3.3). La Mesa has the highest gross residential density of any city in the region. Redevelopment and increased development along the transit corridors and around transit has, and will continue to provide new housing options and destinations in a mixed-use environment. This smart growth development pattern brings residents in closer proximity to transit and creates a more walkable, bikeable environment to help reduce vehicle trips. The City's ongoing and future efforts to facilitate such development will be complemented by improvements to transit services and active transportation projects identified in the San Diego Forward Plan that would serve La Mesa residents, visitors, and employees.

All of the above has led to a 2010 baseline greenhouse gas emissions level of 7.37 MT CO_2e/yr per capita for the City of La Mesa. This level is significantly lower than the County wide emissions baseline of 10 MT CO_2e/yr per capita. In addition, the California Air Resources Board Scoping Plan recommends a target of 6.0 MT CO_2e/yr per capita by 2030. La Mesa is already close to this target.

Other efforts have included incorporation of hybrid vehicles in the City fleet and the rehabilitation of existing buildings. Some of these actions may also serve to reduce greenhouse gas (GHG) emissions within the community, which can help the City to achieve its adopted emissions reduction target. The City of La Mesa Climate Action Plan is an enforceable document to the maximum extent of the law.

As a continuation of these efforts, the City has prepared this Climate Action Plan (CAP) to provide a comprehensive strategy for reducing local GHG emissions and meeting the obligations set forth in the City's General Plan Environmental Impact Report (EIR). The EIR directed preparation of a CAP to analyze emissions at the community-wide level, rather than on a project-by-project basis and sets the framework to analyze future projects.

This CAP represents the results of collaborative planning efforts among City staff, members of the City's Environmental Sustainability Commission, Planning Commission, San Diego Gas and Electric (SDG&E), San Diego Association of Governments (SANDAG), Energy Policy Initiatives Center of the University of San Diego (EPIC), and public input from La Mesa residents, its business community, and community advocacy groups. To underline the importance of this document, the City Council established a City Council ad hoc subcommittee in January 2017 to oversee the development of this

CAP. Councilmembers Kristine Alessio and Bill Baber, as representatives of the Council, were instrumental in the document's completion.

Throughout the CAP development process, the City has engaged in community outreach consisting of public meetings, presentations to boards and commissions, online and in-person surveys, educational presentations, a community workshop, and a community block party event. These outreach activities served to educate community members and encouraged their feedback and participation in the public process. Extensive outreach and feedback from community members, in coordination with data collection of existing and proposed climate action plans, drove the recommendations documented in this plan. In addition, there was a page on the City's website dedicated to the CAP and e-mail announcements were sent to community members that signed up for the CAP e-news email list. Regular updates were provided to the City Council throughout the course of the project to keep them apprised of the CAP's progress.

This chapter presents La Mesa's rationale for climate action planning within the context of ongoing statewide and regional efforts. It also introduces the CAP development process and primary components found within this plan. The chapter includes a description of the CAP's relationship to the California Environmental Quality Act (CEQA) and concludes with a discussion on environmental justice.

California's Climate Planning Efforts

Momentum for local climate planning action in the United States primarily originates in California. La Mesa's strategy for climate protection reflects the broader context of the state, California has long been a leader in sustainability planning, as illustrated by Governor Schwarzenegger signing Executive Order (EO) S-3-05 in 2005. EO S-3-05 recognized California's vulnerability to climate change through a reduced snowpack, exacerbation of air quality problems, and potential sea-level rise.

To address the State's contribution to these concerns, the Governor established the following targets to reduce statewide GHG emissions:

- Return to 2000 levels by 2010,
- Return to 1990 levels by 2020, and
- Achieve 80% below 1990 levels by 2050

As a continuation of these efforts, the City has prepared this CAP.

Goals of the Climate Action Plan:

(1) Analyze La Mesa's 2010 baseline GHG emissions and 2020 and 2035 projected emissions relative to population growth in the City.

(2) Establish GHG emissions targets for the years 2020 and 2035 consistent with statewide goals identified in Assembly Bill (AB) 32, Senate Bill (SB) 32, and Executive Order S-3-05.

(3) Provide a detailed roadmap for achieving the City's GHG emissions reduction targets.

(4) Fulfill the City of La Mesa's General Plan Environmental Impact Report (EIR) requirement to complete a CAP as per Mitigation Measure 4.5.5, GHG-1.

(5) Serve as a comprehensive plan for addressing the cumulative impacts of GHG emissions within La Mesa.

(6) Outline procedures to implement, monitor, and verify the effectiveness of the CAP measures.

AB 32 resulted in the 2008 adoption by the California Air Resources Board (ARB) of a *Climate Change Scoping Plan* (Scoping Plan), outlining the State's plan to achieve emission reductions through a mixture of direct regulations, alternative compliance mechanisms, different types of incentives, actions, market-based mechanisms, and funding. The Scoping Plan describes strategies for emissions reductions in a range of strategy areas similar to those presented in this CAP, such as:

- energy efficiency,
- renewable energy development,
- multi-modal transportation options,
- land use planning,
- vehicle fuel efficiency,
- solid waste reduction,
- water conservation, and
- green infrastructure development.

ARB updated the Scoping Plan for the first time in 2014 to analyze progress to date towards the statewide reduction goals and consider new strategies and technologies for future implementation. In 2016, California adopted Senate Bill (SB) 32, expanding statewide GHG targets to 2030 and requiring achievement of emissions levels 40% below 1990 levels. ARB subsequently updated the Scoping Plan for a second time via the *2017 Climate Change Scoping Plan Update* (Scoping Plan Update). This most recent update outlines the State's pathway toward achievement of the SB 32 GHG target.

Recognizing the importance that local governments play in the reduction of GHG's, the original 2008 Scoping Plan recommended that local governments reduce communitywide and municipal operation emissions to a level approximately 15% below baseline levels by 2020 (equivalent to a return to 1990 levels). Guidance from the State Office of Planning and Research (OPR) at the time expanded that recommendation to suggest that local governments should plan to reduce their emissions on a trajectory that would contribute to the State's long-term 2050 target expressed in EO-S-3-05 (i.e., 80% below 1990 levels). The draft 2017 Scoping Plan Update recommends per-capita emissions targets for local communities for 2030 and 2050 and indicates that local jurisdictions may choose to develop their own targets, including those based on per capita (resident population). As cited in the draft 2017 Scoping Plan Update under "Recommended Local Plan-Level Greenhouse Gas Emissions Reduction Goals":

> *The recommended local government goals of six metric tons CO_2e per capita by 2030 and two metric tons CO_2e per capita by 2050 are intended by provide consistency with the 2030 Target Scoping Plan and the State's long term goals. This is a statewide goal based on all local emissions sectors in the State, and local jurisdictions may choose to derive region-specific evidenced based on per capita or per service population GHG emissions goals tied to these statewide goals. Once adopted, the plan and policies to achieve this goal can serve as a performance metric for subsequent projects.*

CLIMATE CHANGE SCIENCE

Climate scientists around the world, represented by the Intergovernmental Panel on Climate Change (IPCC), have presented a position with regard to the effects of human activity on the earth's atmosphere. Their research has shown that the release of GHG emissions from human activities, particularly the release of GHGs through the combustion of fossil fuel, is changing the earth's climate. It is also their position that based on the accelerated rate of change, the longer communities delay in taking action, the greater the risk humans face of depleting nonrenewable resources and irreversibly damaging the planet's environment. At a statewide level, damaging impacts include reduced snow pack in the Sierra Nevada affecting California water supplies; rising sea levels threatening cities along the coast, bays and estuaries, and the state's rivers; decreasing air quality affecting public health; rising temperatures impacting the state's agricultural industry; and, drought and wildfires.

In addition to ongoing local sustainability efforts, this CAP is designed to reduce local contributions of GHG emissions that contribute to global climate change.

Purpose of La Mesa's Climate Action Plan

At its basic level, this CAP represents a roadmap by which La Mesa can reduce its contributions of GHG emissions through the development and implementation of strategies that are informed by the City's goals, values, and priorities. Throughout California, communities are developing and implementing CAPs to support the State's broad climate protection efforts, while simultaneously advancing local initiatives to improve community health and safety, reduce transportation and utility costs, facilitate locally beneficial development projects, and enhance collaboration on regional planning strategies.

This CAP is a long-range plan to reduce GHG emissions from community activities and municipal operations within the City of La Mesa in order to support the State's efforts under Executive Order S-3-05, SB 32, and AB 32 and to mitigate climate-related impacts.

In 2013, the City of La Mesa completed a comprehensive update to its General Plan, which included a General Plan mitigation measure to adopt a Climate Action Plan. The Greenhouse Gas Mitigation Measure specifically required the City to develop and implement this plan for reducing GHG emissions to conform to CEQA Section 15183.5 and established a target to reduce emissions by 15% compared to baseline levels by the year 2020. The CAP demonstrates how the City will achieve this 2020 target. Further, the CAP provides a 2035 efficiency target consistent with the City's General Plan horizon year, and extrapolated from the State's goals to reduce GHGs by 40% compared to 1990 levels by the year 2030 and by 80% compared to 1990 levels by the year 2050. This CAP implements the requirements of this mitigation measure and is consistent with guidance from the State efforts to reduce greenhouse gas emissions.

Specifically, the City of La Mesa CAP does the following:

- Summarizes the results of the City of La Mesa GHG Emissions Inventory Update, which identifies the major sources and quantities of GHG emissions produced within La Mesa and forecasts how these emissions may change over time.
- Identifies the quantity of GHG emissions that the City of La Mesa will need to reduce to meet the City's targets, consistent with AB 32 and SB 32, and working toward the long-term goal identified in Executive Order S-3-05.
- Sets forth municipal operations and communitywide GHG reduction measures, including actions and progress indicators which, when implemented, would collectively achieve the specified emissions reduction targets.
- Sets forth procedures to implement, monitor, and verify the effectiveness of the CAP measures and adjust efforts moving forward.

In addition to reducing the City's GHG emissions consistent with statewide goals and mitigating the community's contribution to global climate change, implementation of the CAP will help achieve multiple community goals, such as lowering energy costs, reducing air pollution, supporting local economic development, and improving public health and quality of life. The CAP will also be utilized to tier and streamline the analysis of GHG emissions of future development within the City of La Mesa pursuant to CEQA Guidelines Sections 15152, 15183, and 15183.5 (refer to Chapter 1—Relationship to CEQA).

ADDITIONAL BENEFITS OF ADDRESSING GHG EMISSIONS

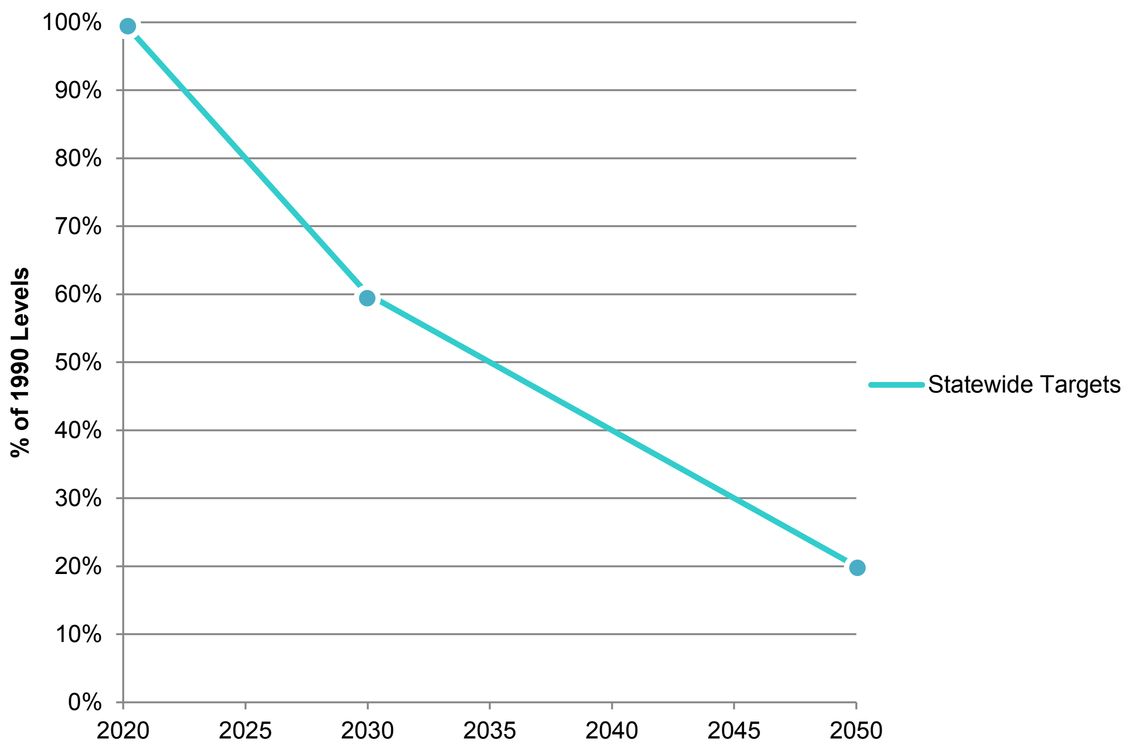
In addition to reducing local emissions levels, implementation of the CAP's strategies will provide co-benefits to the community. This CAP proposes measures that would improve the quality of life within La Mesa, by reducing resident and business utility costs through efficiency improvements, enhancing bicyclist and pedestrian safety, improving local air quality, and extending the operational life of local landfills through waste diversion activities, among other benefits. Figure 1.1 depicts some of the co-benefits associated with CAP implementation.

Figure 1.1 – CAP Measure Co-Benefits

STATE OF CALIFORNIA EMISSIONS TARGETS

Figure 1.2 illustrates the statewide emissions trajectory from the GHG targets established in AB 32, SB 32, and EO-S-3-05.

Figure 1.2 – Statewide Emissions Target Trajectory



Note: Senate Bill (SB) 32 established the 2030 target to reduce statewide greenhouse gas emissions GHG to 40 percent below the 1990 level by 2030. Executive Order EO-S-3-05 established the 2050 target to reduce GHG emissions to 80 percent below 1990 levels by 2050.

As with all executive orders, EO-S-3-05 applies to the Executive Branch of the State of California and does not directly impose additional requirements on local governments. While the intent of these actions is to reduce emissions across multiple sectors throughout the state, the State laws and executive orders do not establish emissions target requirements for local communities. However, this CAP is an enforceable document to the maximum extent of the law.

STATEWIDE ACTIONS

AB 32 led to several companion laws that can assist California in achieving its statewide emissions targets. Some of these companion laws directly result in local emissions reductions within La Mesa, and contribute to the City's emissions target achievement. These legislative actions and regulations are referred to as statewide actions throughout this plan, and represent a substantial source of the estimated GHG reductions. This CAP estimated the emission reductions associated with the following, which are detailed below:

(a) Renewables Portfolio Standard,

(b) AB 1109 – Lighting Efficiency,

(c) Statewide vehicle programs,

(d) Senate Bill 375.

As the regulatory framework surrounding AB 32 and SB 32 continues to grow and the 2017 Scoping Plan Update is adopted and implemented, the City may be able to evaluate a wider range of statewide reductions. Additional statewide action will likely be needed to achieve the State's aggressive 2050 reduction goal. Please see Chapter 2 for more information about reduction targets and Chapter 3 for more information about future statewide and local action.

A. Renewables Portfolio Standard (RPS)

Senate Bill (SB) 1078, SB 107, EO-S-14-08, and SB X1-2 have established increasingly stringent renewables portfolio standard (RPS) requirements for California's utility companies. RPS-eligible energy sources include wind, solar, geothermal, biomass, and small-scale hydro projects.

- **SB 1078** required investor-owned utilities to provide at least 20% of their electricity from renewable resources by 2020.
- **SB 107** accelerated the SB 1078 timeframe to take effect in 2010.
- **EO-S-14-08** increased the RPS further to 33% by 2020.
- **SB X1-2** codified the 33% RPS requirement established by EO-S-14-08.
- **SB 350** increased the RPS to 50% by 2030.

B. AB 1109 – Lighting Efficiency

AB 1109 was signed into law in 2007. The California Lighting Efficiency and Toxics Reduction Act requires the California Energy Commission (CEC) to adopt energy efficiency standards for all general purpose lights, reducing lighting energy use in indoor residences and State facilities by no less than 50% by 2018, as well as require a 25% reduction in commercial facilities by that same date. To achieve these efficiency levels, the CEC applied its existing appliance efficiency standards to include lighting products, as well as required minimum lumen/watt standards for different categories of lighting products. In addition, the bill prohibits the manufacturing for sale or the sale of certain general purpose lights that contain hazardous substances.

C. Statewide Vehicle Programs

The State has developed and implemented several policies and programs aimed at reducing on-road transportation sector emissions, such as the Pavley legislation, Advanced Clean Cars Program, Heavy-Duty GHG Phase I, and Truck and Bus Regulation Amendments. The EMFAC emissions model is developed and used by the California Air Resources Board (ARB) to assess emissions from on-road vehicles including cars, trucks, and buses in California, and to support California Air Resources Board's (ARB) regulatory and air quality planning efforts to meet the Federal Highway Administration's transportation planning requirements. EMFAC is a mobile source emission model for California that provides vehicle emission factors by both county and vehicle class. ARB's EMFAC2014 on-road emissions model incorporates the emissions-reduction potential of these programs as they relate to achievement of the State's GHG targets, and represents the regulatory compliance scenario used in analysis of the Scoping Plan Update.[1] The previous version of ARB's model (EMFAC2011) also incorporated GHG reductions from implementation of the Low Carbon Fuel Standard (LCFS). However, during the EMFAC2014 model update, ARB decided to remove GHG reductions related to the LCFS because the emissions reductions from this regulation primarily occur during the production cycle of vehicle fuels, rather than in the combustion cycle (i.e., tailpipe emissions). La Mesa's transportation sector emissions were calculated using EMFAC2014, and therefore, include the statewide reductions incorporated therein as part of the City's future emissions forecasts. LCFS reductions are not estimated or included as part of La Mesa's CAP.

D. Senate Bill 375

In addition to the aforementioned regulations, the Sustainable Communities and Climate Protection Act of 2008 (referred to as SB 375) aligns regional transportation and land use planning efforts, regional GHG reduction targets, and affordable housing allocations. Through SB 375, California Air Resources Board (ARB) established regional targets for GHG emissions reductions from passenger vehicle use. ARB established targets for 2020 and 2035 for each region covered by one of the state's metropolitan planning organizations (MPOs), including the San Diego Association of Governments (SANDAG). Under this legislation, each MPO is required to adopt a sustainable communities strategy (SCS) as part of its regional transportation plan (RTP) to identify land use, housing, and transportation strategies that will achieve the regional GHG reduction targets.

The SANDAG Board of Directors became the first agency in California to adopt a Regional Transportation Plan (RTP) with a Sustainable Communities Strategy (SCS) in October 2011. ARB's targets call for the region to reduce per-capita emissions by 7% by 2020 and 13% by 2035 from a 2005 baseline. There are no mandated targets beyond 2035. SB 375 does not place any requirements on local governments. Instead, it mandates a planning process to demonstrate how a region would achieve regional emissions targets through per-capita passenger vehicle emission reductions. Qualified projects consistent with an approved SCS or Alternative Planning Strategy and categorized as "transit priority projects" receive incentives under new CEQA provisions. SANDAG adopted its second RTP/SCS, San Diego Forward: The Regional Plan in October of 2015, which

[1] California Air Resources Board. *EMFAC2014 Volume III – Technical Documentation*, v1.0.7, May 12, 2015. Available online: < https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf>

describes how the region will exceed ARB's targets by reducing per-capita passenger vehicle emissions by 15% by 2020 and by 21% by 2035 compared to a 2005 baseline level.[2]

SANDAG provided Vehicle Miles Traveled (VMT) estimates for use in the CAP. The VMT estimates are consistent with SANDAG's RTP/SCS and achievement of the SB 375 per capita emissions targets. The CAP does not include separate GHG reductions associated with this legislation, but instead incorporates compliance with SB 375 into the future emissions scenario.

REGIONAL PROGRAMS AND COORDINATION

In addition to the Scoping Plan and other actions taken at the statewide level, numerous county-wide and other regional efforts have also been established to support broad action towards emissions reductions within the San Diego Region. These programs are led by organizations that serve the greater San Diego region, such as SANDAG, the San Diego Gas & Electric Company (SDG&E), and the Center for Sustainable Energy (CSE), among others. The following program summaries provide a sample of efforts to promote emissions reductions and support broader community health goals within the region. Some of these programs are referenced within the local reduction measures presented in Chapter 3, where collaborative implementation opportunities have already been identified. Others may provide the funding or knowledge-sharing framework that will support future long-range emissions reduction efforts within La Mesa.

SANDAG San Diego Forward: The Regional Plan

The Regional Plan combines the big-picture vision for how the San Diego region will grow over the next 35 years with an implementation program to help make that vision a reality. On October 9, 2015, the SANDAG Board of Directors adopted the Regional Plan and its Sustainable Communities Strategy (SCS). The Regional Plan provides a blueprint for how the region will invest more than $200 billion in projects and improvements in the transportation network over the next 35 years. The goal of the future transportation system is to offer a variety of transportation choices – not just highways, but also carpool lanes, rail and bus services, and active transportation facilities. Pursuant to SB 375, the Regional Plan and its SCS describe how the region will reduce greenhouse gas (GHG) emissions from passenger cars and light-duty trucks through the reduction in vehicle-miles traveled. The goals for the San Diego region, set by the California Air Resources Board, are to reduce emissions by 7%, per capita, by 2020, and 13%, per capita, by 2035 compared with a 2005 baseline. The Regional Plan reduces GHG emissions beyond these targets to 15% by 2020 and 21% by 2035.

SANDAG Regional Climate Action Strategy

In 2010, this strategy was developed as the first-of-its-kind guidance document for local governments. The guide describes potential climate policies that SANDAG and local jurisdictions should consider in future updates to their long-range planning documents (e.g., RTP, General Plans). Potential regional

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[2] California Air Resources Board. 2015 (December). Technical Evaluation of the Greenhouse Gas Emissions Reduction Quantification for the San Diego Association of Governments' Sb 375 Sustainable Communities Strategy. Available: https://www.arb.ca.gov/cc/sb375/sandag_scs_technical_evaluation_final.pdf.

policies include land use and transportation investments that reduce emissions from light-duty trucks and passenger vehicles, building energy efficiency improvements, and measures to reduce emissions from municipal operations. The Climate Action Strategy was approved by SANDAG's Board of Directors on March 26, 2010.

SANDAG Regional Energy Strategy

This strategy establishes goals for energy efficiency, renewable energy development, and energy infrastructure enhancements to meet the region's growing energy demand. The Regional Energy Strategy (RES) focuses on opportunities for member agencies to influence energy use through the areas of land use and transportation planning, funding, and the building entitlement process. The RES also assesses the regional need for additional energy resources and infrastructure. While this strategy does not replace regional energy provider's long-term planning efforts, it can inform their decision-making process. The SANDAG Board of Directors accepted the most recent Final RES Update on December 18, 2009. A summary report was prepared in 2014 to show regional progress in meeting each RES goal. In addition, the RES underwent a technical update in 2014 that extended its forecasts to 2050.

SANDAG Energy Roadmap Program

SANDAG provides local governments with energy management plans, or "Energy Roadmaps" that identify ways to save energy in municipal operations and community-wide, resulting in municipal cost savings and benefits to the environment. This program is a local government partnership with SDG&E, and each Roadmap is developed in consultation with City staff. Through energy audits, the program identifies potential energy savings, cost savings, and GHG reductions for municipal buildings and parks. The program was launched in July 2010, and is based on the Sustainable Region Program that SANDAG piloted from 2005 to 2009 with the cities of Carlsbad, Poway, and Solana Beach. Through the program, SANDAG offers assistance to cities to pursue energy saving opportunities at the community-wide and municipal operations levels. Energy roadmaps have been completed for nearly all local governments within the region. SANDAG published the City of La Mesa Energy Roadmap in March 2013.

San Diego Regional Plug-In Electric Vehicle Readiness Plan

SANDAG partnered with the Center for Sustainable Energy (CSE) to develop a comprehensive plug-in electric vehicle (PEV) readiness plan for the San Diego region. The SANDAG Board of Directors accepted the plan in January 2014, which addresses barriers to PEV adoption through best practices, resources, and recommendation. In order to inform the development of the Readiness Plan, CSE published a report in December 2012 assessing levels of preparation for PEV deployment among jurisdictions in the region.

San Diego Regional Clean Cities Coalition

The San Diego Regional Clean Cities Coalition is a federally-funded Department of Energy program, coordinated locally by Center for Sustainable Energy (CSE), with a goal to reduce the use of petroleum in transportation. The coalition works with vehicle fleets, fuel providers, community leaders, and other stakeholders in both the public and private sectors on efforts to increase use of alternative fuel and alternative fuel vehicles, as well as encourages measures to reduce vehicle idling and improve fuel economy. The coalition also promotes emerging transportation technology and related infrastructure (e.g., ethanol, biodiesel, hydrogen). The coalition's efforts are conducted primarily through planning, education, and outreach activities. One of the coalition's primary programmatic goals is to displace 8 billion gallons of petroleum in the transportation sector by 2020. Through the Energy Roadmap Program described above, the San Diego Regional Clean Cities Coalition provided an alternative fuel assessment tailored to La Mesa's fleet and vehicle replacement protocols.

The San Diego Foundation

The San Diego Foundation provides education and support to the region's communities in implementing climate change planning efforts through research, strategic investments, and collaboration with community leaders and policymakers. The Foundation also provides tools and technical assistance to help local governments plan for future climate change. The Foundation has prepared several regional reports on climate change, including:

- Focus 2050 Study for the San Diego Region (2008),
- Regional Public Opinion Research on Climate Change (2010),
- Climate Action Planning Progress in the San Diego Region (2013), and
- San Diego, 2050 Is Calling. How Will We Answer? (2014).

CITY OF LA MESA ACTIONS

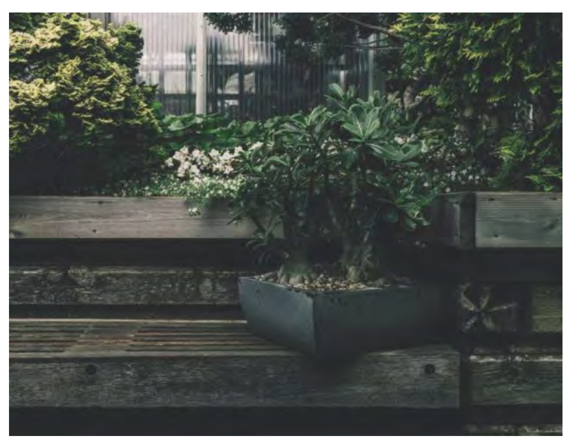
The strategies presented in this CAP build from the commitment of La Mesa's residents, local businesses, and City government to take actions that will improve the community's quality of life, while also reducing La Mesa's greenhouse gas emissions.

Past actions include:

- Completing various retrofit projects on municipal buildings, including replacing backup generators with more energy efficient units, replacing windows at the Community Center and Recreation Center, and updating office equipment with more energy-efficient options
- Installing high-efficiency induction street lights (2011) and retrofitting all traffic signals with green and red light emitting diode (LED) lights (2003)
- Retrofitting parking lot lighting with induction lamps that have digital timers for dusk-to-dawn control

- Adopting a Sustainable Building Policy that evaluates the feasibility of integrating sustainable building techniques into all new buildings

- Developing a mixed-use overlay zone that supports compact, infill development and pedestrian-oriented neighborhoods
- Implementing a Bicycle Facilities and Alternative Transportation Plan to identify infrastructure and pedestrian environment enhancements, “Safe Routes to Transit,” and opportunities for public education and outreach efforts on local bike routes and safe riding practices
- Improving fuel efficiency and reducing air pollution in municipal fleet vehicles and installing AIMS Fuelmaster devices on all emergency vehicles to monitor fuel consumption and identify maintenance issues
- Offering a backyard composting program allowing residents to purchase discounted bins
- Increasing construction and demolition (C&D) debris diversion requirements to 75% and requiring a C&D diversion deposit to encourage participation
- Participating in (PACE) financing districts that offer residents and businesses financing options for qualifying energy- and water-conservation improvements, including CaliforniaFirst (adopted by City Council by Resolution No. 2010-022); HERO (adopted by City Council by Resolution No. 2014-047); Figtree (adopted by City Council by Resolution No. 2015-019); and Ygrene Works (adopted by City Council by Resolution in 2015)
- Adopting a model water-efficient landscaping ordinance to reduce outdoor water use on City property through lawn removal projects and irrigation system upgrades



- Adoption of a Walkability Plan (2006). The purpose of the Plan was to create a broad, community-based vision and action plan to make La Mesa a more walkable community. The Plan set the stage for achieving the General Plan vision of creating a community in which residents can get around the City without a motor vehicle.
- Adoption of a Sidewalk Master Plan (2008)

- Adoption of the La Mesa Freeway Crossing Plan (2008), a report to improve mobility across freeways
- Implementation of the General Plan Complete Streets policy
- Adoption of the Parks Master Plan (2012). The document identifies access barriers to parks, areas of the City that are underserved by parks and open space, and potential opportunities for urban respite places, varied size parks or green space development, and creating pedestrian friendly paths from neighborhoods to parks. Community volunteers conducted walk audits throughout the City to identify and document the barriers that are included in the Plan.
- Development of the Urban Trails Mobility Action Plan (2016) to identify connecting urban trails to expand and provide additional options non-motorized access to transit, parks, recreation, retail, schools, and other key destinations to further promote walking, biking and transit to reduce traffic congestion and lower emissions.
- Since 2007, the City has invested $22 million dollars in grants for planning, infrastructure, education, and outreach to encourage and improve the City's walkability and bikeability.

La Mesa's CAP Approach

Scope and Content of the Climate Action Plan

The City of La Mesa's Climate Action Plan is a roadmap and a long range plan. The City's Climate Action Plan presents local La Mesa emissions levels and future estimates, establishes reduction targets, and outlines strategies to achieve those targets. La Mesa's CAP is presented in the following four chapters:

- **Chapter 1: Planning for Climate Change** provides an overview of the topics covered in the CAP. This chapter sets La Mesa's CAP within the context of statewide climate planning efforts and related regional initiatives, and presents a concise overview of conventional climate change science findings. The chapter also describes the City's climate action planning process and components found within the CAP. It also describes the relationship between the CAP and the California Environmental Quality Act (CEQA), including implementing the City's General Plan Environmental Impact Report (EIR) Mitigation Measure 4.5.5., GHG-1. The chapter concludes with a discussion on environmental justice.
- **Chapter 2: Greenhouse Gas Emissions** presents the community-wide baseline inventory and horizon year 2020 and 2035 forecasts to identify the sources of emissions within La Mesa. The chapter describes La Mesa's emissions reduction targets and how they compare to future emissions levels, and describes the level of emissions reductions estimated to occur as a result of the ongoing statewide actions described in Chapter 1. The combination of future emissions levels, assumed statewide reductions, and the City's targets

results in the emissions reduction gaps that are addressed through local actions described in Chapter 3.

- **Chapter 3: Emissions Reduction Measures** introduces the CAP's local reduction measures organized into five reduction strategy areas: energy, land use and transportation, water, solid waste, and green infrastructure. The chapter presents the reduction measures by first describing the City's related past actions, then describes what new steps will be taken. Emissions reduction estimates related to implementation of these local measures are provided, where possible, to help demonstrate how the combination of local and statewide actions will allow the City to achieve its emissions reduction targets.

- **Chapter 4: Benchmarks and Implementation** describes a process for monitoring the City's future progress towards emissions reduction target achievement. This chapter introduces the commitment of regular inventory updates as a means to track overall progress, as well as measure-specific review to guide revisions to the City's implementation strategy.

Technical appendices A, B, and C provide additional detail on topics covered within the plan.

- **Appendix A: Emissions Inventory and Forecast Methodology** provides a technical description of the methodology and data sources used to prepare the 2010 baseline emissions inventory and the 2020 and 2035 emissions forecasts.

- **Appendix B: Reduction Quantification Methodology** presents the assumptions and methodologies used to estimate the emissions reduction potential of the CAP measures.

- **Appendix C: Cost-Effectiveness and Benefit-Cost Analyses, and Implementation Cost Report** presents the results of an analysis that evaluates the CAP's implementation costs and return on investment per measure.

The CAP builds from the commitment of La Mesa's residents, local businesses, and City government to take actions that will improve the community's quality of life.

Relationship to the California Environmental Quality Act (CEQA)

Local governments may prepare a greenhouse gas reduction plan that can be used for CEQA review of subsequent plans and projects that are consistent with the GHG reduction strategies and targets in the plan.

This approach allows jurisdictions to:

- Address GHG emissions at a community-wide and municipal operations level to determine the most effective and efficient methods to reduce GHG emissions,
- Identify the reduction measures that would promote the goals of the General Plan, and
- Implement the reduction measures that have the most co-benefits (for improving mobility and access, local economic development, reducing household and business utility and transportation costs, improving public health, etc.).

This CAP was developed to implement the City's General Plan EIR Mitigation Measure. Specifically, the General Plan EIR includes Mitigation Measure 4.5.5., GHG-1, which requires adoption of a Climate Action Plan in conformance with CEQA Guidelines Section 15183.5 [3] and identifies a 15% reduction target. Recommended plan elements from CEQA Guidelines Section 15183.5(1) include establishing "… a level, based on substantial evidence, below which the contribution to greenhouse gas emissions from activities covered by the plan would not be cumulatively considerable." The City's 2020 CAP reduction target supports the State's AB 32 reduction target and is consistent with the 2008 Scoping Plan recommendation that local governments reduce communitywide and municipal operation emissions to a level approximately 15% below baseline levels by 2020. The CAP also includes a longer-term 2035 reduction target that is consistent with the State's own targets established under SB 32 (for 2030) and Executive Order S-3-05 (for 2050). As demonstrated in this CAP and the accompanying environmental document, this target would avoid cumulatively considerable contributions to the significant cumulative impact of climate change.

The City's Climate Action Plan will allow the City to analyze and mitigate the significant cumulative effects of GHG emissions at a programmatic level by adopting a plan for the reduction of GHG emissions. Once the CAP is adopted following environmental review, later projects that are consistent with the General Plan growth projections and land uses, upon which the GHG modeling is based, and the CAP measures and actions may tier from and/or incorporate the CAP by reference in their cumulative GHG impact analyses. The adoption of the CAP and associated environmental document will allow the use of these documents by future development projects to streamline project CEQA requirements. Consistency with the CAP is determined through the CAP Consistency Checklist. The Checklist in conjunction with the CAP provides a streamlined CEQA review process for proposed discretionary review projects.

[3] 15183.5. Tiering and Streamlining the Analysis of Greenhouse Gas - Emissions. https://govt.westlaw.com/calregs/Document/I872A68805F7511DFBF66AC2936A1B85A?viewType=FullText&originationContext=documenttoc&transitionType=CategoryPageItem&contextData=%28sc.Default%29

Social Equity / Environmental Justice

The City of La Mesa uses Community Development Block Grant (CDBG) funds for community development purposes that direct improvements that benefit lower-income households. The Community Development Block Grant (CDBG) program involves federal money granted to cities each year for a variety of community development activities. Federal regulations require that the majority of these funds provide verifiable benefits to lower-income households. The City will continue to use CDBG funds within the parameters of federal regulations to implement the Community Development and Housing Goals of the General Plan. Examples of CDBG programs include capital improvements and renovations in lower-income neighborhoods, public services to special needs populations including seniors, homeless people, and people affected by domestic violence, and fair housing services to ensure that La Mesa's housing environment is accessible to all types of households. The majority of CDBG program funds received by the City is directed to sidewalk and park improvements and will continue to be directed to eligible neighborhoods.

Senate Bill (SB) 1000, signed into law on September 24, 2016, amended Government Code Section 65302 to provide more specific guidance on addressing environmental justice in general plans. This bill is intended to improve local planning efforts to reduce disproportionate environmental and health impacts on California's most vulnerable residents and address the needs of overburdened and under-resourced neighborhoods. SB 1000 specifies that local agencies include an environmental justice element in their general plan or include environmental justice goals and policies throughout the seven mandatory general plan elements when a general plan update is adopted or when two or more general plan elements are revised on or after January 1, 2018. Using the State of California Office of Environmental Health Hazard Assessment (OEHHA) CalEnviroScreen, the City of La Mesa is not located in an underserved area.

SB 1000 also requires these updated general plans to identify objectives and policies to reduce the unique or compounded health risks in disadvantaged communities, identify objectives and policies to promote civil engagement in the public decision making process, and identify objectives and policies that prioritize improvements and programs that address the needs of disadvantaged communities.

The State of California Office of Planning and Research (OPR) released revised General Plan Guidelines on August 2nd, 2017. These Guidelines address environmental justice, but because SB 1000 passed after the public comment concluded for the draft General Plan Guidelines, OPR will be soliciting more focused feedback and will make additional guidance available in the coming year.[4] The Guidelines suggest that environmental justice can be addressed as a stand-alone element or integrated throughout various elements of a general plan. OPR highlights policies related to land use compatibility, public engagement, remediation, over-concentration of sources of hazardous materials, equitable distribution of services and resources, and transit-oriented development as a way to promote environmental justice in the draft Guidelines.[5] The City will address policies regarding social equity and environmental justice in future General Plan Updates consistent with SB 1000. In preparing a holistic approach to equity, the City will develop tracking and reporting metrics to determine progress and success of its environmental justice element. Updates of the Climate Action Plan will be consistent with the City's General Plan, including environmental justice related policies. The General Plan is scheduled to be updated in 2021 to include social equity and environmental justice elements. Following the General Plan update, the Climate Action Plan update in 2023 will include social justice tracking and reporting metrics.

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4 See OPR's website for more detail: https://www.opr.ca.gov/docs/Environmental_Justice_General_Plans.pdf

5 Governor's Office of Planning and Research (OPR). 2015. General Plan Guidelines – Draft for Public Comment. 2017 General Plan Guidelines: https://www.opr.ca.gov/docs/OPR_COMPLETE_7.31.17.pdf.

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CHAPTER 2

Greenhouse Gas Emissions

Although there are dozens of Greenhouse Gases (GHGs), State law defines GHG as being any of the following compounds: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen triflouride (NF_3).[6] The reduction of GHG emissions is the basis of the La Mesa CAP. Developing meaningful reduction measures and evaluating their ability to meet an emissions reduction target requires an understanding of baseline and future year community-wide emissions levels. This chapter describes the sources and scale of emissions generated by activities within La Mesa and how they are estimated to grow through the 2020 and 2035 target years. It also describes the City's emissions reduction targets, and how the statewide actions described in Chapter 1 help to make progress toward these targets. These steps provide the

[6] Source: California Health and Safety Code Section 38505(g).

Note: The six compounds listed were highlighted in the 2009 U.S. EPA Proposed Endangerment and Cause or Contribute Findings for GHGs under the Clean Air Act (Endangerment Finding) in the Federal Register. The Endangerment Finding is based on Section 202(a) of the CAA, which states that the EPA Administrator should regulate and develop standards for "emission[s] of air pollution from any class of classes of new motor vehicles or new motor vehicle engines, which in [its] judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare."

foundation for development of the locally-appropriate reduction measures described in Chapter 3 to address any remaining emissions reduction gap between the statewide actions and the City's targets.

GHG Emissions Inventory

Establishing a baseline inventory was the first step in developing the City's Climate Action Plan. The inventory provides a snapshot of the amount and sources of GHG emissions within the community. Baseline inventories can serve as a reference point to help determine appropriate emissions reduction targets, and indicate the types of measures to pursue in order to make meaningful progress towards those targets. This section introduces La Mesa's emissions sources and resulting contributions to the 2010 baseline inventory.

The City previously prepared a 2005 emissions inventory. As part of this CAP development process, a new baseline inventory was prepared using community-wide activity data from 2010 and current industry practices in inventory preparation. The underlying methodologies used to prepare the two inventories were substantially different, such that direct comparisons cannot be made between the 2005 and 2010 inventories.

Emissions Sectors

The baseline inventory organizes emissions into categories, or sectors, based on the source of emissions. La Mesa's inventory includes emissions from five sectors, which are described further below. The list is in order from highest to lowest emissions contribution:

- **Transportation**: Emissions associated with passenger cars; light-, medium-, and heavy-duty trucks; buses; mobile homes; and motorcycles.
- **Energy** (electricity and natural gas): Emissions from building energy use associated with electricity and natural gas in residential, commercial, and industrial buildings.
- **Solid Waste**: Emissions from the disposal of organic materials in landfills and community generated mixed waste from residences and business in the City.
- **Potable Water**: Emissions associated with the energy consumed during treatment, transport, and distribution of water.
- **Wastewater**: Fugitive emissions resulting from the treatment process for domestic sewage.

Details regarding sources and methodology for the emissions inventory can be found in Appendix A.

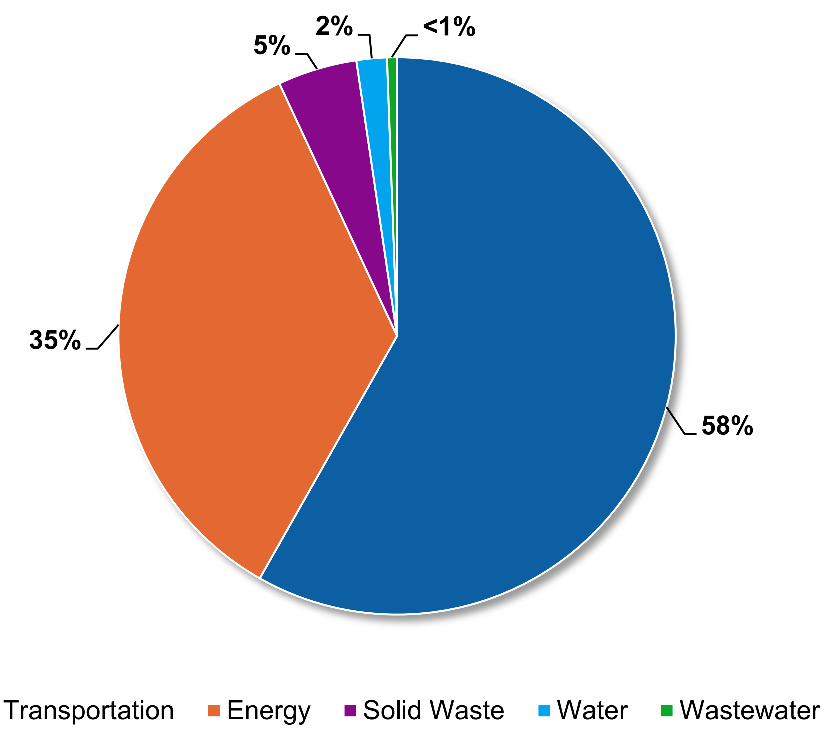
Residents, businesses, and organizations make daily choices that result in GHG emissions and may be beyond the influence of the City or the CAP. However, individual residents or businesses should not feel limited to only taking action within the identified strategies, which are focused on the City's inventoried emissions. Community members are encouraged to engage in a range of climate-friendly actions, such as purchasing locally-sourced foods and products to reduce transportation emissions or installing efficient or clean-energy appliances and equipment to lower energy-related emissions. The City's contribution to global climate change can be reduced through efforts at the individual level beyond what is described in the 2017 CAP.

La Mesa's Baseline Inventory (2010)

La Mesa is one of the most compact communities in the region. Its housing and employment densities are among the highest in San Diego with growth policies that encourage development along the transportation corridors. This compact development along with transportation infrastructure including three freeways, seven bus line and five trolley stations has led to a baseline greenhouse gas inventory significantly lower than that of the region. La Mesa was one of the first communities in the region to build transit oriented development projects.

La Mesa's baseline emissions inventory totals 422,672 MT CO_2e/yr in 2010. For context, San Diego County's 2010 emissions inventory was estimated to be 32 million MT CO_2e, or 10 MT CO_2e per capita compared to approximately 7.37 MT CO_2e per capita in 2010 in La Mesa.[7] As shown in Figure 2.1, transportation is the largest contributor of GHG emissions in the City (58%), with energy use contributing the majority of the remainder (35%). The transportation and energy sectors account for approximately 93% of total emissions, suggesting that local reduction efforts should focus on these areas. Solid waste emissions provide 5% of the inventory. Potable water and wastewater are both small contributors by comparison, making up the remaining 2% of the inventory. See Table 2.1 on the following page for total emissions from each sector.

Figure 2.1 – 2010 Baseline Emissions by Sector



Source: EPIC 2014, AECOM 2017

[7] Countywide emissions from the Energy Policy Initiatives Center, University of San Diego School of Law. 2013 (March). San Diego County Updated Greenhouse Gas Inventory. Population data from the California Department of Finance. 2014. Population and Housing Estimates for Cities, Counties, and the State, January 1, 2011-2014, with 2010 Benchmark.

Table 2.1 2010 Community-wide Emissions			
Emission Sector	**Subsector**	**Emissions (MT CO_2e/yr)**	**Community-wide Total (%)**
Transportation		**246,015**	**58.2%**
Energy		**147,309**	**34.9%**
Electricity Subtotal		*96,604*	*22.9%*
	Commercial	52,166	12.3%
	Residential	44,438	10.5%
Natural Gas Subtotal		*50,705*	*12.0%*
	Commercial	13,183	3.1%
	Residential	37,522	8.9%
Solid Waste		**19,465**	**4.6%**
Potable Water	Water Supply Demand	**7,442**	**1.8%**
Wastewater	Wastewater Treatment	**2,441**	**0.6%**
Total		**422,672**	**100.0%**
Total per Capita (MT CO_2e/capita/yr)		**7.37**	

Source: EPIC 2015, AECOM 2017

Note: MT CO_2e = metric tons of carbon dioxide equivalent

La Mesa's baseline inventory can serve as a reference point to help determine appropriate emissions reduction targets.

Emissions Forecasts

The baseline inventory was used to develop community-wide emissions forecasts for 2020 and 2035. Emissions forecasts provide insight regarding the scale of reductions necessary to achieve the City's emissions targets. The 2020 forecast year provides consistency with AB 32. The 2035 forecast year corresponds with the City's General Plan horizon year.

Emissions were first forecast assuming the same historical trends in energy and water consumption and solid waste and wastewater generation will remain the same in the future on a per unit basis (i.e., per resident). Transportation sector forecasts were developed using SANDAG's Vehicle Miles Traveled (VMT) forecasts for La Mesa, and then quantified based on ARB's EMFAC2014 model, which incorporates statewide transportation sector GHG reduction programs. Statewide energy sector GHG reduction programs, including RPS and AB 1109 described in Chapter 1, were then incorporated into the emissions forecasts (Appendix B- Forecasts Methodology).

The emissions forecasts provide insight regarding the scale and source of local reductions necessary to achieve the City's GHG targets. They represent a best estimate at the time of preparation for the City's future emissions levels.

One important variable influencing the forecasts is projected population growth within the City, which was based on forecasts by SANDAG. The other variables include the VMT estimates prepared by SANDAG, and the success of statewide action implementation, including the transportation programs included in EMFAC2014, SDG&E's plans for compliance with the RPS, and continued implementation of lighting efficiency improvements described in AB 1190. The City will need to update the inventory to compare against the CAP's forecast emissions levels, in order to verify near-term target achievement. Periodic inventory updates after the 2020 target year will be required to track progress toward the 2035 target. Regular emissions inventory updates will help to assess interim progress and identify opportunities for CAP strategy revisions. The City's schedule for inventory and CAP updates is outlined in Measure I-2 of Chapter 3.

Table 2.2 shows La Mesa's community-wide emissions by sector in 2010, 2020, and 2035. Emissions are forecast to decrease by 46,530 MT CO_2e/yr (-11.0%) between 2010 and 2020, and decrease by 81,625 MT CO_2e/yr (-19.3%) between 2010 and 2035. The declining emissions forecasts are a result of statewide actions influencing the City's transportation and electricity emissions. All other emissions sources are forecast to increase based on population and employment growth in the City. See Appendix A for further description of how the emissions forecasts were estimated.

Table 2.2 Community-wide Emissions with State Reductions (2010, 2020, and 2035)			
Emission Sector	**2010 Emissions ($MT\ CO_2e/yr$)**	**2020 Emissions ($MT\ CO_2e/yr$)**	**2035 Emissions ($MT\ CO_2e/yr$)**
Transportation	**246,015**	**228,852**	**180,449**
Energy	**147,309**	**115,992**	**126,290**
Electricity Subtotal	*96,604*	*61,831*	*66,918*
Commercial	52,166	33,889	36,577
Residential	44,438	27,943	30,340
Natural Gas Subtotal	*50,705*	*54,161*	*59,372*
Commercial	13,183	14,082	15,437
Residential	37,522	40,079	43,935
Solid Waste	**19,465**	**20,741**	**22,736**
Potable Water	**7,442**	**7,949**	**8,714**
Wastewater	**2,441**	**2,607**	**2,858**
Total	**422,672**	**376,142**	**341,047**
Change from 2010 (total)	**-**	**-46,530**	**-81,625**
Change from 2010 (%)	**-**	**-11.0%**	**-19.3%**

Source: EPIC 2015; AECOM 2017

Note: MT CO_2e = metric tons of carbon dioxide equivalent; Columns may not sum to total shown due to rounding

Emissions Reduction Targets

Following preparation of an emissions inventory and forecasts, the next step in the CAP development process is to establish reduction targets. A CAP's primary goal is to reduce GHG emissions and the reduction targets serve as the pathway toward that effort. Establishing clear, attainable, and enforceable targets can help guide long-term strategies, and increase transparency and accountability regarding the CAP's objectives. In the case of La Mesa, the 2020 reduction target was selected to implement the City's General Plan EIR Mitigation Measure 4.5.5, GHG-1 (which calls for a CAP and a 15% GHG reduction). This mitigation measure was also developed to ensure consistency with State guidance provided in AB 32. While not legally required to adopt a 2035 target, the City established a 2035 reduction target to demonstrate local commitment to the State's longer-term GHG targets (i.e., SB 32, EO-S-3-05), while aligning with the City's General Plan horizon year.[8]

State Legislation and Guidance

There are many options for the City to consider in selecting a reduction target that is consistent with State directives. Executive Order S-3-05 established a long-range GHG reduction target of 80% below 1990 levels by 2050. Subsequently, AB 32, the California Global Warming Solutions Act of 2006, was signed,

[8] State of California Governor's Office of Planning and Research. 2017 General Plan Guidelines. Chapter 8, p. 227-228, July 2017. Available: http://www.opr.ca.gov/docs/OPR_COMPLETE_7.31.17.pdf.

which includes an interim reduction target, requiring California to reduce *statewide* GHG emissions to 1990 levels by 2020.

AB 32 also directed ARB to develop and implement regulations that reduce statewide GHG emissions. ARB approved *The Climate Change Scoping Plan* (Scoping Plan) in December 2008. This document outlines the State's plan to achieve the GHG reductions required by AB 32. The Scoping Plan does not define the specific role local governments, like the City of La Mesa, will play in meeting the State's GHG reduction goals, but does identify cities and counties as "essential partners" within the overall statewide effort.

After the passage of AB 32, many cities and counties began to assess local GHG contributions and develop community-focused CAPs. However, many local governments do not have sufficient historical data available to prepare a 1990 baseline emissions inventory, which would allow local governments to establish reduction targets that exactly match the State's own targets. ARB provided guidance in the Scoping Plan to assist in developing climate action plans that are consistent with the State mandates, encouraging "local governments to adopt a reduction goal for municipal operations emissions and move toward establishing similar goals for community emissions that parallel the State commitment to reduce greenhouse gas emissions by approximately 15% from current levels by 2020."[9] Based on this language, many cities preparing community-wide CAPs have selected a reduction target of at least 15% below baseline levels by 2020 to parallel the State's target. Increasingly, jurisdictions are also establishing longer-term targets consistent with the State's 2030 target of 40% below 1990 levels and the 2050 goal of 80% below 1990 levels.

There is no guidance directing the City to choose a specific longer-term emissions target. ARB's *2017 Climate Change Scoping Plan Update* (Scoping Plan Update) recommends per-capita emissions targets for local communities for 2030 and 2050. As cited in the Scoping Plan Update under "Recommended Local Plan-Level Greenhouse Gas Emissions Reduction Goals":

> *This local government-recommended goal expands upon the reduction of 15 percent from "current" (2005–2008) levels by 2020 previously recommended in the 2008 Scoping Plan. This is a statewide goal based on all emissions sectors in the State, and local jurisdictions may choose to derive region- specific evidenced based on per capita GHG emissions goals tied to these statewide goals. CARB recommends that local governments aim to achieve community-wide goal to achieve emissions of no more than six metric tons CO_2e per capita by 2030 and no more than two metric tons CO_2e per capita by 2050.*[10] *Per capita and mass emissions goals are consistent with the statewide emissions limits established in AB 32, SB 32, SB 391,*[11] *and Executive Order S-3-05 and B-30-15.*[12]

[9] California Air Resources Board. Climate Change Scoping Plan: a Framework for Change. December 2008. Available: http://www.arb.ca.gov/cc/scopingplan/document/adopted_scoping_plan.pdf.

[10] These goals are appropriate for the plan level (city, county, subregional, or regional level, as appropriate), but not for specific individual projects because they include all emissions sectors in the State.

[11] http://www.leginfo.ca.gov/pub/09-10/bill/sen/sb_0351-0400/sb_391_bill_20091011_chaptered.html

[12] ARB's 2017 Climate Change Scoping Plan: https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf

LA MESA'S EMISSIONS REDUCTION TARGETS

Because of pre-existing compact employment and housing characteristics, La Mesa has a baseline greenhouse gas level lower than that of the rest of the San Diego region. Land use policies that promote development along the transit corridors have created the foundation to further limit greenhouse gases. La Mesa is also a substantially built out community. These factors could temper the City's ability to reduce emissions but it also does not have as far to go.

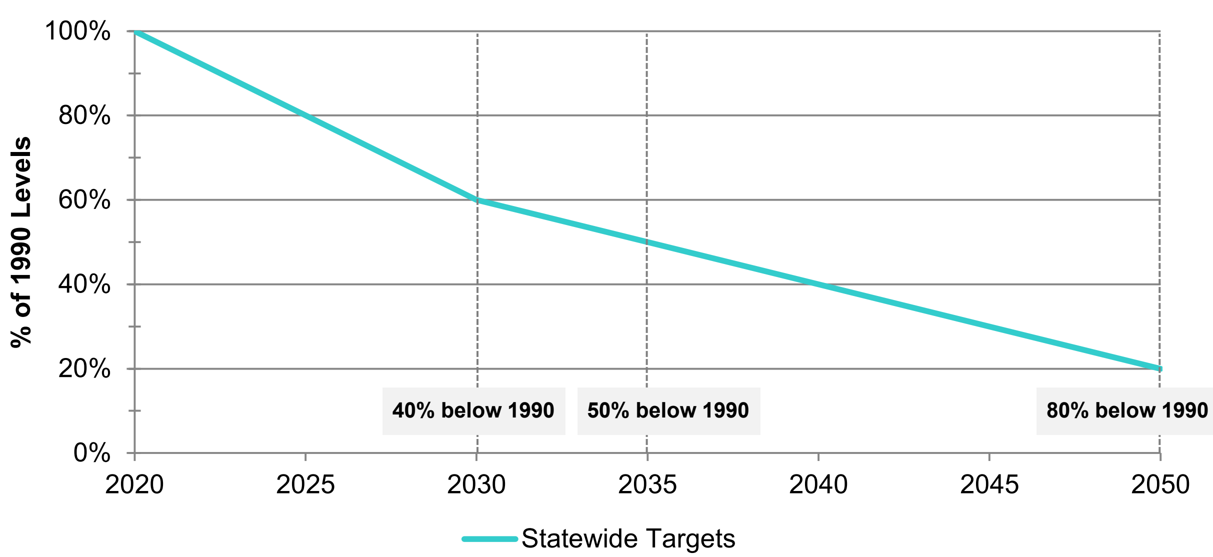
La Mesa is implementing the 2020 target pursuant to the General Plan Mitigation Measure to reduce baseline emissions by 15% by 2020. This level of reduction is consistent with the State's target to reduce statewide emissions to 1990 levels by 2020. The City's 2035 target is consistent with the State's longer-term goals expressed in SB 32 for 2030 and in Executive Order S-3-05 for 2050. La Mesa's CAP also includes a proposed 2050 target to be consistent with ARB's Scoping Plan Update.

La Mesa has chosen a GHG reduction target for 2035 because that is the General Plan horizon year. Existing programs and characteristics of the City (for example, a substantially built out City with transit service) have led to relatively low rates of existing GHG emissions in La Mesa, when measured on a per capita basis. La Mesa's 2010 baseline emissions level is 7.37 MT CO_2e per capita, while San Diego County's is 10 MT CO_2e per capita.

The 2035 target approach allows the City to acknowledge its existing emissions efficiency, while still establishing a target that requires thoughtful local action toward achievement, consistent with the policy framework established in the City's General Plan, and consistent with the State's SB 32 and Executive Order S-3-05 goals.

The State does not have a specific target for 2035, but instead has targets for 2020, 2030 and 2050, which can be interpolated to derive a corresponding 2035 target. If the State were to establish a target for 2035 based on SB 32 and Executive Order S-3-05, it could be interpolated as a reduction of 50% below 1990 levels as shown in Figure 2.2.

Figure 2.2 – Statewide Emissions Target Trajectory



However, since La Mesa does not have a 1990 baseline inventory as is used in the State's GHG target setting, the State target needs to be recalculated using a 2010 baseline to correspond to La Mesa's baseline inventory. In doing so, La Mesa can establish a local GHG target that is consistent with the State GHG targets.

Based on Figure 2.2, the State target for 2035 would be 213,500,000 MT CO_2e/yr (50% below 1990 levels).[13] The State's emissions in 2010 totaled 449,590,000 MT CO_2e/yr.[14] Therefore, the 2035 target would represent a 53% reduction from 2010 levels. Since La Mesa developed a 2010 baseline inventory, a reduction in emissions of 53% below baseline levels by 2035 would be consistent with State targets.[15]

The California Air Resources Board (ARB) recommends that local governments aim to achieve community-wide emissions of no more than six metric tons CO_2e per capita by 2030 and no more than two metric tons CO_2e per capita by 2050. This is a statewide goal based on all emissions sectors in the state, and local jurisdictions may choose to derive region-specific, evidenced based goals on per capita or per service population.[16] La Mesa's 2010 baseline emissions rate is 7.37 MT CO_2e per capita. Based on the above, La Mesa has chosen a 2035 target that is 53% below its 2010 baseline emissions rate, which equals 3.46 MT CO_2e per capita or 237,640 MT CO_2e.[17]

Table 2.3
La Mesa's Emissions Reduction Target Selection Basis

Target Year	Target Description	Target Basis
2020	15% below 2010 baseline levels	Based on General Plan EIR Mitigation Measure 4.5.5
2035	3.46 MT CO_2e per capita	SB 32 and EO-S-3-05 set statewide mass emissions targets of 40% below 1990 levels by 2030 and 80% below 1990 levels by 2050. A 2035 target value between these two points would require GHG reductions of 50% below 1990 levels. A 50% reduction below 1990 levels is equivalent to a 53% reduction below 2010 levels. A 53% reduction below La Mesa's 2010 baseline of 7.37 MT CO_2e per capita is 3.46 MT CO_2e per capita.

[13] This value is based on a 50% reduction below the State's original 2020 emissions limit of 427 million MT CO_2e. Available: https://www.arb.ca.gov/cc/inventory/1990level/1990archive.htm

[14] California Air Resources Board. California Greenhouse Gas Inventory for 2000-2011 by IPCC Category, based upon IPCC Second Assessment Report Global Warming Potentials. Available: https://www.arb.ca.gov/cc/inventory/pubs/reports/2000_2011/ghg_inventory_ipcc_00-11_sum_2013-08-01.pdf

[15] The calculations supporting a 53% reduction below 2010 levels are based on the State's original 2020 emissions limit and 2010 inventory, which were calculated using global warming potential values from the Second Assessment Report. In 2014, ARB revised the 2020 emissions limit and the previous statewide emissions inventories based on global warming potential values from the IPCC's Fourth Assessment Report. The result is a new 2020 emissions limit of 427 million MT CO_2e and a revised 2010 inventory of 446.1 million MT CO_2e, which corresponds to a reduction of 52% below 2010 levels by 2035. However, the City of La Mesa has selected the more aggressive of these two options as its 2035 GHG target (i.e., 53% below 2010 levels).

[16] California Air Resources Board. *The 2017 Climate Change Scoping Plan Update.* January 2017, pg. 133. Available: https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf

[17] Based on projected population of 68,682 in 2035.

Table 2.3 La Mesa's Emissions Reduction Target Selection Basis		
Target Year	**Target Description**	**Target Basis**
2050	2.0 MT CO_2e per capita	ARB's 2017 Climate Change Scoping Plan Update sets a 2050 efficiency target of no more than 2.0 MT CO_2e per capita. The City will revisit this target during future CAP updates based on future guidance for local governments.

Note: Per capita = resident population

Table 2.4 summarizes La Mesa's emissions forecasts based on statewide reductions, emissions reduction targets, and the remaining emissions reduction gaps to be addressed through implementation of local actions to achieve the targets.

Table 2.4 2020 Emissions Reduction Target		
	2020 (MT CO_2e/yr)	**2035 (MT CO_2e/yr)**
Emissions Forecast (including statewide reductions)	376,142	341,047
La Mesa Emissions Reduction Target	359,271	237,640[1]
Local Action Reductions Needed to Achieve Target	**16,871**	**103,407**

[1] 3.46 MT CO_2e/per capita with projected resident population of 68,682 in 2035

Calculation of La Mesa's GHG Targets

2020 – 359,271 MT CO_2e/yr

Based on the 2010 emissions inventory of 422,672 MT CO2e/yr, the 2020 mass emissions reduction target is 359,271 MT CO_2e/yr (15% below baseline emissions levels by 2020):

- 422,672 MT CO2e/yr x (1.0 - 0.15) = **359,271 MT CO2e/yr**

The local reductions needed to achieve the 2020 target is the difference between the 2020 emissions forecast of 376,142 MT CO_2e/yr and the 2020 GHG target of 359,217 MT CO_2e/yr:

- (376,142 MT CO2e/yr) - (359,271 MT CO2e/yr) = **16,871 MT CO2e/yr**

2035 – 3.46 MT CO_2e per capita (237,640 MT CO_2e/yr)

The 2035 target of 3.46 MT CO_2e per capita/yr (or 237,640 MT CO_2e/yr) represents a 53% reduction in per capita emissions below La Mesa's 2010 emissions level of 7.37 MT CO_2e per capita/yr. The 53% reduction value is calculated based on the State's 1990 emissions level (431,000,000 MT CO_2e/yr), 2010 emissions level (449,590,000 MT CO_2e/yr), and interpolated 2035 GHG target of 213,500,000 MT CO_2e/yr (i.e., 50% below 1990 levels):

- (449,590,000 MT CO_2e/yr) - (213,500,000 MT CO_2e/yr) = 236,090,000 MT CO_2e/yr
  - (236,090,000 MT CO_2e/yr) / (449,590,000 MT CO_2e/yr) = 53%

- 7.37 MT CO_2e per capita/yr * (1.0 - 0.53) = **3.46 MT CO_2e per capita/yr**
    - 3.46 MT CO_2e per capita/yr = **237,640 MT CO_2e/yr**

The local reductions needed to achieve the 2035 target is the difference between the 2035 emissions forecast of 341,047 MT CO_2e/yr and the 2035 target of 237,640 MT CO_2e/yr:

- (341,047 MT CO_2e/yr) - (237,640 MT CO_2e/yr) = **103,407 MT CO_2e/yr**

Note: See the footnotes on page 30 for additional explanation of calculations and sources.

2050 Emissions Planning

Executive Order S-3-05 established a long-term GHG goal of 80% below 1990 levels by 2050. This goal has not yet been codified into State law. The Scoping Plan Update recommends that local governments "aim to achieve a community-wide goal [sic] to achieve emissions…of no more than two metric tons CO_2e per capita by 2050."[18] Although there are no requirements for a local government to plan for a 2050 GHG target, the 2035 selected target approach described also allows the City to demonstrate a trajectory toward the State's 2050 reduction target, as recommended in the Scoping Plan Update for community-wide GHG reduction programs.

The emissions forecasts provided in this CAP align with the City's General Plan horizon year of 2035. As such, this planning horizon also covers the State's two codified GHG emissions goals adopted through AB 32 (i.e., return to 1990 emissions levels by 2020) and SB 32 (achieve emissions reductions 40% below 1990 levels by 2030). The CAP also includes a 2050 GHG target, which helps to put the City's 2020 and 2035 GHG targets into context (i.e., the 2020 and 2035 targets establish a trajectory toward achievement of a long-term 2050 target). However, the CAP does not attempt to estimate the community's GHG emissions forecasts or GHG reduction opportunities through the 2050 target.

Preparing long-term emissions forecasts through 2050 and estimating the reduction potential from statewide and local actions is highly speculative at this time, and can be more thoroughly addressed through future CAP updates, as outlined in Chapter 4. Several variables will influence long-term emissions growth in the community, as well as opportunities for emissions reductions, including:

- The State's continued role in implementing policies and programs that result in local GHG reductions. The Scoping Plan Update provides an outline for State action through the SB 32 target year of 2030; ARB may prepare additional Scoping Plan updates to address the State's 2050 GHG target.
- New technology that supports additional emissions reductions. Existing technologies may also become more cost-effective and lead to greater than expected implementation.

[18] California Air Resources Board. The *2017 Climate Change Scoping Plan Update*, pg. 133. January 20, 2017. Available online at: <https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf>

- New sources of emissions or increased consumption rates in existing sectors. For example, as use of personal electronics, such as smartphones and tablets, increases emissions from electricity plug-load may also increase.
- Faster or slower local population growth upon which emissions forecasts are based.

CAP Measure I-2 CAP Implementation and Monitoring provides direction on how to ensure the CAP analysis and direction are kept up to date. Implementation Action 5 within that measure calls for CAP updates on a five-year cycle. These regular updates will include, in part, inventory and projection updates, and potentially development of longer-term emissions forecasts to 2050 or another horizon year. Chapter 4 of the CAP also provides additional detail on CAP maintenance and revisions.

California Environmental Quality Act (CEQA) Guideline for Project Tiering

This Climate Action Plan (CAP) implements General Plan EIR Mitigation Measure 4.5.5, GHG-1, which commits the City to preparation of a CAP with a 15% reduction target. This CAP was also developed consistent with State guidelines that pertain to local plans "for the reduction or mitigation of GHG emissions" (pursuant to SB 97 and CEQA Guidelines Section 15183.5). La Mesa's CAP has been developed consistent with CEQA Guidelines Section 15183.5, and the City can use the CAP rather than project-level analysis for GHG emissions impact assessment under CEQA. CEQA Guidelines Section 15183.5 establishes the criteria for GHG reduction plans. In general, GHG reduction plans:

- Quantify GHG emissions within a defined area,
- Establish a level where GHG emissions are not cumulatively considerable,
- Identify emissions from activities covered by the plan,
- Specify measures to achieve the emissions reduction goal,
- Monitor progress and amend if necessary, and
- Be adopted in a public process following environmental review.

Section 15183.5(b)(1)(B) establishes that a GHG reduction target will "[e]stablish a level, based on substantial evidence, below which the contribution to [GHG] emissions from activities covered by the plan would not be cumulatively considerable." The CAP describes development of the City's 2020 and 2035 reduction targets, detailing their consistency with State legislation and executive orders, and establishing that meeting the reduction targets would avoid cumulatively considerable effects.

CHAPTER 3

Emissions Reduction Measures

This chapter presents the City of La Mesa's emission reduction strategies, including goals, measures, and action steps, that La Mesa City staff and community members will implement to reduce community-wide GHG emissions and achieve the City's 2020 and 2035 reduction targets. The targets are to achieve 15% below the 2010 baseline by 2020 and 3.46 MT CO_2e/per capita by 2035. To better ensure proper implementation, each measure includes a brief description, development background information, and lists necessary actions, as well as anticipated reductions from implementation of the measure.

The measures identified in this chapter address issues within the City's direct influence, and have primarily been selected to influence emissions reductions within the community. The City will evaluate effectiveness of CAP measures and actions on an ongoing basis and propose program modifications, if necessary, to achieve reduction targets.

The following sections describe the structure and components of the five reduction strategy areas:

- Energy,
- Transportation and land use,
- Water,
- Solid waste, and
- Green infrastructure.

Emissions Reduction Strategy Areas

The community has provided extensive input on the list of reduction measures. Each strategy area comprises a collection of legally binding and enforceable reduction measures to the maximum extent of the law related to a certain emissions source area or topic. These strategies represent the primary avenues through which La Mesa will reduce community-wide emissions. As described in Chapter 1, this document focuses on achievement of the City's 2020 and 2035 emissions targets. Future inventory and CAP updates may indicate that additional reduction strategies should be developed to help achieve the City's GHG targets. The emission reduction strategies are as follows:

- **Energy Strategy:** requires implementation of programs to increase energy efficiency in existing buildings and outdoor lighting, as well as increase use of renewable energy sources.
- **Transportation and Land Use Strategy:** requires implementation of multi-modal transportation options, including walking, biking, and transit through land use, design, infrastructure development, and demand management. This strategy also lays the foundation for future transitions toward alternative-fueled vehicles.
- **Water Strategy:** requires the efficient use of water in buildings and landscapes.
- **Solid Waste Strategy:** increases diversion of waste materials that can be composted, recycled, or otherwise beneficially reused.
- **Green Infrastructure Strategy:** presents a strategy for long-term growth, management, and health of the City's existing and future urban forest.

Each strategy section in this chapter begins with an introduction linking it to emissions generation and reduction opportunities. The introductory overview is then followed by the specific measures and actions to guide implementation of the CAP's programs.

Reduction Measures

The reduction measures presented under each strategy in this chapter were developed by:

(a) Evaluating existing community conditions,

(b) Identifying emission reduction opportunities within the community,

(c) Including best practices from other jurisdictions and organizations, and

(d) Incorporating State and regional laws, guidelines, and recommendations.

Table 3.1 summarizes La Mesa emissions reduction strategies and measures, and quantifies the emissions reductions anticipated from their implementation, as described later in this chapter. Total emissions reductions are compared to the City's reduction targets to show how implementation of this CAP will allow the City to achieve the 2020 and 2035 emissions targets.

Some measures in Table 3.1 do not include numeric reduction estimates, but are identified as "Supporting." These measures cannot be separately quantified at this time for several reasons. For example, supporting data or a quantification methodology are not currently available. Or, the emissions reductions have been included within the estimate of another measure and cannot be calculated separately (e.g., bicycle safety programs and supporting infrastructure are both important to increase ridership). Though not quantified at this time, supporting measures are presented in the La Mesa climate action plans because they broadly contribute to achievement of reduction targets and help lay the foundation for even greater emissions reductions over the long term.

Similarly, some measures show no reduction values for 2020 because implementation is assumed to begin after the 2020 target year. In instances where there is no 2035 reduction value, it is assumed that the corresponding measures are replaced after the 2020 target year with a new reduction measure. For example, measures SW-1 Food Scrap and Yard Waste Diversion and SW-2 Construction and Demolition Waste Diversion would provide reductions in 2020, and would then be replaced by measure SW-3 75% Waste Diversion Strategy for the 2035 target year.

Figure 3.1 illustrates the La Mesa CAP measure reductions by sector.

Figure 3.1 – CAP Reductions by Sector

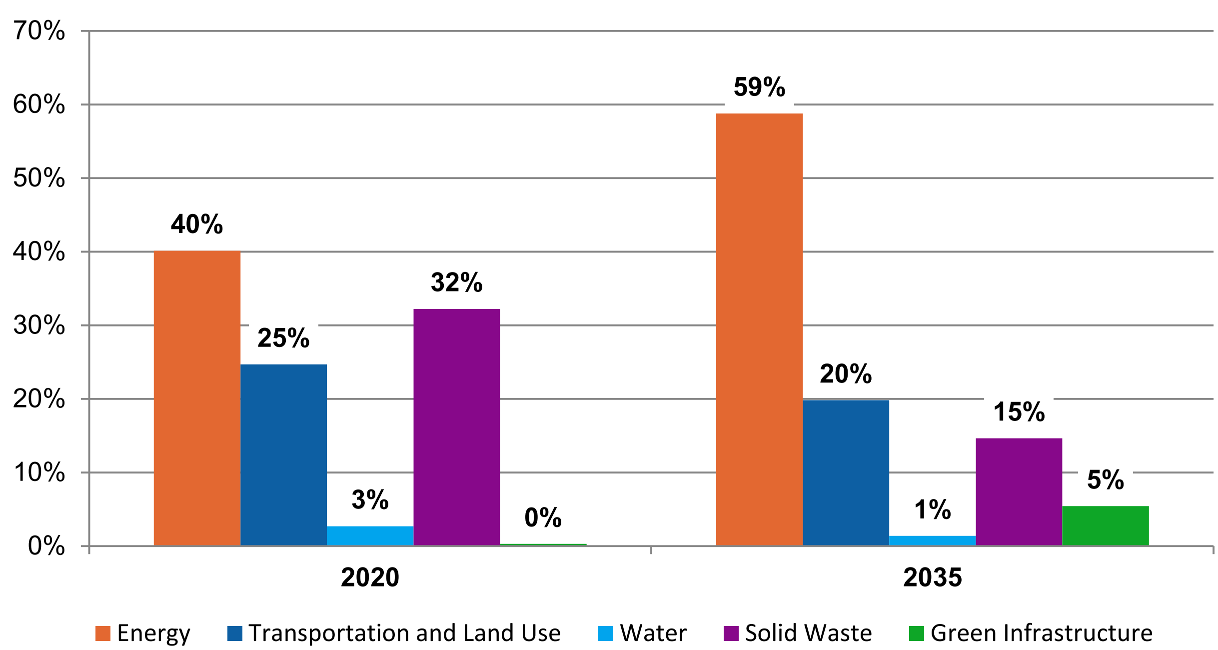


Table 3.1 Summary of Measures and Quantified Reductions					
Reduction Strategies and Measures		2020		2035	
		MT CO_2e/yr	% of Local Reductions	MT CO_2e/yr	% of Local Reductions
ENERGY					
E-1	Building Retrofit Program	4,200	25%	17,810	15%
E-2	Shade Tree Program	<1	<1%	10	<1%
E-3	Municipal Energy Efficiency Goal	30	<1%	60	<1%
E-4	Public Lighting	170	1%	170	<1%
E-5	Solar Photovoltaic Program	2,350	13%	4,660	4%
E-6	Solar Hot Water Heater Program	30	<1%	30	<1%
E-7	Solar Ready Construction	*Supporting*			
E-8	Zero Net Energy Construction	-	-	8,470	7%
E-9	100% Clean Energy CCA Program	-	-	37,240	32%
	Energy Subtotal	**6,780**	**40%**	**68,450**	**59%**
TRANSPORTATION and LAND USE					
T-1	Bicycle and Pedestrian Infrastructure Development	50	<1%	50	<1%
T-2	Bicycle Safety Program	*Supporting*			
T-3	Transportation Demand Management Program	2,152	12%	2,720	2%
T-4	Mixed-Use and Transit-Oriented Development	1,890	11%	19,750	17%
T-5	Alternative Refueling Infrastructure Development	150	1%	550	<1%
T-6	Municipal Fleet Transition	10	<1%	10	<1%
	Transportation Subtotal	**4,252**	**25%**	**23,080**	**20%**
WATER					
W-1	Urban Water Management Plan Programs	450	3%	1,590	1%
W-2	Water Sensitive Landscape Design and Irrigation	*Supporting*			
W-3	Pure Water Program	*Supporting*			
	Water Subtotal	**450**	**3%**	**1,590**	**1%**

Table 3.1
Summary of Measures and Quantified Reductions

Reduction Strategies and Measures		2020 MT CO_2e/yr	2020 % of Local Reductions	2035 MT CO_2e/yr	2035 % of Local Reductions
SOLID WASTE					
SW-1	Food Scrap and Yard Waste Diversion	2,010	12%	-	-
SW-2	Construction and Demolition Waste Diversion Program	3,340	20%	-	-
SW-3	75% Waste Diversion Goal	-	-	17,050	15%
	Solid Waste Subtotal	**5,350**	**32%**	**17,050**	**15%**
GREEN INFRASTRUCTURE					
GI-1	Urban Forest Master Plan	50	<1%	-	-
GI-2	Expanded Urban Forestry Program	-	-	6,300	5%
	Green Infrastructure Subtotal	**50**	**<1%**	**6,300**	**5%**
TOTAL		**16,876**	**100%**	**116,470**	**100%**

TARGET ACHIEVEMENT	2020	2035
Reduction Target	15% below baseline[1]	3.46 MT CO_2e per capita
Reduction Target	359,271 MT CO_2e/yr	237,640 MT CO_2e/yr
Reductions Needed	16,871 MT CO_2e/yr	103,407 MT CO_2e/yr
Reductions Estimated[2]	16,876 MT CO_2e/yr	116,470 MT CO_2e/yr
Estimated Achievement Level[2]	**15% below baseline[1]**	**3.27 MT CO_2e per capita[3]**
Estimated Mass Emissions Level[2]	**359,266 MT CO_2e/yr**	**224,577 MT CO_2e/yr**

Source: AECOM 2017

Notes: MT CO_2e = metric tons of carbon dioxide equivalent

[1] 2010 baseline level: 422,672 MT CO_2e/yr

[2] Estimates and assumptions are conservative and based on the best available data at the time of CAP development, and could underestimate the actual potential for GHG emissions reductions compared to what may actually occur.

[3] Estimated mass emissions level (224,577) / 2035 population estimate (68,682) = 3.27

Measure Structure

CAP measures describe the programs, policies, projects, and other actions the City will carry out to accomplish its emissions reduction goals, including reductions attributed to past actions that occurred since the 2010 baseline year. Each measure presented in this chapter describes its relationship to local emissions reduction opportunities, related actions previously taken by the City or community members, and future actions that the City will lead during the CAP implementation process. These narrative descriptions are followed by measure implementation tables that summarize the actions to be taken, departments responsible during implementation, a recommended timeframe to guide implementation prioritization, and progress indicators to help gauge future achievement of measure objectives. The following summaries describe these measure components in more detail.

Measure Number and Title

The measure numbers and titles are provided for easy reference and match those shown in Table 3.1 above. The numbers and titles are color coded to indicate the measure's overarching strategy area:

- **Energy**
- **Transportation and Land Use**
- **Water**
- **Solid Waste**
- **Green Infrastructure**

Measure Statement

The measure statement is a one to two sentence description of the action to be taken. The statements expand upon the concept indicated in the measure title, but are not as detailed as the action steps presented later.

GHG Reduction Potential

Annual emissions reduction estimates from measure implementation are provided, where possible. As described above, measures identified as "Supporting Measure" contribute to implementation of other measures, and may provide additional emissions reductions that cannot be accurately quantified at this time.

MEASURE DESCRIPTIONS

A narrative text provides details about how the measure can reduce emissions, past City and community efforts related to measure implementation, potential sources for funding and additional technical support, and future actions to be taken.

IMPLEMENTATION TABLES

The tables following the measure descriptions summarize the actions to be taken, designate responsibility among City departments, indicate an implementation timeline, and provide progress indicators to track implementation success. Details will be defined through a CAP implementation plan to be prepared within one year of CAP adoption and will include specific dates for implementation of CAP Actions.

Actions and Responsibility

Actions identify specific steps that the City and its partners will take to implement each measure in order to realize the emissions reduction estimates. The tables also identify the City departments that are best positioned to lead or provide input for implementation of certain tasks.

Timeline

The timeline column indicates when each action will occur, from the date of Climate Action Plan adoption, using the following four timeframes, and can be used to help prioritize the City's actions over the next five years:

- **On-going** items are actions the City is already performing or programs the City is already offering that will continue into the future.
- **Near-term** items are actions to be pursued immediately, within 2 years, following CAP adoption.
- **Medium-term** items are actions that help to achieve the 2020 reduction target, and are pursued within 5 years, following CAP adoption.
- **Long-term** items are actions that help provide broader measure implementation, but are not critical for near-term reduction target success; these items include actions that can be started now and will take 5 or more years to complete, or can wait for implementation in 5+ years.

Progress Indicators

Progress indicators describe the specific action that is being quantified to estimate the reduction potential. These indicators enable City staff, the City Council, and the public to track implementation and monitor overall CAP progress. Progress indicators are provided for the 2020 and 2035 target years, and are specifically described when possible (e.g., 1 million kWh/yr saved from building energy retrofits). Progress indicators are not provided for supporting measures, which do not have quantifiable emissions reductions. Actual tracking of progress indicators will require City Departments to establish or enhance data collection practices, and build information-sharing relationships with various agencies and organizations.

CAP measures describe the programs, policies, projects, and other actions the City of La Mesa will carry out to accomplish its emissions reduction goals.

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NO PARKING FIRE LANE

Energy Strategy

As presented in Chapter 2, the consumption of electricity for appliances, lighting, and cooling, and combustion of natural gas for heating, cooking, and other processes within residential, commercial, and industrial buildings generated approximately one-third of La Mesa's community-wide GHG emissions in 2010. These emissions can be reduced by improving energy efficiency in new and existing buildings and increasing the amount of electricity and heat generated from renewable energy sources.

In La Mesa, approximately 80%[19] of the housing stock was built before California's energy code, Title 24 Part 6, was first adopted in 1978. Consequently, the building stock offers considerable opportunity for cost-effective energy efficiency retrofits to decrease the use of both electricity and natural gas. The City plans to achieve energy efficiency improvements in both existing and new buildings and lighting through:

- a combination of new community-wide programs,
- continuation or enhancement of existing efforts, and
- additional public outreach and education.

In the *2007 Integrated Energy Policy Report*, the California Energy Commission (CEC) adopted a goal to achieve net zero energy buildings in new residential construction by 2020 and non-residential construction by 2030. A net zero energy (ZNE) building consumes only as much energy on an annual basis as can be generated with an on-site renewable energy system (e.g., solar, wind, geothermal). While the pathway to realize this goal has not yet been defined at the statewide level, CSE produced a ZNE Roadmap for the San Diego region in 2014, which could help to realize long-term emissions reductions through new construction.

SDG&E is the natural gas and electricity provider for residential, commercial, industrial, and municipal users in La Mesa. SDG&E provides electricity that is generated from a variety of sources, including natural gas, coal, and renewables. As of 2017, the California Public Utilities Commission cites the percentage of SDG&E's Renewables Portfolio Standard (RPS) procurement currently under contract for 2020 at 45.2%.[20] As SDG&E continues to comply with the provisions of the RPS mandate, it will expand its renewable electricity portfolio, making additional emissions-free electricity available to customers within La Mesa. The City will also continue to encourage community-wide installation of rooftop solar photovoltaic (PV) and solar hot water systems to increase the portion of La Mesa's energy portfolio provided from renewable sources.

The total emissions reduction potential of the Energy Strategy is estimated to be 6,670 MT CO_2e/yr in 2020, and 68,450 MT CO_2e/yr in 2035. This represents approximately 40% of total 2020 reductions and 59% of 2035 reductions anticipated from La Mesa CAP measure implementation (see Table 3-2).

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[19] US Census, 2013. American Community Survey 5-Year Estimates, *Year Structure Built.* Data represents occupied housing units constructed prior to 1980.

[20] Renewable Procurement Status Percentages: http://www.cpuc.ca.gov/RPS_Homepage/

This high reduction amount is largely driven by strong past participation in utility-sponsored building retrofit programs and community-wide solar PV installations, both of which are expected to continue into the future. The individual energy strategies that follow this introduction explain how these emission reductions are achieved for La Mesa's overall energy sector. Additionally, this CAP includes implementation of a 100% clean energy program and other energy related strategies.

Table 3.2
Energy Strategy Emissions Reduction Potential

Target Year	Total Mass Emissions (MT CO_2e/yr)	Percentage of Total Local Reduction Potential
2020	6,670	40%
2035	68,450	59%

Note: MT CO_2e = metric tons of carbon dioxide equivalent

E-1

BUILDING RETROFIT PROGRAM

Complete energy efficiency retrofits in existing residential and non-residential buildings.

2020 GHG Reduction Potential: **4,200 MT CO_2e/yr**
2035 GHG Reduction Potential: **17,810 MT CO_2e/yr**

Methodology: See Appendix B, pages B-4, 5

Building retrofit improvements can reduce electricity and natural gas use in existing buildings by incorporating energy-efficient appliances and lighting, improving building system operating efficiency (e.g., HVAC tune-ups), and decreasing heating and cooling needs through improvements to the building. Various financial incentives and educational platforms exist to help building owners identify low-cost, high-return improvements. For example, the Center for Sustainable Energy and Energy Upgrade California offer online platforms with access to incentives, technical assistance, and qualified contractors. SDG&E also offers rebates and other financial incentives for the installation of energy-saving retrofits.

- SDG&E has identified that approximately 17.9 million kilowatt hours (kWh) and 150,000 therms have been conserved in La Mesa since 2010 through utility-sponsored efficiency programs. This represents a 6% reduction below baseline electricity consumption and 1.6% reduction below baseline natural gas consumption.
- Continuation of SDG&E's programs at the same rate experienced from 2010 through 2014 is estimated to yield total savings of 35.5 million kWh and more than 300,000 therms in 2020.

Property Assessed Clean Energy (PACE) programs are a simple and effective way to finance energy efficiency, renewable energy, seismic strengthening, vehicle charging infrastructure, and water conservation upgrades to residential or commercial buildings. The City of La Mesa participates in six PACE programs, including the HERO, Figtree, California FIRST, California Municipal Finance Authority Program, California Statewide Communities Development Authority Open PACE, and Ygrene programs. The availability of these financing programs has already resulted in local energy savings totaling 417,000 kWh/yr and 28,100 therms since the 2010 baseline year, which are in addition to the SDG&E sponsored program savings.

In addition to retrofits at the community level, the City has also taken a leadership position through pursuit of retrofit projects in municipal buildings and facilities (see Measure E-3 for additional discussion of municipal efficiency opportunities).

In 2016, Grossmont Hospital opened a new co-generation facility. This facility will result in lower electricity consumption than previously assumed in the emissions forecasts. The new co-generation facility can generate electricity more efficiently than the previous model for on-site consumption, which has resulted in a decreased demand to purchase electricity for use at the hospital.

Implementation Table E-1: Building Retrofit Program

Action		Responsibility	Timeline
1.	a. Identify high-priority (or hard-to-reach) neighborhoods for focused home energy retrofit outreach (e.g., neighborhoods with low levels of past participation in utility rebate programs, neighborhoods with higher energy use identified through heat-mapping, neighborhoods with older building stock) b. Develop outreach program that identifies quick-payback or high-impact retrofit projects that would be suitable in these neighborhoods; include projects supported by current rebate and incentive programs and home energy audits	Community Development (CD) - Building	Near-term
2.	a. Work with existing PACE financing providers to increase awareness and participation among residents and businesses b. Work with local PACE financing participants to include success stories and case studies on City Sustainability webpage	CD - Building	Near-term
3.	a. Continue to partner with CSE in hosting home energy upgrade workshops for community members b. Work with SDG&E to augment workshop information with examples of local case studies demonstrating actual energy / utility cost savings, simple payback calculations, challenges faced, and lessons learned c. Energy Benchmarking: Promote tools like ENERGYSTAR Portfolio Manager for residential and non-residential property owners and operators to build awareness of their energy use, GHG footprint, and options for improving efficiency d. Work with SDG&E to enroll La Mesa's top residential and non-residential energy users in an energy benchmarking program	CD - Building	Near-term

Implementation Table E-1: Building Retrofit Program

Action		Responsibility	Timeline
4.	a. Partner with organizations that provide assistance to low-income and elderly households to develop targeted outreach program that promotes federal and state weatherization programs, including development of education materials that highlight benefits of improved occupant comfort and reduced utility bills b. Provide information (including program links) about available low-income weatherization programs on Sustain La Mesa webpage and identify other outreach methods to increase visibility and familiarity with these programs	CD - Building	Medium-term
5.	a. Develop partnership and plan with SDG&E and PACE providers to encourage information sharing on number and type of retrofit installations performed annually community-wide b. Establish reporting and tracking procedure, as part of CAP implementation process, to collect new retrofit project data and estimate related energy savings c. Analyze retrofit data with SDG&E to identify focus areas for increased outreach	CD - Building	Long-term
6.	a. Amend Title 14 of La Mesa Municipal Code to require energy efficiency audit prior to building permit issuance for remodels or renovations b. Amend Title 14 of La Mesa Municipal Code to require energy efficiency disclosure for real estate transactions at the point of sale	CD - Building	Medium-term

Progress Indicators	Year
Reduce electricity consumption by 36.4 million kWh/yr from the 2010 baseline; Reduce natural gas consumption by 360,500 therms from the 2010 baseline	2020
Reduce electricity consumption by 91.6 million kWh/yr from the 2010 baseline; Reduce natural gas consumption by 962,500 therms from the 2010 baseline	2035

Note: The reduction quantifications for this measure subtract the electricity savings associated with implementation of the AB 1109 Lighting Efficiency program, which are included separately as statewide reductions in the emissions forecasts; this helps to avoid double-counting reduction potential from these two important programs. For implementation tracking purposes though, the progress indicators presented above should be used. See Table 4.2 in Chapter 4 for annual energy efficiency tracking metrics that correspond to the GHG reduction estimates in this measure.

E-2

SHADE TREE PROGRAM

Develop a shade tree program to require developers and property owners to plant shade trees.

2020 GHG Reduction Potential: **<1 MT CO_2e/yr**
2035 GHG Reduction Potential: **10 MT CO_2e/yr**

Methodology: See Appendix B, pages B-8, 9

The City supports increasing greenery within the community and has been recognized as a Tree City, USA since 1980. The City also participates in the San Diego County Tree Inventory program, which provides interactive maps to quantify the ecological and economic benefits of trees. The City will require new development and renovation where feasible to plant shade trees through the development review process. This measure will provide long-term GHG reductions that would increase over time as the trees grow and provide increased levels of building shade. Trees provide myriad benefits beyond emissions reductions, which make this an attractive measure to pursue.

Such benefits include:

- Improving water quality,
- Reducing stormwater runoff,
- Lowering summer temperatures,
- Reducing energy use in buildings,
- Increasing walkability and reducing traffic speeds,
- Reducing air pollution,
- Enhancing property values,
- Improving human health, and
- Providing wildlife habitat and aesthetic benefits.

Many of the benefits that trees provide are correlated with the size and structure of the tree canopy, which is the layer of branches, stems, and leaves of trees that cover the ground when viewed from above. Therefore, understanding tree canopy is an important step in urban forest planning. A tree canopy assessment provides an estimate of the amount of tree canopy currently present, as well as the amount of tree canopy that could theoretically be established.[21] The City of La Mesa will conduct a tree canopy assessment to evaluate existing tree canopy data and how to expand its existing tree canopy.

A citywide urban forestry program will be expanded and the services of a regional urban forester, shared with neighboring municipalities, will be engaged. Opportunities may also exist through the San Diego County Tree Inventory program to develop regional promotional materials and outreach strategies to assist property owners with species selection and planting advice. Additionally, the Public Works Department could provide advice on planting strategies to avoid future root damage to sidewalks, driveways, and underground utilities.

Implementation Table E-2: Shade Tree Program

Action		Responsibility	Timeline
1	a. Update City's tree planting standards to maximize tree root growth and minimize hardscape infrastructure damage potential	Public Works (PW) - Engineering	Near-term
2	a. Adopt tree protection and maintenance ordinance for street trees b. Adopt tree protection and maintenance ordinance for trees on private property	CD	Medium-term
3	a. Update street tree and landscaping ordinance to modify tree requirement to plant shade trees where appropriate	PW - Engineering	Medium-term
4	a. Collect and share related informational materials on City's Sustainability webpage, such as shade tree planting guides and current tree giveaways or rebates b. Make available to public and provide informational materials to customers during building permit process (for new and existing construction or major retrofits)	PW - Engineering	Medium-term
5	a. Collaborate with CSE and SDG&E in developing shade tree give-away program or other incentives to encourage planting of shade trees for existing residential and non-residential sites	PW - Engineering	Long-term
6	a. Develop shade tree planting program b. Identify regional partners, including other participants in San Diego County Tree Inventory program, to collaborate on development of outreach campaign to highlight benefits of shade trees and provide planting technical guidance	PW - Engineering	Long-term

Progress Indicators	Year
250 new shade trees planted in the community from 2010 to 2020	2020
1,575 new shade trees planted from 2010 to 2035	2035

[21] National Research Council. Urban Forestry: Toward an Ecosystem Services Research Agenda: A Workshop Summary. Washington, DC: The National Academies Press, 2013.

E-3

MUNICIPAL ENERGY EFFICIENCY GOAL

Reduce the City's energy use for the operation of municipal building and facilities through system retrofits, increased employee conservation efforts, and by implementing La Mesa's Energy Roadmap.

2020 GHG Reduction Potential: **30 MT CO_2e/yr**
2035 GHG Reduction Potential: **60 MT CO_2e/yr**

Methodology: See Appendix B, page B-9

Municipal emissions are a small subset within community-wide emissions. Energy efficiency projects at City facilities will therefore provide community-wide reductions, while also saving taxpayer dollars through reduced utility costs and provide opportunities for the local government to lead by example. Municipal retrofit projects can also demonstrate new energy-saving technology or showcase the local application of existing conservation strategies.

La Mesa has already taken steps to identify energy savings within municipal operations. The City has:

- Replaced backup generators at Fire and Police facilities with cleaner, more efficient units,
- Replaced windows and doors at the Community Center and Recreation Center with energy efficient options,
- Installed "Vending Miser" systems on machines at City facilities to reduce energy use during evenings and weekends, and
- Updated office equipment/appliances with more energy-efficient options (including ENERGY STAR models, where possible).

Additionally, the City worked with SANDAG to prepare a strategic plan to guide the community towards increased energy conservation through the City of La Mesa Energy Roadmap. The Energy Roadmap identifies energy efficiency measures across all municipal sites, including energy efficient vending machines at City Hall, the Community Center, and the Adult Enrichment Center; building system retro-commissioning at City Hall; installation of pump controls and lighting retrofits at the City pool; and, lighting retrofits at the Adult Enrichment Center and Fleet Maintenance Building. Energy savings from projects identified in the Roadmap total nearly 124,000 kWh/yr and almost 1,300 therms/yr.

This goal will be achieved through the City's implementation of the Energy Roadmap, in addition to the following action steps:

- As the initial step, the City has established a municipal energy efficiency goal and outlined strategies for its achievement.
- The City will pursue collaborative and information-sharing opportunities with other local governments to identify additional best practices in energy conservation within municipal operations. This collaboration could lead to joint pursuit of grant funding for retrofit projects or opportunities to participate in pilot programs for new technologies.
- The City will continue to partner with SANDAG or other organizations to conduct emissions reduction planning.

Implementation Table E-3: Municipal Energy Efficiency Goal

Action			Responsibility	Timeline
1	a.	Implement Energy Roadmap recommendations	PW - Engineering	Medium-term
	b.	Use support services provided by SANDAG's Energy Roadmap Program and continue to discuss potential strategies with SDG&E to identify utility rebate programs, on-bill financing, or other incentive programs		
	c.	Develop phasing strategy for retrofit projects that accounts for other near-term planned building / facility retrofit work, and incorporate energy efficiency components into these planned projects		
2	a.	Revisit retrofit opportunities and municipal efficiency goal on regular cycle (e.g., every 5 years) when revising municipal goal	PW - Engineering	Medium-term
	b.	Double 2020 electricity savings target by 2035		
3	a.	Calculate energy and cost savings and GHG reductions related to municipal efficiency projects and share case study information on City's Sustainability webpage to encourage residents and businesses to explore efficiency strategies in their buildings	PW - Engineering	Near-term
	b.	Highlight additional co-benefits of projects, such as improved building occupant comfort		
4	a.	Leverage San Diego Regional Climate Collaborative and SANDAG Regional Energy Working Group for sharing local successes and best practices in municipal operations energy efficiency	PW - Engineering	Long-term
	b.	Use San Diego Climate Collaborative and other regional networks to identify and pursue regional funding opportunities for energy conservation or other emissions reduction-related projects		

Implementation Table E-3: Municipal Energy Efficiency Goal

Progress Indicators	Year
Reduce electricity consumption at municipal facilities by 124,000 kWh/yr from 2005 municipal inventory levels; Reduce natural gas consumption at municipal facilities by 1,275 therms from 2005 municipal inventory levels. Install all improvements recommended in the La Mesa Energy Roadmap.	2020
Reduce electricity consumption at municipal facilities by 248,000 kWh/yr from 2005 municipal inventory levels. Reduce natural gas consumption at municipal facilities by 2,550 therms from 2005 municipal inventory levels.	2035

E-4

PUBLIC LIGHTING

Reduce energy consumption in the City's traffic signals, street lights, and park lighting through installation of energy-efficient lighting technology.

2020 GHG Reduction Potential: **170 MT CO_2e/yr**
2035 GHG Reduction Potential: **170 MT CO_2e/yr**

Methodology: See Appendix B, pages B-9, 10

Lighting efficiency upgrades typically represent one of the most cost-effective solutions for energy conservation, providing lower utility costs and reduced maintenance costs from less frequent lamp replacements. Public realm lighting in La Mesa includes traffic signal and street lights, municipally-owned parking lot lights, and public park lights. The City has already installed high-efficiency induction street lights using funding from the American Recovery and Reinvestment Act (ARRA), which reduced street light energy consumption by half. The City has also retrofitted all traffic signals with green and red LED lights.

The following are ongoing or planned municipal energy efficiency related activities:

- Revise its streetlight standards to require that new and replacement bulbs also use energy-efficient technology.
- Monitor advancements in energy-efficient lighting technology to keep its streetlight standards up to date.
- Prioritize park lighting retrofit projects and implement the Energy Roadmap. Review park and recreation area lighting systems and energy use in future Roadmap updates to determine if opportunities for retrofits exist. Additional energy savings may be available from City-owned park and recreation area lighting upgrades, but are not currently included in reductions from this measure. According to La Mesa’s Energy Roadmap, park lighting consumed nearly 290,000 kWh/yr in 2013.

- Develop energy-efficient lighting program for park facilities that prioritizes potential candidates for future retrofits, seeks low energy use in all new facilities, and installs appropriate new lighting technologies that maintain sufficient lighting levels for applicable uses (e.g., sports play, safety).
- Work with SDG&E and the Energy Roadmap Program to identify utility rebates, on-bill financing options, or other strategies to help defray program costs.

The following implementing actions are forward looking toward additional lighting retrofit opportunities that could help the City to achieve future year emissions targets.

Implementation Table E-4: Public Lighting

Action		Responsibility	Timeline
1	a. Develop energy-efficient lighting program for parks that: ▪ identifies outdoor lighting retrofit candidates among City-owned parks and recreation areas (e.g., pathways, restroom facilities, area lighting, sport field lighting), and ▪ identifies appropriate energy-efficient lighting technologies for sports fields / courts that still provide lighting levels required for applicable sporting use	PW - Engineering	Near-term
2	a. Revise City's street lights standard to include requirement for energy-efficient technology and adaptive controls in new and replacement bulbs	PW - Engineering	Near-term
3	a. Use Energy Roadmap Program and partner with SDG&E to pursue utility rebates or on-bill financing options to retrofit identified park lighting opportunities	PW - Engineering	Medium-term
4	a. Continue to monitor advancements in lighting technology, rebate / financing programs, and other factors that could prompt City to pursue deeper energy savings in municipally-owned street lights	PW - Engineering	On-going

Progress Indicators	Year
All City-owned traffic lights and street lights have been retrofitted with energy-efficient technology that reduces electricity use by 50%, and electricity savings will continue to be realized in the 2020 and 2035 target years. - **Progress Achieved!**	2020 and 2035
Reduce public lighting energy consumption by 50% from 2005 levels	2020

E-5

SOLAR PHOTOVOLTAIC PROGRAM

Install solar PV systems on residential and non-residential property in the community, and identify opportunities for municipal installations on City property

2020 GHG Reduction Potential: **2,350 MT CO_2e/yr**
2035 GHG Reduction Potential: **4,660 MT CO_2e/yr**

Methodology: See Appendix B, pages B-10, 11

As the sixth largest economy in the world, California's demand for electricity is growing, fueled by an expanding population and a robust economy. As shown in Chapter 2, electricity-related emissions make up 38% of La Mesa's emissions inventory.

Measures designed to reduce electricity consumption or provide clean electricity can play a significant role in the City's emissions target achievement. To meet the State's growing demand for electricity, California's principal energy agencies—the California Energy Commission (Energy Commission), the California Public Utilities Commission, and the California Consumer Power and Conservation Financing Authority (Power Authority)—established an energy resource loading order to guide their energy decisions.[22] The loading order consists of decreasing electricity demand by increasing energy efficiency and energy demand response, and meeting new energy generation needs first with renewable and distributed generation resources, and second with clean fossil-fueled generation.

The State's preferred energy loading order identifies development of site specific renewable energy as a secondary action that should follow energy efficiency building retrofits and other energy conservation strategies. This will allow photovoltaic (PV) systems to be sized to match a building's electricity demand and reduce costs of the PV system. Therefore, this measure is viewed as a companion to the other energy measures described in this CAP, and is part of this comprehensive emissions reduction strategy.

Solar PV systems are generally installed on building rooftops or carport shading structures, and convert solar radiation into electricity that can offset a building's electricity use from utility grid-tied sources. While numerous barriers can prevent widespread adoption of solar PV technology, including up-front costs, lack

.[22] California Energy Commission Loading Order White Paper: http://www.energy.ca.gov/2005publications/CEC-400-2005-043/CEC-400-2005-043.PDF of information, new opportunities for financing and collaboration have emerged that reduce these barriers and encourage greater use of solar energy.

- The City will review its existing building codes and regulations to identify potential barriers to solar project implementation, and reduce or remove these barriers through a municipal code amendment.
- As with other measures, the City can learn from local best practices in this topic area and consult with regional jurisdictions on their past efforts to streamline the solar permitting process, reduce permit fees, or remove other regulatory barriers.
- Continued partnership with the Center for Sustainable Energy (CSE) may provide an ideal venue for this type of knowledge sharing.

Renewable energy financing and rebate programs are available to offset the initial capital costs associated with system installation.

In addition to PACE financing described in Measure E-1, power purchase agreements (PPA) can help to facilitate broader community-wide PV installations. With PPAs, solar service providers install PV systems that they own and maintain, then sell the generated electricity back to the property owner at an established rate. Some of these programs also offer lease-to-own options in which property owners own the PV system at the end of their PPA contract.

Rebates may also be available through the investor owned utility-funded California Solar Initiative (CSI) and its related programs, as well. CSI has a goal to create 3,000 MW of new, solar-generated electricity by 2017, and has been a source of solar PV financial incentives in the past. As the program nears completion, rebate values are expected to continue to decline, which may lead to slower PV installation growth in the future if additional financial resources are not provided.

The City will provide links to available solar rebate and financing options on the Sustain La Mesa website, and will also work to develop informational resources explaining the benefits of solar PV systems. Outreach or informational materials leverage related existing resources that have previously been prepared by SDG&E, Energy Upgrade California, CSE, and other renewable energy advocates.

City staff with a public interface role in the building permitting process will also continue to be trained on the City's solar PV permitting process, available rebates and financing programs, and frequently asked questions to provide an informational resource for community members.

In addition to broadly encouraging community solar installations, the City will identify municipal buildings or facilities that would be good candidate sites for a PV system. Cities throughout California have used direct ownership, financing models like PPAs, or regional procurement programs to pursue municipal PV projects. A regional procurement program could allow San Diego area governments to leverage their combined purchasing power into favorable solar contract terms, accelerated project financing, and reduced transaction costs.

La Mesa will engage its regional partners to identify local interest in such a collaborative approach, as one option to help pursue municipal PV systems. The City will also work with SDG&E to determine if utility-sponsored rebate or incentive programs are available to offset initial PV installation costs. When researching viable solar sites, the City will also consider the options to pursue a stand-alone solar project or a broader energy service contract that identifies and finances municipal energy efficiency projects in addition to renewable energy systems.

Implementation Table E-5: Solar Photovoltaic Program

Action		Responsibility	Timeline
1	a. Streamline permitting process (e.g., building, electric, plumbing) for solar PV systems b. Train Building Department counter staff in City's solar permitting process in order to assist community members through process c. Provide training to Planning Department and Building Division counter staff regarding available sources for rebates / financing / incentives, as well as printed pamphlets or FAQ sheets for distribution to customers seeking permits for new construction or major renovation projects d. Provide links to similar information on City's Sustainability webpage	CD	On-going
2	a. Review and revise all applicable building, zoning, and other codes and ordinances that are potential regulatory barriers to installation of solar PVs in residential and nonresidential construction	CD	Near-term
3	a. Work with Center for Sustainable Energy (CSE), Property Assessed Clean Energy (PACE) districts, and neighboring jurisdictions to develop comprehensive outreach campaign to increase participation in solar PV installation programs, including directory of existing rebates / incentive programs, explanation of simple-payback calculations for solar PV systems, and technical assistance b. Leverage existing solar PV informational materials from CSE, California Solar Initiative, SDG&E, and other organizations	CD	Medium-term
4	a. Identify opportunity sites on City buildings or parking lots for municipal solar PV installation b. Partner with CSE to investigate interest in pursuing regional renewable energy procurement program with other area governments and public agencies	PW - Engineering	Long-term

Progress Indicators	Year
6.4 MW solar capacity installed community-wide since 2010 with systems generating 11.5 million kWh/yr	2020
12.9 MW solar capacity installed community-wide since 2010 with systems generating 23 million kWh/yr	2035

E-6

SOLAR HOT WATER HEATER PROGRAM

Install solar water heaters in new construction and building retrofits.

2020 GHG Reduction Potential: **30 MT CO_2e/yr**
2035 GHG Reduction Potential: **30 MT CO_2e/yr**

Methodology: See Appendix B, pages B-11, 12

By using the sun's energy to heat or preheat water, solar hot water heaters can complement natural gas or electric systems, reducing utility use, costs, and carbon emissions. Solar water heating systems include solar collectors, typically placed on roofs, which are attached to an insulated water storage tank. According to the CSI, solar hot water systems can lower energy bills by meeting 50 to 80% of hot water needs. The California Solar Water Heating and Efficiency Act of 2007 (AB 1470) created a 10-year program aimed at installing solar water heaters in homes and businesses and was designed to lower system purchase costs, which typically range from $3,000 to $6,000. Similar to solar PV installations, rebate programs and other financing options (such as PACE programs) can help reduce upfront installation costs.

To implement the goals of AB 1470, SDG&E developed a Solar Water Heating Pilot Program, which it ran from 2007-2010. This program identified numerous barriers to the widespread adoption of solar water heating systems. In particular, participating contractors named permitting and inspection costs and delays as a primary obstacle to widespread adoption for single-family residential buildings because non-material costs represented approximately 65% of total system costs. That means, only 35% of total costs were related to the actual system price. The current low cost of natural gas, commonly used in traditional water heaters, further decreases demand for solar hot water systems by increasing their payback period.

Given the previous low levels of participation in the CSI-Thermal program, this CAP assumes continued low participation through the 2020 target year, and only estimated 2020 emissions reductions based on actual reported results from 2011 through 2016. However, solar hot water heating strategies could play an important role in achieving the state's long-term emissions reduction goals, and could experience enhanced attention for broad implementation in the future. The 2035 solar thermal reduction estimates are also based on a continuation of the relatively low participation rates. The monitoring program evaluates changes to market conditions that could result in more wide-spread adoption of solar thermal technology in La Mesa and the CAP will be updated to reflect these changes.

In addition to revised utility rebate program rate structures, there are also some initial actions the City can take to lay the foundation for future implementation. While the City cannot influence global energy prices, it can work to reduce the non-system costs identified in SDG&E's pilot program (e.g., permitting costs and process duration). This would reduce or remove one barrier to broader adoption, and help make solar hot water systems a more attractive alternative, should natural gas prices increase or system costs decrease in the future. The City can also act as a facilitator among rebate and financing entities (e.g., CSE, PACE districts), potential customers, and technical practitioners to identify barriers to installation and collaboratively develop solutions to these barriers.

Implementation Table E-6: Solar Hot Water Heater Program

Action		Responsibility	Timeline
1	a. Work with Center for Sustainably Energy (CSE) to understand non-system costs identified in solar hot water pilot program, and work to reduce costs associated with City requirements by streamlining permitting process and reducing / removing permit fees	CD - Building	Near-term
2	a. Provide training to Planning Department and Building Division counter staff regarding available sources for rebates / incentives b. Provide similar information on the City's Sustainability webpage, and identify local success stories that can be shared	CD - Building	Near-term
3	a. Leverage information and research from CSE and California Solar Initiative (CSI)-Thermal Program to provide informational materials at Building Permit counter to new applicants	CD - Building	Long-term
4	a. Investigate municipal opportunities for solar hot water systems at facilities with high hot water heating loads, such as City swimming pools and recreation centers (review Energy Roadmap energy assessment data to identify such opportunities)	PW - Engineering	Long-term
5	a. Work with SDG&E to identify local businesses with high hot water heating load that could benefit from installation of solar hot water system	CD - Building	Long-term
6	a. Convene roundtable discussion that includes CSE, SDG&E, local PACE districts, City Building Division permitting staff, identified local business representatives to discuss potential opportunities for, and barriers to installation of solar hot water systems	CD - Building	Long-term

Progress Indicators	Year
5,100 therms/yr saved from solar thermal installs since 2010	2020
6,300 therms/yr saved from solar thermal installs since 2010	2035

E-7

SOLAR READY CONSTRUCTION

Incorporate solar-ready design into new construction, including building orientation for maximum solar exposure, pre-wiring and pre-plumbing for solar PV and solar hot water, and roof system construction that can handle additional loads from potential future solar installations.

Supporting Measure – Not Separately Quantified

As previously described, increasing the use of distributed renewable energy systems (e.g., rooftop solar) prevents the combustion of fossil fuels to generate electricity and heat water, thereby reducing GHG emissions. La Mesa's location and geography provides a high solar insolation rating, which makes it an excellent candidate for effective adoption of solar technologies. In addition to strategies described in Measures E-5 and E-6, the City currently implements CALGreen Building Code on the installation of solar technologies which requires new construction to be pre-wired and pre-plumbed to support future systems, and constructed to support roof loads from solar installations. The City also works with applicants to orient new construction for maximum solar access. These early considerations can reduce costs associated with solar design retrofits for homeowners.

In the near-term, the City will continue to implement its Sustainable Building Policy that evaluates the feasibility of integrating sustainable building techniques into new buildings and major retrofits to support additional installation of solar energy systems, the City can work with builders and applicants during the design phase to provide the supporting solar infrastructure at the time of construction. The City can provide technical assistance in solar design or share information on solar-ready construction techniques. It can also refer building applicants to SDG&E's Savings by Design program, which offers financial incentives and additional design assistance for high-performance projects.

This measure supports implementation of Measures E-5 and E-6, and is not quantified separately.

Implementation Table E-7: Solar Ready Construction

Action			Responsibility	Timeline
1	a.	Work with SDG&E, Center for Sustainably Energy (CSE), building industry and contractor associations, and other local jurisdictions to develop and/or promote available technical assistance programs to help developers and builders minimize costs associated with solar-ready design and construction	CD - Building	Medium-term

E-8

ZERO NET ENERGY CONSTRUCTION

Implement California's zero net energy building standards for new residential construction starting in 2020 and new non-residential construction starting in 2030.

2020 GHG Reduction Potential: **0 MT CO_2e/yr**
2035 GHG Reduction Potential: **8,470 MT CO_2e/yr**

Methodology: See Appendix B, pages B-12, 13

In the *2007 Integrated Energy Policy Report*, the CEC adopted a goal to achieve zero net energy (ZNE) buildings in new residential construction by 2020 and non-residential construction by 2030. ZNE buildings consume only as much energy on an annual basis as can be generated with an on-site renewable energy system (e.g., solar, wind, geothermal).

The emissions reduction calculations presented above assume that 100% of new residential electricity and natural gas demand from 2020 through 2035 will be offset through on-site renewable energy development or the purchase of 100% renewable energy from community choice aggregation (see Measure E-9) or another clean energy program. The calculations also assume that 100% of new non-residential electricity and natural gas demand from 2030 through 2035 will be similarly offset. In lieu of specific guidance at this time, this CAP assumes that changes to the State's building code will be the primary implementation mechanism, and that the City's role will be to enforce the most current building code standards.

Implementation Table E-8: Zero Net Energy Construction

Action			Responsibility	Timeline
1	a.	Adopt California's building code standards that define zero net energy building requirements	CD - Building	Near-term
2	a. b.	Work with local development community to identify technical and / or regulatory barriers to ZNE implementation and define solutions Provide technical resources and/or local case study information to builders/applicants, as feasible	CD - Building	Medium-term

Progress Indicators	Year
14,800 MWh of new residential electricity demand is off-set; 708,450 therms of new residential natural gas demand is off-set; 5,800 MWh of new non-residential electricity demand is off-set; 83,000 therms of new non-residential natural gas demand is off-set.	2035

E-9

100% CLEAN ENERGY - COMMUNITY CHOICE AGGREGATION (OR SIMILAR) PROGRAM

Partner with other San Diego County jurisdictions to develop a regional Community Choice Aggregation program with 100% renewable electricity

2020 GHG Reduction Potential: **0 MT CO_2e/yr**
2035 GHG Reduction Potential: **37,240 MT CO_2e/yr**

Methodology: See Appendix B, page B-13, 14

Assembly Bill 117, which was signed into law in 2002, enables California cities and counties, either individually or collectively, to supply electricity to customers within their borders through the establishment of a community choice aggregation district (CCA). Unlike a municipal utility, a CCA does not own the transmission and delivery systems, but is responsible for providing electricity to its constituent residents and businesses. The CCA may own electricity generation facilities, but more often, it purchases electricity from private electricity generators. CCAs provide flexibility in pursuing low-carbon electricity options in a community because procurement objectives are defined locally. For example, a San Diego County CCA could decide to provide 75% of its electricity from renewable sources, which would exceed State requirements directing California's utilities to provide 50% of their electricity from renewable sources by 2030. CCAs can also range in size from a city to an entire region.

Developing a CCA would require a detailed analysis of energy demand, efficiency opportunities, and available clean electricity sources for purchase. In order to create a CCA, the City of La Mesa may desire to partner with other area communities to create efficiencies. Other local jurisdictions may also be interested in jointly pursuing such an option. Existing models from Marin and Sonoma County could serve as blueprints for program development.

Since electricity accounts for 23% of La Mesa's baseline emissions inventory, participation in a regional CCA district could provide a significant source of future emissions reductions. The City will participate in ongoing regional discussions to identify opportunities for collaboration on CCA design and implementation that would produce mutually beneficial results.

A CCA program could provide substantial reductions by 2035. For purposes of this CAP, it was assumed that a local CCA program in which La Mesa's residents and businesses could voluntarily participate would not be implemented prior to the 2020 target year due to the lead time required for existing CCAs to perform necessary studies, form governing bodies, and complete other administrative tasks. At the statewide level, increasing access to clean electricity has been identified as a primary mechanism for achieving the State's long-term emissions reduction goals.

CCAs are typically designed as an opt-out program, meaning that all residents and businesses within its boundaries are automatically enrolled in its service with the ability to opt out and remain with their existing utility provider. This type of enrollment is one reason that CCA programs enjoy high participation rates. For comparison, the Marin Clean Energy District currently provides electricity to 77%[23] of its service population, while Sonoma Clean Power has a 90%[24] participation rate.

The reduction estimates shown above were modeled based on the results of the *City of San Diego Feasibility Study for a Community Choice Aggregation* that shows the feasibility of developing a CCA program that provides 100% clean electricity by 2035.[25] The calculations assume that by 2035, 80% of La Mesa's residents and businesses would participate in a CCA program that provides 100% clean electricity, while the remaining 20% would continue to purchase energy from SDG&E.

Implementation Table E-9: 100% Clean Energy - Community Choice Aggregation

Action			Responsibility	Timeline
1	a.	City will prepare an implementation study, individually or collaboratively, to develop a CCA program or similar program that will provide 100% renewable electricity by 2035	City Manager's Office	Medium-term
2	a.	Develop a CCA or similar program to achieve 100% renewable electricity by 2035	City Manager's Office	Long-term

Progress Indicators	Year
80% of La Mesa residents and businesses participate in a CCA or similar program that provides 100% renewable electricity	2035

[23] Marin Clean Energy Integrated Resource Plan Annual Update, November 2014. Available online: <http://www.mcecleanenergy.org/wp-content/uploads/2014_Integrated_Resource_Plan.pdf> Accessed October 15, 2015.

[24] Sonoma Clean Power. Agenda, Sonoma Clean Power Authority Business Operations Committee, Thursday April 9, 2015. Available online: <https://sonomacleanpower.org/wp-content/uploads/2015/03/FINAL-BOC-Packet-2015-04-09.pdf> Accessed October 15, 2015.

[25] City of San Diego Feasibility Study for a Community Choice Aggregate, July 2017. Available online: <https://www.sandiego.gov/sites/default/files/san_diego_cca_feasibility_study_final_draft_main_report_7-11-17.pdf>


3002
OLD TOWN
MTS

Transportation and Land Use Strategy

Transportation-related emissions make up approximately 58% of the community-wide baseline emissions inventory. While vehicle fuel efficiency, fuel carbon content (amount of carbon dioxide released in relation to energy produced), and vehicle operations all influence the amount of transportation emissions generated in a community, the amount also depends on the number of vehicle miles traveled (VMT) by residents. Long vehicle trips and high numbers of trips create higher emissions.

While State-mandated technological changes in fuel efficiency and reductions in fuel carbon content will greatly reduce transportation emissions, additional reductions will require local and regional action. For example, by eliminating or shortening vehicle trips through increased alternative transportation options, such as transit, bicycling, or walking, and through facilitating a finer-grain mixing of land uses. Where people live, work, shop, and play influences how far they have to travel daily and whether they choose to walk, bike, use public transit, or drive. Measures that support mixed land uses and opportunities for higher-density development along transit routes are essential to supporting alternative transportation options.

Regional GHG Reductions from the Transportation Sector

SANDAG is responsible for developing a regional transportation plan (RTP) in coordination with the 18 cities and the County of San Diego. As a requirement of SB 375, the RTP must include a Sustainable Communities Strategy (SCS) that identifies strategies and policies to reduce GHG emissions from passenger vehicles to meet targets established by ARB. The most recent RTP/SCS, “San Diego Forward: The Regional Plan” (2015), shows that new jobs and homes would be relatively more compact and located in areas with existing and planned transit service. San Diego Forward details regional strategies addressing active transportation, transit, transit-oriented development, transportation systems management, transportation demand management, and other topics, and demonstrates how these strategies will allow the San Diego region to meet and exceed targets for per-capita reductions in GHG emissions from passenger vehicles.

These regional strategies will produce GHG reduction benefits in La Mesa. However, the regional reductions are not distributed evenly – some parts of the region would experience higher passenger vehicle VMT reductions than other areas. In order to ensure consistency with this regional approach to reducing GHG emissions associated with passenger vehicles, the City has directly used SANDAG’s travel demand estimates to support this CAP. This Land Use and Transportation Strategy is designed to increase the local share of passenger vehicle emissions reductions.

Supportive City Policy and Regulatory Framework

The City’s policy and regulatory framework encourages development, reinvestment, and transportation planning that would reduce VMT and associated GHG emissions, including support for mixed use, transit-oriented developments in areas served by the San Diego Metropolitan Transit System (MTS) trolley and bus system. Examples of development in transit-served areas include the La Mesa Village Plaza in

Downtown La Mesa on the west side of Spring Street, the La Mesa Archstone apartment project near the Amaya station, and the Pravada and Alterra apartment project at the Grossmont Trolley Station, among others. During the planning period covered by this CAP, the City anticipates development activity focused around the City's transit stations, which is supported by General Plan policy encouraging infill development in these areas, including properties in the vicinity of La Mesa Boulevard Station, 70th Street Station, Amaya Station, and Spring Street Station.

The City's Mixed-Use Corridors represent another opportunity for development that would have the density, location, and mix of land uses to reduce travel demand (vehicles miles traveled [VMT]) and associated GHG emissions. The General Plan applies the Mixed-Use Urban land use designation along transit corridors – a designation that allows higher-density development.

Policies in the Land Use and Urban Design Element of the City's General Plan call for pedestrian-friendly improvements in areas with high pedestrian activity, bicycle and pedestrian facility connections between neighborhoods and destinations, infill development in the City's Mixed-Use Overlay Zone, additional housing in areas with substantial commercial development, compact transit-oriented development in areas with existing transit service, reduced and shared parking Downtown and in areas with transit, and incentives for transit-oriented and mixed-use development.

The Circulation Element promotes the use of public transit by working with MTS to increase the access, aesthetics, and safety of trolley and bus infrastructure, and ensuring that future development improves access to public transit. The Circulation Element also encourages pedestrian and bicycle transportation by applying a "complete streets" approach to future transportation infrastructure projects, implementing the bicycle-related policies and programs contained in the City's *Bicycle Facilities and Alternative Transportation Plan*, and focusing on "Safe Routes to Schools" around school sites.

Future policy development in La Mesa will also support VMT reductions. Senate Bill (SB) 743 directed the California Governor's Office of Planning and Research (OPR) to provide guidance on an alternative to analyzing transportation-related impacts of projects using level of service (congestion). OPR selected VMT as the preferred metric. La Mesa will develop context-appropriate guidance for addressing travel demand (VMT) effects. The City's approach for SB 743 implementation will consider GHG emissions reductions from transportation outlined in this CAP, as well as promoting active transportation, and encouraging infill development, all of which are identified as objectives in the legislative intent of SB 743.

SUPPORTIVE CONTEXT FOR LOW-VMT DEVELOPMENT

As noted, La Mesa has oriented its policy and regulatory framework in a way that promotes future low-VMT development and the City has experienced successful infill, mixed-use, relatively compact, transit-oriented development. The City's supportive policies and regional efforts to reduce VMT are applied to a supportive local context. La Mesa is well-served by transit, with five trolley stations and seven bus routes. General Plan policies support compact, transit-oriented development along the City's transit corridors and around transit hubs. General Plan buildout anticipates development to occur along existing bus routes and near trolley stations. In addition, La Mesa has the third highest population density of any city in the entire San Diego region (see Table 3.3). La Mesa has the highest gross residential density of any city in the region. These characteristics are important for achieving relatively low VMT per capita– both under existing and future conditions.

Table 3.3
Residential Density, San Diego Region (2013)

Jurisdiction	Population	Occupied Dwelling Units	Population/Square Mile	Dwelling Units/Total Gross Acre
La Mesa	58,328	24,807	6,481	4.3
El Cajon	100,602	34,179	6,986	3.7
Lemon Grove	25,590	8,439	6,562	3.4
Imperial Beach	26,533	9,107	6,030	3.2
National City	58,915	15,508	6,404	2.6
Solana Beach	13,006	5,653	3,825	2.6
Vista	95,398	29,483	5,129	2.5
Chula Vista	251,973	77,260	4,950	2.4
San Diego	1,328,073	485,881	3,878	2.2
Oceanside	169,593	59,522	4,019	2.2
Escondido	146,115	45,719	4,036	2
Encinitas	60,568	24,263	3,090	1.9
Santee	55,110	19,666	3,340	1.9
San Marcos	87,165	27,916	3,632	1.8
Del Mar	4,205	2,064	2,336	1.8
Carlsbad	108,401	42,131	2,772	1.7
Coronado	23,201	7,434	1,657	0.8
Poway	48,628	16,241	1,244	0.6
Unincorporated	493,170	161,660	138	0.1
Total	3,154,574	1,096,933	740	0.4

Sources: Population and dwelling unit data is from the California Department of Finance for 2013 to match the date of VMT collection data from SANDAG used to prepare the emissions inventory and forecasts. State of California, Department of Finance, E-5 Population and Housing Estimates for Cities, Counties and the State — January 1, 2011- 2017. Sacramento, California, May 2017. Estimate of land area is from the San Diego County Fact Sheet, prepared by the San Diego County Finance & General Government Group, Office of Financial Planning.

TRANSPORTATION AND LAND USE REDUCTION MEASURES

The City's Transportation and Land Use Strategy includes bicycle and pedestrian infrastructure improvements to encourage walking and biking between nearby destinations, along with efforts to improve bicycling safety. Transportation demand management actions in the City's Transportation and Land Use Strategy are focused on commute trips, and are coordinated with regional efforts. The City's General Plan and Municipal Code support development that would reduce transportation-related GHG emissions, including transit-oriented development, affordable housing, compact, infill, and mixed-use development. Improving transit services and access to transit stops also supports multi-modal circulation options. In addition, facilitating a transition to alternative fueled vehicles can provide long-term emissions reductions as the community-wide mix of vehicles shifts with broader vehicle market transformations. This includes incorporating alternative fueled vehicles in the municipal fleet, and facilitating installation of charging and refueling stations for community use.

OVERALL PERFORMANCE STANDARD

It is difficult to quantify the environmental benefit of a land use/transportation strategy. Researchers have identified a connection between density and reducing travel demand, but the benefits depend on transit access, land use mix, regional accessibility, and other factors. The effectiveness of VMT reduction can be enhanced by a complementary suite of other reduction measures.[26] Some of the City's VMT reductions are already included in SANDAG's travel demand forecasts for 2020 and 2035. Since the reduction measures are interrelated, and since some overlap with those already included in the 2020 and 2035 forecasts, the City has established an overall performance standard for VMT reductions for 2035, shown in Table 3.4.

[26] Reid Ewing and Robert Cervero 2001. Travel and the Built Environment: A Synthesis. Transportation Research Record 1780. Paper No. 01-3515. Marlon G. Boarnet and Susan Handy 2014. Impacts of Residential Density on Passenger Vehicle Use and Greenhouse Gas Emissions Policy Brief. Prepared for the California Air Resources Board. Impacts of Employment Density on Passenger Vehicle Use and Greenhouse Gas Emissions Technical Background Document. Prepared for the California Air Resources Board.

Table 3.4 Transportation Performance Standard	
Performance Standard	**Year**
Reduce VMT per capita by 6% compared to 2010 levels (25.1 daily VMT per capita in 2010); The emissions reductions associated with this standard can be achieved through reducing travel demand or by combining a reduction in travel demand with a change to less GHG-emitting fuel sources (electric vehicles, for example) that provides equivalent benefit for GHG emissions reductions.	2035

Note: Transportation mode share data has been requested from SANDAG. Once the data is provided, existing transportation mode share information will be reported and mode share goals set in future CAP updates within one year of obtaining mode share data.

As with the progress indicators identified for other reduction strategies, the City will monitor progress toward this overall Land Use and Transportation Strategy Performance Standard. If necessary, the City will adjust the reduction measures or add new ones if monitoring shows that the desired amount of VMT reductions are not occurring as planned. Strategies T-1 and T-6 also have their own specific progress indicators related to how those reductions were estimated, which the City will still monitor independent of the overall performance standard shown above for the Transportation and Land Use strategies. The overall Transportation and Land Use Strategy emission reduction potential is shown in Table 3.5.

Table 3.5
Transportation and Land Use Strategy Emissions Reduction Potential

Target Year	Total Mass Emissions ($MT\ CO_2e/yr$)	Percentage of Total Local Reduction Potential
2020	4,100	25%
2035	23,080	20%

Note: MT CO_2e = metric tons of carbon dioxide equivalent

T-1

BICYCLE AND PEDESTRIAN INFRASTRUCTURE DEVELOPMENT

Continue to plan for and construct safe, attractive bicycle and pedestrian paths and facilities within the community, and provide education programs aimed at increasing use of alternative transportation options.

2020 GHG Reduction Potential: **50 MT CO_2e/yr**
2035 GHG Reduction Potential: **50 MT CO_2e/yr**

Methodology: See Appendix B, pages B-14, 15

Pedestrian enhancements support safe and comfortable walking environments, potentially increasing foot traffic to retail establishments and businesses, while decreasing automobile trips and emissions. Pedestrian enhancements include the provision of seating, shading, way-finding signs, safe crosswalks, and traffic calming measures. Providing connectivity and convenient, enjoyable pedestrian areas also improves residents' quality of life. Similarly, bicycle infrastructure improvements can increase ridership through an expanded geographic reach or depth of services provided. Bicycle infrastructure includes designated on-street lanes, striping and signage indicating bike paths and shared roadways, secure and visible bicycle storage, and end-of-trip facilities for bicycle commuters. Pedestrian and Bicycle Facility Plans provide a framework for local governments to address pedestrian and bicycle safety, and identify important improvements to increase safety and comfort within a community.

The California State Legislature passed the Complete Streets Act of 2008 (AB 1358), followed by adoption of the federal Safe and Complete Streets Act of 2011. Complete streets describe those that are planned and designed for use by everyone and for all modes of transportation (e.g., automobiles, bicycles, walking). The City adopted a Bicycle Facilities and Alternative Transportation Plan, in accordance with AB 1358 legislation. The Plan identifies bicycle and pedestrian needs throughout the city and describes opportunities to connect and integrate existing and proposed facilities.

Per the City's Plan, there are 12.8 miles of existing Class II bike routes (i.e., on-street designated and striped bike lanes), with an additional 12.8 miles planned for future installation. Other related previously adopted plans have addressed neighborhood traffic management (February 2004), walkability (February 2006), and pedestrian and bicycle crossings over area freeways (December 2008). New sidewalk construction has also occurred as a result of the ongoing implementation of the Sidewalk Master Plan. In 2012, La Mesa earned the Most Walkable City designation by WalkSanDiego (now called Circulate San Diego).

To further support the development of complete streets, the City will continue to make infrastructure enhancements, as identified in the Bicycle Facilities and Alternative Transportation Plan, as well as continue to improve the pedestrian environment to increase comfort and safe walkability.

In 2016, the City Council approved an Urban Trails Mobility Action Plan. This plan provides a comprehensive implementation strategy for the City of La Mesa that identifies connecting urban trails (sidewalks) between high-priority neighborhoods and key community destinations such as parks and recreation, hospitals, and local retail. The increased active transportation options could lead to significant health, economic, environmental, and social benefits for City residents and the community as a whole. The plan identifies pedestrian improvements and implementation strategies based on community input. Implementation of this plan will enable the City to effectively promote walking, biking, and transit use.

Regular updates of these plans will allow the City to prioritize projects based on up-to-date community priorities and funding opportunities. In addition to safe routes for riders, bicycle commuting can also be encouraged if end-of-trip facilities are available where commuters can store their bikes and change clothes and/or shower. The City has an existing bicycle outreach and education program and continuously promotes bikeability through bike rodeos, bike to school day, walk to school day, and safe routes to school. La Mesa's Rock and Roll program is a safe routes to school program working with schools as well as older adults to promote walking and biking that reduces congestion and air pollutant emissions near schools. Transit trainings are discussed in the City's Urban Trails Mobility Action Plan and will be implemented as an educational outreach item to promote transit use.

Implementation Table T-1: Bicycle and Pedestrian Infrastructure Development

Action		Responsibility	Timeline
1	a. Prioritize implementation of pedestrian enhancements as identified in City's Sidewalk Master Plan and Urban Trails Mobility Plan and Parks Master Plan b. Prioritize Bicycle improvements as identified in City's Bicycle Facilities and Alternative Transportation Plan c. Continue to maintain these plans through regular updates	PW - Engineering	On-going
2	a. Leverage SANDAG's iCommute program to help encourage businesses and new non-residential development to provide bicycle commuter facilities (e.g., showers, lockers) to support employees' alternative transportation options)	PW - Engineering / Community Services (CS) Department	Near-term
3	a. Work with the La Mesa-Spring Valley School District (LMSVSD) to improve the safety and efficiency of the drop-off and pick-up process at La Mesa schools to reduce vehicle idling time	PW	Medium-term
4	a. Increase number of bike parking facilities in front of retail, restaurants, and employment centers	PW	Medium-term
5	a. Improve existing bike lanes by providing enhanced signage or striping	PW	Near-term

Implementation Table T-1: Bicycle and Pedestrian Infrastructure Development

6	a.	Install sharrows on bike routes	PW	Near-term

Progress Indicators	Year
Install 3 miles of new Class II bike lanes (in addition to existing 12.8 miles)	2020
Install 10 miles of new Class II bike lanes (in addition to existing 12.8 miles) Increase percentage of bike commuters by 0.3% from 2010 levels	2035

T-2

BICYCLE SAFETY PROGRAM

Implement a bicycle program to advance community-wide "bikeability" through safety programs, bicycle tune-up clinics, and partnerships with bicycle advocacy groups, local schools, and cycling clubs.

Supporting Measure – Not Separately Quantified

Bicycling can be a healthy and enjoyable alternative to driving that reduces VMT, resulting in lower community-wide emissions and local air quality improvement. In addition to supportive bicycle infrastructure described in Measure T-1, bicycle education and outreach programs are also important to increase bicycle safety and ridership within the community. These programs can increase community members' comfort with cycling for exercise or daily errands through instruction on proper bicycle maintenance, safe cycling techniques, and an introduction to local cycling groups. Safe Routes to School (SRTS) is a federal, State and local effort designed to enable and encourage children, including those with disabilities, to walk and bicycle to school.

Through implementation of its Sidewalk Master Plan and Bicycle Facilities and Alternative Transportation Plan, the City encourages non-automobile transportation with installation and improvements to sidewalks, bicycle lanes, and pedestrian-friendly zones. The Bicycle Facilities and Alternative Transportation Plan was recently revised with a "Safe Routes to Transit" component to further increase access to this alternative transportation option. The City will continue working with SANDAG to provide bicycle safety training and educational activities, and will work with local cycling groups to identify opportunities for bike safety improvements within the community.

Implementation of this measure will broadly support the efforts of increasing community-wide cycling and contribute to VMT reductions.

Implementation Table T-2: Bicycle Safety Program

Action		Responsibility	Timeline
1	a. Work with SANDAG to continue its bicycle safety education activities, centered around May is Bike Month, including bicycle rodeos and Walk-and-Roll programs at local schools b. Work with community organizations and local bicycle advocacy groups to provide additional bicycle rodeos targeting school-aged population, possibly as end-of-summer event or at start of each new school year	Police Department (PD)/ Community Services (CS)	On-going
2	a. Solicit comments from local cycling clubs / advocacy groups to identify dangerous cycling conditions within community as part of regular implementation of Bicycle Facilities and Alternative Transportation Plan b. Identify opportunities to address problem areas through SRTS Program grants, SANDAG grants, or other alternative transportation funding sources (possibly SDAPCD funding programs)	PW - Engineering	Medium-term

T-3

TRANSPORTATION DEMAND MANAGEMENT PROGRAM

Use SANDAG's iCommute program to reduce single-occupancy vehicle trips community-wide.

2020 GHG Reduction Potential: **2,000 MT CO_2e/yr**
2035 GHG Reduction Potential: **2,720 MT CO_2e/yr**

Methodology: See Appendix B, pages B-16, 17, 18

Transportation demand management (TDM) programs apply strategies and policies to reduce travel demand (specifically single-occupancy vehicles) and traffic congestion, particularly at peak commute hours. Instead of increasing capacity by widening or adding roadway, TDMs promote subsidized transit passes, flexible work hours, guaranteed ride home, vanpool or carpool incentives, and parking cash-out programs that pay employees who agree to give up their guaranteed parking spaces, as a means to reduce VMT and transportation-related emissions.

Within the region, several agencies have programs and measures that encourage alternatives to driving alone. Based on a review of SANDAG's iCommute offerings, the City can encourage residents and businesses to take advantage of existing transit services, as well as ridesharing through online carpooling services and reduced vanpool leasing fees. These programs offer an opportunity for the City to develop partnerships that leverage resources, expand incentives, and further support efforts to reduce regional traffic congestion, lower emissions, and improve public health.

As of April 2017, iCommute had 15 vanpools originating in La Mesa and several travel to Border Patrol locations in the southeast County and Calexico. No vanpools are currently destined for La Mesa employment locations. City data showed several staff members active in the City's employer commute program, as well.

The City will leverage community partnerships and available outreach and informational resources to increase participation within SANDAG's and other transportation demand management programs. The City will work with the local Chamber of Commerce and La Mesa Village Association to identify employers currently offering commuter benefit programs and local employers that might find value in developing a customized employee commuter benefits program. The City will then host a knowledge-sharing workshop with assistance from SANDAG. Alternatively, the City could develop its own customized TDM program to be offered community-wide through free support and tools from SANDAG. The City may find that partnering with several other local jurisdictions on a commuter benefits program is more advantageous given the diffuse nature of employment centers in the San Diego area.

Future CAP updates will collect iCommute participation data, and work to reflect program participation in the City's VMT estimates to demonstrate transportation emissions reductions from alternative transportation programs.

Implementation Table T-3: Transportation Demand Management Program

Action			Responsibility	Timeline
1	a.	Add link to iCommute (or similar program) on City's Sustainability webpage	Community Services (CS) and CD	Near-term
	b.	Review iCommute toolkit (or similar program) for integrating TDM into development review process		
2	a.	Work with SANDAG and area jurisdictions to develop outreach campaign that encourages use of iCommute program offerings	PW - Engineering/CS	Medium-term
	b.	Identify employers that would benefit from customized commuter benefits program, as offered through SANDAG (or similar programs)		
	c.	Identify local employers currently offering commuter benefits programs, and host knowledge-sharing workshop, previously identified local businesses, and iCommute program representatives to discuss program structures and cost / benefit considerations		
3	a.	Develop program for commuters as part of development review, independently or with support from SANDAG, to include transportation benefits such as carpool / vanpool priority parking areas, electric vehicle charging stations, secure bicycle parking, access to locker room / shower facilities, and possibly subsidized transit passes. Adopt zoning ordinance to incorporate these programs for new development.	CD - Planning	Long-term

Performance Standard	Year
Reduce VMT per capita by 6% compared to 2010 levels (25.1 daily VMT per capita in 2010); The emissions reductions associated with this standard can be achieved through reducing travel demand or by combining a reduction in travel demand with a change to less GHG-emitting fuel sources (electric vehicles, for example) that provides equivalent benefit for GHG emissions reductions.	2035

T-4

MIXED-USE AND TRANSIT-ORIENTED DEVELOPMENT

Continue to encourage mixed-use and transit-oriented development through land use and zoning designations to support alternative transportation opportunities.

2020 GHG Reduction Potential: **1,890 MT CO_2e/yr**
2035 GHG Reduction Potential: **19,750 MT CO_2e/yr**

Methodology: See Appendix B, pages B-18-20

Transit-oriented development (TOD) places higher density and intensity development within walking distance of transit stops. This strategy brings residents and jobs closer to transit opportunities, providing additional ridership for the public transit system. Successful TOD can take various shapes, depending on the character of the community. TOD can focus on increasing employment near transit stops, typically within a ½-mile walking distance, provided adequate pedestrian connectivity is available for riders to then reach their jobs. It can also focus on increasing residential densities near transit stops, usually within a ¼-mile walking distance.

TOD can also include a mix of uses (e.g., residential, office, retail) when the goal is to develop a more complete neighborhood center. The distribution of land uses and the degree of street connectivity within a city also influences how people travel. Land use strategies that place daily needs near each other and near residential neighborhoods allows some trips to be made without a car. Development patterns that provide convenient pedestrian connectivity to parks, schools, retail, and jobs also supports non-automotive transportation options. Mixed-use development can create pedestrian-friendly environments with a variety of uses nearby that allow people to live, work, play, and shop in one place.

The City of La Mesa has a history of building smart growth projects. The City's planning efforts for infill TOD have been ongoing since the late 1980s when the trolley first came to La Mesa. The Mixed-Use Overlay Zone was established in 2009 to promote the revitalization of La Mesa's transit corridors by increasing housing options close to transit. As part of the proposed Mixed-Use Overlay Zone, a conditional use permit is required for new gas stations, drive-through sales, and other automobile uses. Limits on the amount of retail area on the ground floor in the residential zone were removed. The Mixed-Use Overlay Zone standards and design guidelines facilitate the development of pedestrian areas and streetscape improvements that create a more walkable and attractive pedestrian environment, implementing related goals and policies of the General Plan.

Redevelopment and increased development along the transit corridors and around transit has, and will continue to, provide new housing options and destinations in a mixed-use environment. This development pattern brings residents in closer proximity to transit and creates a more walkable, bikeable environment to help reduce vehicle trips. The City's ongoing and future efforts to facilitate such development will be complemented by improvements to transit services and active transportation projects identified in the San Diego Forward Plan that would serve La Mesa residents, visitors, and employees.

In 2015, the City of La Mesa adopted an optional in-lieu parking fee program and amended parking standards for the Downtown Village to implement existing goals and policies of the Downtown Village Specific Plan regarding parking. This program allows parking requirements to be met via an in-lieu fee instead of constructing on-site parking, which effectively increases the amount of development that can be accommodated in this area. The City has also applied a 25% reduction in parking requirements in the Downtown Commercial zone to reflect the presence of transit. SANDAG created a Regional Parking Management Toolbox[27] to support local governments in designing and implementing parking management strategies.

- The Toolbox presents common parking system challenges and corresponding strategies across 12 different community typologies identified within the San Diego area (e.g., urban center, suburban employment center, coastal community).
- The Toolbox can be used to develop community-specific solutions to parking problems, and could be applied to mixed-use or TOD areas within La Mesa to help further facilitate this type of development without generating new parking concerns.

The City will evaluate the parking-related strategies within the Toolbox as a part of a broader examination of potential barriers to TOD or mixed-use projects. As part of San Diego Forward: The Regional Plan, SANDAG is developing a Regional Mobility Hub Implementation Strategy. By locating multiple transportation services and amenities in one location, mobility hubs will help people take advantage of transit and other alternate transportation choices. Stations along Trolley, SPRINTER, COASTER, Rapid, and high-volume bus routes are all candidates for mobility hub investment. The strategy will identify areas where mobility hubs could be located and how they might be designed. Pilot projects could then be implemented to test out and demonstrate how mobility hub concepts can be applied. A catalog of mobility hub features, amenities, and implementation options are also being prepared to describe the wide range of elements that can contribute to a mobility hub, including transit improvements, pedestrian and bicycle amenities, emerging technologies, and motorized transportation amenities and services, including those that are provided by private entities. The catalog will serve as a resource for member agencies, transit operators, and private service providers as they work together to design and implement mobility hubs in their communities. As part of the program, the Grossmont Trolley Station is identified as one of eight examples of successfully operating mobility hubs.

The City will continue to identify areas that can support the increased densities and activities associated with mixed-use development strategies, including:

- analyzing infrastructure capacity and developing infrastructure investment strategies,

[27] SANDAG Regional Parking Management Toolbox— http://www.sdforward.com/mobility-planning/parking-toolbox

- identifying amenities that can be constructed in planned higher-density development areas to help attract investment,
- restructuring development impact fees to reflect reduced public facilities demand associated with more compact development,
- distribution of shared parking opportunities, and
- identifying strategies to increase densities around primary transit nodes.
- incorporating incentives to new developments that include transportation strategies to reduce VMT (reduced parking offset by TDM incentives).

The City's trolley stations are currently outside of the Mixed-Use Overlay Zone, though some are surrounded by land use designations that potentially allow for mixed-use developments. Opportunities may exist to expand these mixed-use designations or overlay zone to additional trolley station areas in future land use planning efforts to further improve residents' and employees' access to transit and increase the ridership base. This would also provide the added benefit of reducing off-street parking requirements within these areas, as an additional incentive for development.

The California Governor's Office of Planning and Research is charged with providing guidance on analyzing travel demand (VMT) impacts of projects under CEQA. Local jurisdictions are developing their own tailored approach for this same topic. As a part of a future General Plan update, amendment, or separate transportation impact analysis guidelines, the City will develop an approach to examining VMT impacts of future projects that is appropriate for the local and regional context, and that considers VMT-related emission reductions needed to achieve GHG reduction targets, related co-benefits of VMT reductions, and relevant goals, objectives, and policies of the City's General Plan.

This reduction measure is related to, and potentially enhances, the effectiveness of other Land Use and Transportation reduction measures. As noted previously, the relationship between reduction measures is why the City has developed an overall Performance Standard for the Land Use and Transportation Strategy (see Table 3.3). The VMT reductions from infill, mixed-use, and transit-oriented development under this reduction measure will work with the City's existing policy framework, regional programs, and the supportive existing context to lower per-capita and per-service-population emissions in the City toward achievement of the 2020 and 2035 GHG targets. Transportation emissions in future GHG inventory updates will be sensitive to the local context in order to capture the emissions-reduction benefit of this and related reduction measures.

Implementation Table T-4: Mixed-Use and Transit-Oriented Development

Action		Responsibility	Timeline
1	a. Host roundtable discussion or individual interviews with representatives of local development community to identify primary barriers to higher-density / intensity development in transit-served areas throughout community; include an examination of whether impact fees can be adjusted to reflect reduced utility / service demands of higher-density, mixed-use development b. Take steps to reduce / remove identified municipal barriers to such development to facilitate higher-density development within designated areas to increase potential ridership of residents and employees along existing transit routes	CD - Planning	Near-term
2	a. As part of General Plan update, amendment, or stand-alone guidance, develop VMT impact analysis and mitigation guidelines for proposed development	CD - Planning	Near-term
3	a. Adopt zoning amendment that provides incentives for new development to incorporate TDM strategies	CD - Planning	Near-term
4	a. Work with SANDAG to enhance local transit service options in designated higher-density, mixed-use development areas to take advantage of proximity to new potential transit riders b. Participate in future SANDAG-led mobility hub planning programs to lay foundation for long-term VMT reduction opportunities in La Mesa	CD - Planning	Medium-term
5	a. Identify areas that could support increase in population or employment within ¼ - ½ mile walking distance to transit stops (e.g., trolley station areas). Expand Mixed Use land use designation and zoning district in vicinity of LM-5, Amaya Trolley Station, and LM-7, Spring Street Trolley Station regional Smart Growth Areas b. Work with Public Works Department to evaluate capacity for higher-density / intensity development in these areas, and develop prioritization and funding strategies to complete necessary infrastructure improvements, along with amenities that could be constructed to attract investment	CD - Planning	Medium-term
6	a. Conduct parking surveys in areas with good transit access (e.g., downtown) to determine if existing parking is adequate in quantity and location for future increased development density / intensities; adopt ordinance amendments to allow parking reductions, where appropriate b. Pending conclusions of parking analysis (i.e., if existing parking standards are found to be too high), reduce off-street parking requirements in these areas for transit-oriented and mixed-use developments, for developments providing shared parking, and / or for developments that incorporate certain travel demand management measures	CD - Planning	On-going

Implementation Table T-4: Mixed-Use and Transit-Oriented Development

Action	Responsibility	Timeline

Performance Standard	Year
Reduce VMT per capita by 6% compared to 2010 levels (25.1 daily VMT per capita in 2010); The emissions reductions associated with this standard can be achieved through reducing travel demand or by combining a reduction in travel demand with a change to less GHG-emitting fuel sources (electric vehicles, for example) that provides equivalent benefit for GHG emissions reductions.	2035

T-5

ALTERNATIVE REFUELING INFRASTRUCTURE DEVELOPMENT

Support community-wide use of alternative fuel vehicles through expansion of alternative vehicle refueling infrastructure.

2020 GHG Reduction Potential: **150 MT CO_2e/yr**
2035 GHG Reduction Potential: **550 MT CO_2e/yr**

Methodology: See Appendix B, page B-20

Alternative-fueled vehicles use electricity, compressed natural gas (CNG), liquefied petroleum gas (LPG), hydrogen electric fuel cells, and other fuel sources that have lower carbon content than traditional gasoline and diesel fuel. Zero-emissions vehicles (ZEVs), which include electric and hydrogen electric fuel-cell vehicles, emit no tailpipe pollutants. As engine technologies have continued to advance, alternative-fueled vehicles have become increasingly popular to reduce fuel costs and emissions.

One of the primary challenges to broad adoption of alternative-fueled vehicles, including ZEVs, has been the limited refueling infrastructure available to support a range of vehicle types. Often referred to as "range anxiety," an incomplete network of refueling infrastructure limits broad adoption of these vehicles as drivers feel confined to the limits of their known refueling locations. Local governments can play a role in combatting range anxiety by supporting cost-effective opportunities to install recharging infrastructure for electric vehicles (EV), requiring pre-wiring for electric charging stations in new developments and parking lots, and working regionally to construct more expensive infrastructure, such as CNG, LPG, and hydrogen refueling stations. The City of La Mesa intends to install an EV charging station at City Hall.

Studies have shown that the majority of EV charging takes place at home, which indicates a role for retrofits to existing residential properties to support installation of EV charging stations. Since the majority of EV charging takes place at home, vehicles can be left to charge overnight and can take advantage of utility time-of-use pricing discounts. However, most existing construction was developed prior to consideration of vehicles' charging needs in the garage or carport. Depending on the age of the building, its electrical system, and the design of the garage, electrical retrofits to accommodate an at-home EV charging unit could cost several hundred to several thousand dollars. Increasingly, pre-wiring to accommodate the future installation of EV charging systems is being designed into new residential and commercial construction. Retrofitting existing multi-family rental properties poses an additional unique challenge since the tenants do not own their garages or carport areas or have the ability to install their own charging stations.

To facilitate the installation of at-home charging infrastructure in La Mesa, the following strategies will continue or be implemented:

- Continue to implement requirements of the CALGreen Building Code, including recent revisions addressing pre-wiring requirements for electric vehicle charging stations,
- Adopt a streamlined permitting process for electric vehicle charging stations, per requirements of AB 1236,
- Expand EV charging stations to new commercial construction to increase the presence of EV charging units available in the workplace, and for public use in retail and office parking lots, and
- Collaborate with other local governments to develop a strategy for increasing installation of EV charging units in existing multi-family rental properties.

CNG is another alternative-fuel technology that requires special refueling infrastructure. CNG vehicles have become more common in large vehicle fleets, such as trash trucks, shuttle buses, transit buses, municipal bus fleets or delivery vehicle fleets, because they provide significant emissions reductions over diesel engines and currently offer fuel price savings as a result of increased domestic natural gas production. There are also CNG passenger vehicle and light-duty truck models available for use by the general public. In 2015, EDCO, the City's waste disposal vendor, constructed a new publicly accessible CNG station that is used by its vehicle fleet.

The City will work with the San Diego Regional Clean Cities Coalition to identify strategies for increasing the availability of refueling and recharging infrastructure community-wide, as well as implementing community outreach on the benefits of alternative-fueled vehicles.

In February 2016, SANDAG adopted The San Diego Regional Alternative Fuel Readiness Plan (Readiness Plan), developed to accelerate the deployment of alternative fuel vehicles (AFV) and alternative fuel infrastructure (AFI) in the San Diego region by identifying regional barriers and developing resources to overcome them.

Implementation Table T-5: Alternative Refueling Infrastructure Development

Action		Responsibility	Timeline
1	a. Implement mandatory requirements of CALGreen Building Code related to electric vehicle charging station pre-wiring requirements	Citywide	Near-term
2	a. Require installation of public-use EV charging units in parking lots of new non-residential construction b. Work with regional partners to establish threshold for such requirements (e.g., new construction of more than 10,000 sq. feet, parking lots with more than 20 parking spaces) c. Update City's Municipal Code to reflect these changes	Citywide	Near-term

Implementation Table T-5: Alternative Refueling Infrastructure Development

Action		Responsibility	Timeline
3	a. As alternative fueling and recharging station options become available throughout city and region, provide links to maps showing their location on City's Sustainability webpage b. Include information on available clean vehicle rebate programs	Citywide	Near-term
4	a. Partner with SANDAG, SDAPCD, and local multi-family property managers to develop strategies to increase installations of EV charging infrastructure in existing multi-family complexes, including: ▪ development of technical guidance, ▪ permitting support from Building Division, and ▪ identification of rebates or financing options	Citywide	Medium-term
5	a. Utilize / promote existing EV Expert support available through Plug-In SD to assist potential EV charging station hosts in evaluating options for their site, including commercial, multi-family, municipal, etc. b. Share link to EV Expert on City's Sustainability website	Citywide	Medium-term
6	a. Partner with SANDAG, SDAPCD, and other area jurisdictions in exploring cost-effective ways to increase alternative vehicle charging / refueling infrastructure available for public use within community, through grant funded opportunities or partnerships with technology providers (e.g., EV charging infrastructure providers)	Citywide	Medium-term
7	a. Participate in regional discussions with SANDAG and SDG&E on technical aspects of alternative refueling strategies such as: ▪ infrastructure development, as it relates to increased electricity demand and / or natural gas service expansion ▪ long-term infrastructure development strategies to support broad regional transition towards alternative fuel vehicle options	Citywide	Long-term
8	a. Install EV charging station at City Hall	City Manager's Office	Near-Term

Performance Standard	Year
Reduce VMT per capita by 6% compared to 2010 levels (25.1 daily VMT per capita in 2010); The emissions reductions associated with this standard can be achieved through reducing travel demand or by combining a reduction in travel demand with a change to less GHG-emitting fuel sources (electric vehicles, for example) that provides equivalent benefit for GHG emissions reductions.	2035

T-6

MUNICIPAL FLEET TRANSITION

Continue to transition the municipal vehicle fleet from gasoline- and diesel-powered vehicles to alternative-fuel or other low-emissions vehicles.

2020 GHG Reduction Potential: **10 MT CO_2e/yr**
2035 GHG Reduction Potential: **10 MT CO_2e/yr**

Methodology: See Appendix B, page B-20, 21

Compressed natural gas (CNG), electric vehicles (EVs), and hybrid vehicles are increasingly being incorporated into municipal fleets nationwide to help reduce vehicle-related emissions and show sustainability leadership at the local government level. Although the municipal fleet represents a small subset of the community-wide transportation emissions, the City can take a leadership role in promoting the benefits and opportunities associated with low-emissions vehicles, and possibly realize operational cost savings (depending on the vehicles selected and associated fuel/energy costs).

The City owns four hybrid vehicles for use by the City's building inspectors and parking enforcement, which reduce gasoline consumption. Other departments have begun incorporating high-efficiency vehicle models. The Police Department is employing new Ford models that are 14% more fuel efficient than their predecessors, and nine vehicles in the Public Works Department were replaced with lower emissions models. Global positioning systems (GPS) installed in Public Works Department vehicles have resulted in reductions in fuel consumption. The City is further improving vehicle efficiency though use of AIMS Fuelmaster devices on all EMS vehicles, with plans to install the devices on all new and existing vehicles to help monitor vehicle fuel consumption and support early identification of maintenance issues.

The City analyzed alternative fuel vehicle opportunities within its municipal fleet through the Energy Roadmap Program. This analysis identified five vehicles that could be good candidates for replacement with alternative fuel vehicles given their high annual mileage use and existing alternative fuel vehicle options. Of those five vehicles, two were passenger cars that could be replaced with hybrid electric vehicles in the near-term. The other three were trucks that could potentially be replaced with propane or CNG vehicle options. This measure conservatively estimates reductions associated with the two hybrid vehicle replacement options by the 2020 target year, and does not assume further vehicle replacements to occur.

To formalize its fleet transition towards lower emissions models, the City will develop fleet-related targets, such as an emissions reduction target, fuel consumption target, or specific vehicle type targets (e.g., 15% EV models, 10% CNG models, 25%, ultra-low-emissions models). As described in Measure T-5, the City can also pursue installation of refueling and recharging infrastructure, including EV charging units or a CNG facility.

To track implementation success, the City will continue to maintain a detailed vehicle fleet inventory annually log information on each vehicle's: make, model, age, mileage, fuel consumption (by fuel type), associated department, lease expiration date or estimated date of replacement, opportunities for downsizing or consolidation with other vehicles, and potential vehicle replacement models. Accurately collecting this information will allow the City to track progress towards multiple fleet-related goals and better plan for long-term refueling/recharging infrastructure investments.

Implementation Table T-6: Municipal Fleet Transition

Action		Responsibility	Timeline
1	a. Develop municipal fleet low-carbon target; defined as A) Total vehicle fleet composed of X% zero- or lower-carbon vehicles, B) Total vehicle fleet emissions reduction target (can be achieved through combination of reduced VMT, vehicle technology, mode shift, etc.), or C) Total annual fuel use target; define vehicle fleet transition pathway to achieve selected target	Citywide	Medium-term
2	a. Refer to vehicle fleet assessment of Energy Roadmap when deciding which vehicles to replace with alternative-fuel vehicles b. Regularly update assessment to identify opportunities for future vehicle replacement	Citywide	Medium-term
3	a. Explore joint procurement options with other area jurisdictions to leverage regional shift towards cleaner municipal fleets into lower per vehicle costs b. To facilitate this, connect with Public Fleet Supervisors Association to identify partnership opportunities, competitive vendor pricing, and industry best management practices	Citywide	Medium-term
4	a. Pursue grant funding, vendor's promotional offers, or regional joint-procurement partnerships to install alternative fuel charging stations at City facilities for use by municipal vehicles and public	Citywide	Medium-term
5	a. At time of replacement, shift passenger vehicle purchases toward EV, hybrid-electric, hydrogen fuel cell, or CNG models b. Include new vehicles' carbon emissions and fuel efficiency as regular procurement criterion	Citywide	On-going

Progress Indicators	Year
220 gallons of gasoline/yr saved from passenger vehicle replacement; 340 gallons of gasoline/yr saved from light-duty truck replacement	2020 and 2035

Note: This measure conservatively assumes that the City will not expand vehicle efficiency improvements in the municipal fleet beyond the two vehicles described in this measure.

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Water Strategy

Water-related GHG emissions are primarily a result of energy used to pump, transport, and treat potable water, and treat wastewater. Emissions associated with this sector accounted for approximately 2% of the community-wide GHG inventory, which indicates a relatively small role for water conservation in the City's emissions reduction strategy. However, with water supplies on the decline, water conservation strategies have the added benefit of aligning demand with future water availability.

This strategy area considers emissions reductions resulting from local implementation of statewide water conservation legislation. The total GHG emissions reduction potential of the Water Strategy is 450 MT CO_2e/yr in 2020 and 1,590 MT CO_2e/yr in 2035. This represents approximately 3% and 1% of total local CAP measure reductions in 2020 and 2035, respectively (Table 3.6).

Table 3.6
Water Strategy Emissions Reduction Potential

Target Year	Total Mass Emissions (MT CO_2e/yr)	Percentage of Total Local Reduction Potential
2020	450	3%
2035	1,590	1%

Note: MT CO_2e = metric tons of carbon dioxide equivalent

W-1

URBAN WATER MANAGEMENT PLAN PROGRAMS

Support Helix Water District in implementing outreach and community education programs related to water conservation policies contained within the Urban Water Management Plan.

2020 GHG Reduction Potential: **450 MT CO_2e/yr**
2035 GHG Reduction Potential: **1,590 MT CO_2e/yr**

Methodology: See Appendix B, pages B-21, 22

The State has made water conservation a priority through adoption of SB X7-7 in 2009, which requires California to achieve a 20% reduction in urban per-capita water use by December 31, 2020. The State is required to make incremental progress toward this goal by reducing per-capita water use by at least 10% on or before December 31, 2015. SB X7-7 requires each urban retail water supplier to develop both long-term urban water use targets and an interim urban water use target. This law also creates a framework for future planning and actions for urban and agricultural users to reduce per-capita water consumption by 20% by 2020.

On May 9, 2016, the State of California Governor signed Executive Order B-37-16, which established a new water use efficiency framework for California. The order bolstered the State's drought resilience and preparedness by establishing longer-term water conservation measures that include permanent monthly water use reporting, new urban water use targets, reducing system leaks and eliminating clearly wasteful practices, strengthening urban drought contingency plans and improving agricultural water management and drought plans. [28] In April 2015, Executive Order B-29-15 established measures to save water by reducing per-capita water use, requires increased enforcement, including: water conservation pricing

[28] Office of Edmund G. Brown, Jr.- Governor's Drought Declaration. Available: http://www.water.ca.gov/waterconditions/declaration.cfm Accessed May, 20, 2017.

measures, prioritizes and streamlines water supply infrastructure projects, and invests in new water saving technologies. The measure applies to urban water users, as well as agricultural users.[29]

As part of its 2010 Urban Water Management Plan (UWMP), the Helix Water District demonstrates its current and future abilities to provide water within its service boundaries. The Helix Water District incorporated its water conservation targets and plan into its current UWMP. In general, the plan identifies best management practices (BMPs) in water conservation, including:

- residential water surveys and retrofits;
- landscape water audits, leak detection, and turf removal and water-efficient device rebates;
- metering and conservation pricing;
- public information and educational programs;
- water-efficient appliance and high-efficiency toilet rebates; and,
- water waste prevention measures.

The City already provides links to information on the Sustain La Mesa webpage regarding water conservation, including links to Helix Water District's water conservation tips webpage and the San Diego County Water Authority webpage. Also, as previously described, the City participates in six PACE financing districts that offer residents and businesses financing options for qualifying water-conservation improvements. Water conservation rebates may also be available from SoCal WaterSmart. In addition to these water-conserving activities, the City will establish a framework for tracking municipal water use and develop a municipal water use target to be achieved through various efforts, including installation of water-conserving devices and irrigation systems, and employee education.

Implementation Table W-1: Urban Water Management Plan Programs

Action		Responsibility	Timeline
1	a. Participate in Helix Water District outreach programs, as necessary, to increase community awareness and activity in water conservation programs b. Discuss opportunities with Helix to assist in promotion of free water audits for residents and local businesses	CD - Planning	On-going
2	a. Include information related to PACE district financing options for water-conserving retrofits on Sustain La Mesa webpage b. Include local success stories that used this financing option to demonstrate what types of improvements are possible	CD - Planning	Near-term

[29] Office of Edmund G. Brown, Jr. Governor Brown Directs First Ever Statewide Mandatory Water Reductions. Available: http://gov.ca.gov/news.php?id=18910. Accessed May 20, 2017.

Implementation Table W-1: Urban Water Management Plan Programs

Action		Responsibility	Timeline
3	a. Establish operational framework for benchmarking, tracking, and reviewing municipal water use at meter level to allow identification of improper irrigation system use, leaks, or other wasteful water activities b. Incorporate water use reporting into overarching CAP progress reporting procedure (can be linked with annual General Plan implementation reporting procedures)	CD - Planning	Near-term
4	a. Establish municipal water use reduction target to be achieved through education, indoor plumbing and appliance retrofits, use of advanced irrigation systems, and installation of additional low-water use landscapes in medians, parks, and around City buildings / facilities	CD - Planning	Near-term
5	a. Following 2020 water target year, work with Helix Water District staff to identify additional water saving actions that could achieve CAP's 2035 per capita water target. Actions may include further implementation of BMPs already identified in Helix's Urban Water Management Plan or BMPs from other jurisdictions, with greater use of existing PACE financing programs to increase water conservation action in La Mesa. b. City will monitor per capita water consumption rate during CAP implementation progress reporting, using interim targets to track progress between the CAP's 2020 and 2035 target years, including 98 gallons per capita per day in 2025 and 94 gallons per capita per day in 2030.	CD - Planning	Near-term

Progress Indicators	Year
Achieve water use levels of 103 gallons per capita per day	2020
Achieve water use levels of 89 gallons per capita per day	2035

W-2

WATER SENSITIVE LANDSCAPE DESIGN AND IRRIGATION

Conserve water through efficient landscaping design and irrigation.

Supporting Measure – Not Separately Quantified

The City adopted a model water efficient landscape ordinance in 2010, in accordance with AB 325 and the State's requirements for water conservation. In December 2015, Governor Brown's Drought Executive Order of April 1, 2015 (EO B-29-15) directed DWR to update the State's Model Water Efficient Landscape Ordinance (Ordinance) through expedited regulation, which the City currently implements.

The water efficient landscape regulations adopted are intended to achieve the following goals:

a. Promote the values and benefits of landscapes while recognizing the need to utilize water and other resources as efficiently as possible.

b. Establish a structure for planning, designing, installing, maintaining and managing water efficient landscapes in new construction.

c. Promote the use, when available, of tertiary treated recycled water, for irrigating landscaping.

d. Use water efficiently without waste by setting a Maximum Applied Water Allowance as an upper limit for water use and reduce water use to the lowest practical amount.

e. Encourage water users of existing landscapes to use water efficiently and without waste.

The City is leading by example to reduce outdoor water use on City property through:

- lawn removal projects at City Hall and irrigation system upgrades at all City parks and some landscapes at other City buildings and roadway medians.
- developing a graywater education program to help residents and businesses understand the water-saving opportunities and regulations related to graywater use, which is already allowed under the current Building Code.
- a graywater brochure developed by the Environmental Sustainability Commission that provides an introduction to the concept of graywater use at home that can be shared on the Sustain La Mesa website.
- providing educational workshops on graywater systems to environmental groups, gardening clubs, and community-members to further disseminate information and increase use of such systems.

Implementation Table W-2: Water Sensitive Landscape Design and Irrigation

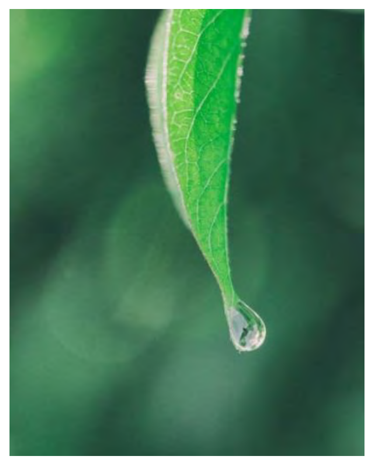
Action			Responsibility	Timeline
1	a.	Finalize graywater education program and begin hosting workshops with local environmental groups, gardening clubs, and other community organizations, and enlist their help in advertising program and benefits of graywater systems	CD - Building	Near-term
	b.	Prepare informational material on graywater system designs for Building Division staff to share during building design and permitting phase; provide links to graywater education program informational materials on Sustain La Mesa webpage		

W-3

PURE WATER PROGRAM

Participate in the Pure Water Program to convert wastewater to potable drinking water.

Supporting Measure – Not Separately Quantified. GHG reductions estimated to occur from the Pure Water Program are not directly attributable to the City of La Mesa because of differing methodologies in GHG calculations.



Currently, the San Diego region imports the majority of its drinking water from distant areas. Significant amounts of energy are required to move the water. By 2035 the Pure Water Program will convert a minimum of 83 million gallons a day of wastewater into potable drinking water for the region. Pure Water will lower the region's reliance on energy-intensive imported water. The water generated by Pure Water will result in a net energy reduction as compared to imported water.

The City of La Mesa sends its wastewater to the City of San Diego Point Loma Wastewater Treatment Plant for treatment. In the future, a portion of the wastewater will be converted into drinking water rather than sent to an ocean outfall. Because of the benefit of offloading wastewater flows from the Point Loma Wastewater Treatment Plant, the City of La Mesa will participate in and benefit from the Pure Water Program. The offloading of flows at Point Loma should allow the Point Loma Plant to remain at the primary treatment level rather than converting to a very expensive secondary treatment level. The offloading of flows will reduce the solids emanating from the outfall to a level that would be equivalent if the Plant were to convert to secondary treatment.

Implementation Table W-3: Pure Water Program

Action			Responsibility	Timeline
1	a.	Implement total of 15 million gallons per day of potable wastewater reuse by 2023	PW - Engineering	Medium-term
	b.	Implement cumulative total of 30 million gallons per day of potable wastewater reuse by 2025		Long-term
	c.	Implement cumulative total of 83 million gallons per day of potable wastewater reuse by 2035		Long term

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La Mesa Village
FARMERS MARKET
CERTIFIED
SINCE 1993
EVERY FRIDAY 2 TO 6 P.M.
CITY OF LA MESA
CAFFÈ ESPRESS

Solid Waste Strategy

Waste disposal creates emissions when organic waste (e.g., food scraps, yard clippings, paper and wood products) is buried in landfills and anaerobic digestion takes place, emitting methane. Additionally, extracting and processing raw materials for consumer products, distributing them to consumers and disposing of them creates GHG emissions. According to the City's 2010 baseline emissions inventory, approximately 5% of GHG emissions are associated with solid waste generation and disposal in landfills. As the City of La Mesa's solid waste franchise company, EDCO Disposal Corporation (EDCO) has the primary responsibility for the solid waste implementation strategy. At EDCO, all current programs are aligned to focus on diversion goals in order to obtain the goal of Zero Waste. An important strategy in the management of organic waste is source reduction, especially as it relates to the generation of food waste. EDCO's goals and actions include:

a. Continuing to stress the importance of the food recovery hierarchy published by the Environmental Protection Agency in future Environmental Times newsletters about organic waste issues.

b. Focusing efforts on commercial food waste diversion/ processing.

c. Identifying site generators that may be required to participate in organic recycling programs based on the volume of solid waste currently generated.

d. Building infrastructure to support the future processing of food waste, both pre- and post-consumer. EDCO's efforts will first be focused around the largest impacts and or materials that have the highest pounds per cubic yard:

    - Commercial landscapers and landscape maintenance providers
    - Restaurants and hospitality establishments with food service
    - Grocery stores
    - Multi-family complexes greater than 5 units with substantial green waste generation
    - Construction & demolition debris

e. Working on infrastructure to extract recyclables from the waste stream.

The City of La Mesa plans to continue to implement the State of California's goal of 75 percent recycling, composting, or source reduction of solid waste by 2020 and supporting EDCOs efforts to achieve its waste diversion goals. Implementation programs to achieve waste diversion can include community-wide recycling, organics collection (e.g., food scraps, compostable paper), and green design to minimize construction-related waste. These practices combined can lead to lower landfill-related emissions, and help to extend the useful operating life of local landfills.

The measures included within the Solid Waste Strategy provide total GHG emission reduction potential of 5,350 MT CO_2e/yr in 2020 and 17,050 MT CO_2e/yr in 2035. This represents approximately 32% and 15% of total local CAP measure reductions in 2020 and 2035, respectively (see Table 3.7).

Table 3.7
Solid Waste Strategy Emissions Reduction Potential

Target Year	Total Mass Emissions (MT CO_2e/yr)	Percentage of Total Local Reduction Potential
2020	5,350	32%
2035	17,050	15%

Note: MT CO_2e = metric tons of carbon dioxide equivalent

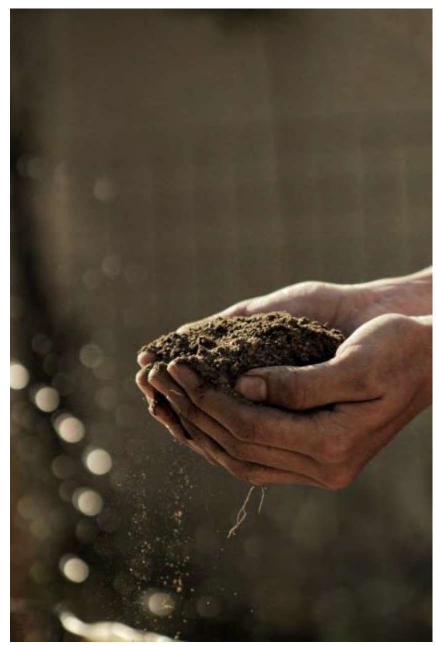
SW-1

FOOD SCRAP AND YARD WASTE DIVERSION

Work with local waste hauler to develop residential food scrap and compostable paper collection program.

2020 GHG Reduction Potential: **2,010 MT CO_2e/yr**
2035 GHG Reduction Potential: **see Measure SW-3**

Methodology: See Appendix B, pages B-22-24



Food scraps are unwanted cooking preparation and table scraps, such as banana peels, apple cores, vegetable trimmings, bones, egg shells, meat, and pizza crusts. Compostable paper, sometimes called food-soiled paper, usually comes from the kitchen and is not appropriate for paper recycling due to contamination. Materials such as stained pizza boxes, uncoated paper cups and plates, used coffee filters, paper food cartons, napkins and paper towels are all compostable paper. Diverting these organic items from the landfill helps to reduce methane gas generation from anaerobic decomposition, and helps to prolong the operable life of a landfill. Composting of organic materials, such as food, is one method of managing these materials and diverting them from landfills.

The City offers a backyard composting program through which residents can purchase discounted bins. In addition to this effort, the City will work with its franchise waste hauler to develop and implement a residential food scrap and compostable paper collection program that could expand participation in diverting these additional organic materials. These programs often use residents' green waste collection bins to transport green waste to area composting facilities. To increase organics diversion over the long-term, the City will continue to partner with regional agencies to develop education programs for integration into classroom curriculum. The City will also explore regional opportunities for food scrap collection and donation through implementation of AB 1826, the state mandated commercial agencies recycling law. The City will conduct a survey of local businesses to determine the current level of organics recycling efforts being made by businesses. Survey results will serve as the basis for La Mesa's commercial agencies recycling collection program. Existing models in San Diego and other jurisdictions can be reviewed for best practices of implementation success.

Implementation Table SW-1: Food Scrap and Yard Waste Diversion

Action			Responsibility	Timeline
1	a.	Discuss opportunities with franchise waste hauler to add residential food scrap collection services to City's waste collection contract	PW - Environmental Services	Medium-term
2	a.	Include links to franchise waste haulers page on Sustain La Mesa webpage or include list of compostable food scraps and paper products that can be collected in green waste bins	PW - Environmental Services	Medium-term
3	a.	Work with franchise waste hauler to promote use of green waste bins for organic waste collection through public outreach campaign that explains what items can be collected and benefits of green waste recycling; work with "I Love a Clean San Diego" to incorporate information on new organic waste collection program into their on-going classroom curriculum	PW - Environmental Services	Long-term
4	a.	Explore opportunities with franchise waste hauler and other local business organizations to develop and encourage participation in commercial food scrap collection pilot program	PW - Environmental Services	Long-term

Progress Indicators	Year
Households and businesses divert 5% of food scraps and compostable paper; Households and businesses divert 85% of yard waste	2020
See Measure SW-3	2035

Note: This measure is contingent on the City's waste service provider, EDCO, having the capacity and facilities to accommodate food waste and organics recycling services. EDCO is in the process of identifying site generators to participate in organic recycling programs based on the volume of solid waste currently generated. EDCO has permitted and is in the process of building infrastructure to support the future processing of food waste, both pre- and post-consumer.

SW-2

CONSTRUCTION & DEMOLITION WASTE DIVERSION PROGRAM

Continue to enforce the City's construction and demolition waste diversion ordinance.

2020 GHG Reduction Potential: **3,340 MT CO_2e/yr**
2035 GHG Reduction Potential: **see Measure SW-3**

Methodology: See Appendix B, pages B-24-25

According to the California Department of Resources Recycling and Recovery (CalRecycle) 2014 Statewide Waste Characterization Study, construction and demolition (C&D) materials account for almost 10% of the waste stream in California, and represent nearly 40% of self-hauled waste.[30] Scrap lumber composes nearly 14% of the statewide total. Lumber is an organic material, and therefore generates methane emissions through anaerobic decomposition in a landfill. Reusing and recycling C&D materials conserves natural resources and diverts material from landfills, reducing GHG emissions and conserving landfill capacity. Many other construction materials can also be diverted from the waste stream for reuse or recycling, including concrete and asphalt, bricks, scrap metal, and drywall.

The California Green Building Code requires the diversion of at least 50% of construction waste materials generated during most new construction, including all new residential and commercial projects. The City of La Mesa increased its diversion rate requirement to 75% when the EDCO recycling facility accepting mixed C&D debris began operation in nearby Lemon Grove. The City also requires a C&D diversion deposit prior to issuing building permits, which further increases implementation of this strategy. A deposit is paid to the City prior to issuance of building permits, and refunded to applicants following submittal and approval of the applicable waste diversion documentation. Alternatively, applicants can provide a signed contract with an authorized C&D collector in lieu of deposit payment. Deposit rates are calculated based on project type and size.

[30] CalRecycle, *2014 Disposal-Facility-Based Characterization of Solid Waste in California*. October 6, 2015. Prepared by Cascadia Consulting Group. Available: http://www.calrecycle.ca.gov/Publications/Documents/1546/20151546.pdf

To maintain a high level of C&D waste diversion from landfills, the City will continue to enforce its diversion ordinance and its deposit program. The City will also continue to participate in regional discussions regarding solid waste diversion efforts in the San Diego area, and consider the efforts of neighboring jurisdictions when planning revisions to La Mesa's requirements.

Implementation Table SW-2: Construction & Demolition Waste Diversion Program

Action		Responsibility	Timeline
1	a. Continue to implement City's 75% C&D diversion requirement for applicable projects as defined in City's Construction and Demolition Debris Diversion Ordinance b. Continue to enforce C&D Debris Diversion Deposit Program to help implement diversion ordinance	CD - Building	On-going
2	a. Participate in regional waste diversion discussions and monitor mandatory participation levels in other area C&D diversion ordinances b. Revise City's diversion requirements to address smaller renovation projects	CD - Building	Long-term

Progress Indicators	Year
Projects divert 75% of construction and demolition waste, per City's ordinance	2020
See Measure SW-3	2035

SW-3

75% WASTE DIVERSION GOAL

Maximize waste diversion efforts community-wide with particular focus on organic and recyclable waste.

2020 GHG Reduction Potential: **0 MT CO_2e/yr**

2035 GHG Reduction Potential: **17,050 MT CO_2e/yr**

Methodology: See Appendix B, page B-26

During the CAP's community outreach process, several participants at the City's CAP workshops suggested local composting programs, food scrap collection services, and waste diversion strategies, which when combined would help to achieve a community-wide 75% waste diversion goal. Achieving a 75% waste diversion goal can be implemented incrementally in concert with statewide efforts. In 2011, Assembly Bill 341 established a policy goal that 75% of solid waste generated statewide should be source reduced, recycled, or composted by 2020. This expands upon the previous State goal to divert 50% of community-wide waste, with the two metrics measured in different ways.

The emissions reduction estimates presented above demonstrate a scenario in which 75% of waste generated in La Mesa that would otherwise have been sent to a landfill is diverted through various zero-waste strategies, which will likely include continued implementation and expansion of Measures SW-1, Food Scrap and Yard Waste Reduction, and SW-2, Construction and Demolition Waste Diversion Program. Robust community participation toward solid waste diversion efforts could be supported through public information and engagement campaigns, which present another opportunity for regional collaboration on this topic. Tracking success toward this goal would also benefit from a local or regional waste characterization analysis to identify the priority areas for intervention (e.g., food soiled waste collection, yard waste composting, enhanced multi-family residential recycling programs). The CAP's solid waste emissions analysis is based on a statewide solid waste characterization study.

Implementation Table SW-3: 75% Waste Diversion Goal

Action			Responsibility	Timeline
1	a.	Continue to implement CAP Measures SW-1 and SW-2	PW - Environmental Services	On-going
	b.	Identify opportunities to expand participation in both after the 2020 target year		
2	a.	City will prepare zero-waste plan that identifies interim steps toward achieving zero-waste community, including 75% waste diversion by 2035, as described in this CAP measure	PW - Environmental Services	Near-term
3	a.	Work with regional partners (e.g., neighboring cities, non-profit organizations, regional waste haulers) to prepare residential and commercial waste characterization studies to identify La Mesa- or San Diego region-specific opportunities for additional waste diversion	PW - Environmental Services	Long-term
	b.	Use study results to develop outreach campaigns that increase participation in City's existing waste management programs, targeting specific waste types and/or sources		
	c.	Implement pilot education program for organics recycling/diversion community-wide; leverage existing work from regional cities, such as Del Mar and Chula Vista, where available to improve on pilot program efficacy		
4	a.	Develop robust outreach campaign to ensure community-wide understanding of materials management service offerings, drive behavior change focused on lifecycle of materials (i.e., source reduction, materials reuse, end-of-life), and facilitate access to emerging materials management support tools	PW - Environmental Services	Long-term

Progress Indicators	Year
12,500 tons, or less, of solid waste disposed in landfills (75% waste diversion)	2035

Green Infrastructure Strategy

Green space consists of a variety of places that, when integrated within an urban environment, provide valuable recreation and health services to the community. In La Mesa, green space includes the urban forest, parks, landscaped medians and parkways, and natural stormwater-absorbing landscapes. Healthy and robust green infrastructure systems can mitigate the urban heat island effect, lower building energy use, provide natural stormwater management and wildlife habitat, improve local air quality, and increase community pride.

As one component of the green infrastructure network, urban forests provide shade and can reduce the heat island effect, which causes temperatures to increase in areas with concentrations of exposed pavement and rooftops. These higher temperatures can lead to increased air conditioner use, which increases energy consumption and can strain utility infrastructure at peak hours of the day. Urban forests also provide a visual amenity for residents and habitat value for wildlife.

The City recognizes various beneficial aspects of trees. Trees beautify neighborhoods, increase property values, reduce noise and air pollution, and create privacy. Additionally, trees gain carbon-sequestering biomass in their trunks and roots as they absorb carbon dioxide from the air to grow. The measure in this section seeks to enhance La Mesa's already well-established urban forest through partnerships with residents, businesses, and community and neighborhood groups.

The total GHG emission reduction potential of the Green Infrastructure Strategy is 50 MT CO_2e/yr by 2020 and 6,300 MT CO_2e/yr by 2035. This represents less than 1% of total 2020 reductions anticipated from local CAP measure implementation and nearly 5% of 2035 local CAP reductions (see Table 3.8). As the trees described in the following measure continue to grow and increase their carbon sequestration potential, the impact of this measure will also increase to provide greater reductions in future CAP updates.

Table 3.8
Green Infrastructure Strategy Emissions Reduction Potential

Target Year	Total Mass Emissions (MT CO_2e/yr)	Percentage of Total Local Reduction Potential
2020	50	<1%
2035	6,300	5%

Note: MT CO_2e = metric tons of carbon dioxide equivalent

GI-1

URBAN FOREST MASTER PLAN

Support natural carbon sequestration opportunities through continued development and maintenance of a healthy, vibrant urban forest.

2020 GHG Reduction Potential: **50 MT CO_2e/yr**
2035 GHG Reduction Potential: **see Measure GI-2**

Methodology: See Appendix B, pages B-26-27

The urban forest contributes to La Mesa's quality of life and attractiveness as a place to live, work, and visit. Trees play a valuable role in the identity of a city by strengthening a community's image, encouraging pedestrian activity, and developing inviting public and private spaces. Trees also perform important environmental functions, such as removing air and water pollutants, providing wildlife habitat, and capturing carbon dioxide from the atmosphere. Urban forests that include street trees can also provide shade to roadways and other paved areas to reduce the heat island effect.

Facilitating the development of vibrant green spaces and urban landscaping is an important goal for the City. The General Plan Land Use and Urban Design Element encourages use of greenery in design, and La Mesa has been recognized as a Tree City, USA since 1980. The City is also a participant in the San Diego County Tree Inventory program, which provides interactive maps to quantify the ecological and economic benefits of trees.

Recognizing the importance of maintaining and enhancing a healthy urban forest, the City will partner with existing neighborhood groups and organizations to encourage additional tree planting within the community. The City will host an educational workshop to assist residents with species selection and planting guidance to maximize building shading and minimize damage to underground utilities and pavement. The City will also continue to implement its existing landscaping requirements to integrate shading within parking lots to reduce local urban heat island impacts, as well as implement landscaping requirements at municipal facilities. To guide the long-term development and health of the City's urban forest, staff will develop an Urban Forest Master Plan or participate in future regional efforts to develop such a strategy. Such plans will include the potential long-term impacts associated with climate change when making recommendations on suitable tree species and planting strategies, particularly watering requirements to maintain a healthy tree network.

Implementation Table GI-1: Urban Forest Master Plan

Action			Responsibility	Timeline
1	a.	Continue to implement and support polices outlined in Tree Policy Manual, including landscaping requirements for new municipal facilities, parking lots, and public rights-of-way	PW - Engineering	On-going
2	a.	Continue to implement City's design standards for parking lot shade trees; continue to investigate best practices to monitor and enforce parking lot shade requirements	CD - Planning / PW - Engineering	On-going
3	a.	Partner with neighborhood groups, community organizations, and local business community to encourage tree planting on private property within La Mesa; host Urban Forestry workshop and invite representatives from SDG&E and Public Works staff to provide technical assistance regarding appropriate species selection, proper siting and safe planting practices, and strategies to avoid damage to sidewalks, driveways, and underground utilities	CD - Planning / PW - Engineering	Long-term
4	a.	City will develop an Urban Forest Master Plan, to reflect current scientific research, and contract with an Urban Forester to serve as strategic, long-range guide to proactively grow, improve, and manage City's urban forest; Master Plan will be implementation pathway for expansion of City's urban forest, as described in CAP Measure GI-2	PW - Engineering	Long-term

Progress Indicators	Year
500 net new trees planted in the community from 2015 onward	2020
See Measure GI-2	2035

GI-2

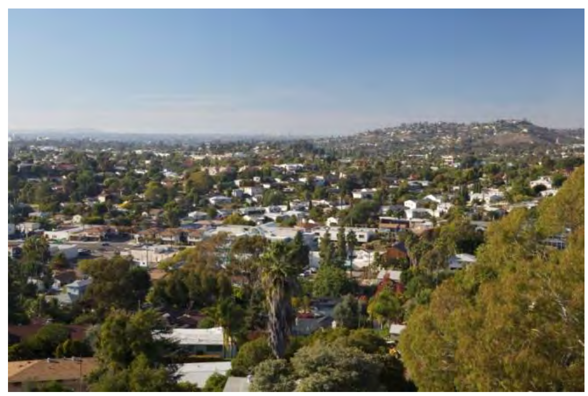
EXPANDED URBAN FORESTRY PROGRAM

Increase La Mesa's urban forest canopy coverage to reduce impacts of the heat island effect, improve stormwater management, provide additional habitat, and maximize carbon sequestration.

2020 GHG Reduction Potential: **0 MT CO_2e/yr**
2035 GHG Reduction Potential: **6,300 MT CO_2e/yr**

Methodology: See Appendix B, pages B-27

An Urban Tree Canopy Assessment was prepared for the San Diego region, which included a high-level analysis of La Mesa's urban forest. Based on the assessment, La Mesa has an existing urban forest canopy that covers 18% of the city (or 1,050 acres) with potential canopy coverage of 66% in the region. This measure assumes La Mesa can achieve 33% coverage by 2035, for a total urban forest of 2,450 acres. This type of ecological transformation would occur gradually over time, and could be guided by a regional approach to improve the health and increase the extent of the San Diego region's urban forest.



The emissions reduction estimate above represents the carbon sequestration potential from substantially increasing La Mesa's urban forest. It is assumed that half of the new urban forest coverage potential could be achieved by the 2035 target year. These estimates represent a high-level analysis for planning purposes, and that more detailed studies would be required to calculate La Mesa's carbon sequestration potential with greater accuracy.

Implementation Table GI-2: Expanded Urban Forestry Program

Action			Responsibility	Timeline
1	a.	Continue to implement CAP Measure GI-1	CD - Planning / PW - Engineering	On-going
2	a.	Identify partners (including jurisdictions, community organizations, residents, academic institutions) to develop and implement San Diego region urban forest strategy to increase percentage of tree canopy coverage. Seek and incorporate feasible input from the California Department of Fish and Wildlife on tree maintenance and urban forestry management strategies to avoid adverse impacts to sensitive species.	CD - Planning / PW - Engineering	Long-term

Progress Indicators	Year
Increase tree canopy by 1,400 acres from 2014 baseline	2035

CAP Implementation Strategies

In addition to the previous five strategy sections that focused on emissions reduction opportunities, this section presents two measures to assist in CAP implementation. La Mesa is one of many local governments in the San Diego region that is taking steps to address climate change through local policy development. It is likely that many of the measures described in this CAP have strong overlap with similar emissions reduction strategies from other cities, and could benefit from a collaborative implementation approach. The City will also need to monitor the implementation success of its CAP strategies and statewide actions to ensure local emissions are decreasing as estimated throughout this chapter.

I-1

REGIONAL IMPLEMENTATION PARTNERSHIPS

Participate in regional partnerships aimed at collaborative implementation of specific CAP strategies or other emissions reduction efforts.

Supporting Measure – Not Quantified

Various measures presented above could provide opportunities for regional collaboration on implementation, either through shared outreach strategies, regional funding and procurement programs, or long-term regional planning efforts. This regional approach could provide implementation efficiencies and facilitate discussion of best practices among local governments regarding emissions reduction strategies. The reduction measures presented throughout this chapter identify numerous implementing actions, some of which can be undertaken locally without need for additional partnerships and others that would benefit from different types of collaboration. The following sections identify collaborative opportunities for outreach and education, funding and finance, and long-term planning among the CAP's measures. Not all measures are represented since some can be fully implemented independently by City staff, while some are shown in multiple lists because different implementing actions could be pursued through the regional approaches discussed below.

Outreach and Education Campaigns

Community engagement and effective participation are essential to the successful implementation of this CAP. During the CAP implementation period, the City will conduct outreach programs that involve residents and businesses in various activities. Because this CAP is designed to leverage the actions of La Mesa's residents and businesses, outreach and informational campaigns explaining the benefits of action will play an integral role in implementation success.

Effective public participation will increase the likelihood that the measures recommended in this plan achieve their estimated participation rates. Furthermore, La Mesa will see higher participation rates if outreach and education programs are adapted over time to meet the changing needs of the community. Increased participation rates will result in increased emissions reductions.

While this CAP was developed to respond to local conditions and opportunities for action, the measures presented throughout likely share strong overlap with the emissions reduction activities or other communities in the region. To the extent that other local governments are developing and implementing outreach campaigns to drive participation in similar CAP program, there may be opportunities to share program costs and leverage existing informational materials, rather than create duplicative programs in La Mesa. For example, other area cities are encouraging the installation of roof-top solar PV systems in their communities. La Mesa could partner with these other jurisdictions to develop a comprehensive outreach and education program, and collectively learn from others implementation successes and challenges. Collaborative opportunities in outreach implementation may be found among the following CAP measures:

- E-1 Building Retrofit Program
- E-2 Shade Tree Program
- E-5 Solar Photovoltaic Program
- E-6 Solar Hot Water Program
- E-9 Community Choice Aggregation Program
- T-2 Bicycle Safety Program
- T-3 Transportation Demand Management Program
- W-1 Urban Water Management Plan Programs
- SW-1 Food Scrap and Yard Waste Diversion
- SW-3 75% Waste Diversion Strategy

Program Funding and Finance Opportunities

Several CAP strategies recommend expensive investment in infrastructure or equipment. As described in the measure descriptions in this chapter, regional financing programs or bulk procurement strategies could help to defray costs associated with the following CAP measures:

- E-3 Municipal Energy Efficiency Goal
- T-5 Alternative Refueling Infrastructure Development
- T-6 Municipal Fleet Transition

Long-Term Regional Planning Partnerships

Some strategies would benefit from a regional approach in ordinance development and implementation, long-term planning programs, or knowledge sharing on past successes and potential challenges to various issues. SANDAG already acts as facilitator on various regional topics. If enough interest exists, additional topics could be explored through a similar process, or other regional platforms, such as the San Diego Regional Climate Collaborative, could be explored depending on the subject area. For example, developing a regional urban forest strategy may be best pursued through a framework similar to the San Diego County Tree Inventory program. The following CAP measures could be elevated for discussion and action at the regional level:

- E-8 Zero Net Energy Construction
- E-9 Community Choice Aggregation Program
- T-1 Bicycle and Pedestrian Infrastructure Development
- T-4 Mixed-Use and Transit-Oriented Development

- T-5 Alternative Refueling Infrastructure Development
- SW-2 Construction and Demolition Waste Diversion
- GI-1 Urban Forest Management
- GI-2 Expanded Urban Forestry Program

Following adoption of the CAP, City staff will prioritize measures for implementation and identify which will be pursued through a regional approach. This will require an understanding of other climate change planning initiatives underway among area jurisdictions, as well as their implementation strategies. SANDAG could provide a platform for these cooperative efforts, and facilitate prioritization of regional emissions reduction actions and programs.

Implementation Table I-1: Regional Implementation Partnerships

Action			Responsibility	Timeline
1	a.	Collaborate with other local governments and SANDAG during CAP implementation phase to identify programmatic overlap among various CAP measures or sustainability strategies that could benefit from comprehensive regional approach; for example, building retrofit outreach programs would be very similar from one San Diego County city to another, allowing joint development of one program using shared resources	CD - Planning	Near-term
2	a.	Partner with other San Diego County governments, possibly through SANDAG-led approach, to prioritize regional sustainability issues and programs for joint implementation	CD - Planning	Near-term

I-2

CAP IMPLEMENTATION AND MONITORING

Establish monitoring and reporting frameworks to keep CAP document relevant and actionable

Supporting Measure – Not Quantified

The CAP is based on numerous assumptions and the best data available at the time of its preparation. However, those assumptions may prove to be inaccurate, which could skew the emissions growth forecasts or influence the emissions reduction estimates presented in this plan. Therefore, the CAP is treated as a living document and monitored and revised on a regular basis. The CAP will need to be updated to accurately reflect La Mesa's role in climate change planning as the State further implements its own emissions reduction actions, new data becomes available for analysis, and additional emissions reduction technologies and strategies are developed. Additionally, the City of La Mesa has received recognition from the Beacon Award Program for its climate efforts. The Beacon Award Program, sponsored by the Institute for Local Government (ILG) and the Statewide Energy Efficiency Collaborative, is a statewide program recognizing California cities and counties that are working to reduce GHG emissions, save energy, and adopt policies and programs that promote sustainability. To participate in the Program, the City must continue to provide ILG with its GHG reduction activities to achieve higher recognition.

It is likely that the State will continue to develop actions and programs that will support achievement of its 2050 statewide reduction target, such as development and implementation of more aggressive energy efficiency improvement programs envisioned as part of SB 350. However, at this time, the potential future impact of those actions is unknown. Therefore, the City will continue to monitor the State's efforts designed to achieve its long-term 2050 reduction target. Should additional statewide actions be developed, or existing actions enhanced, that would have local application to La Mesa, then the City will analyze the local reduction potential and incorporate those reductions into future CAP updates. Statewide or regional agencies may provide guidance on how to estimate the local effect of these new or enhanced statewide actions. Alternatively, the City could learn how to assess this new information from neighboring jurisdictions as they pursue CAP updates of their own.

The uncertainty regarding the future impact of statewide actions is only one of several variables that could influence the City's ability to achieve its longer-term targets. New technologies that further reduce energy or transportation-related emissions (e.g., more efficient appliance standards, fuel-efficient vehicles) may be developed after the City's near-term 2020 target year. Further, existing technologies may also become more effective or financially viable, which could accelerate their purchase and use within the community. One example is the cost and ubiquity of solar photovoltaic panels, which have experienced exponential market growth during the last few decades. To that end, increased residential and commercial renewable energy deployment could be a large source of future emissions reductions, when compared to current conventional grid-sourced energy resources.

Additional local CAP measures and longer-term (e.g., 2050) reduction targets may also be developed during future plan updates. Regular emissions inventory updates will be the best predictor of future target achievement, and will help the City to identify emissions sectors that need additional attention. They will also help to demonstrate that the City remains on a trajectory consistent with the State's 2050 emissions reduction goal.

Similarly, future emissions levels are based on numerous growth estimates, including future year population and employment levels envisioned in the General Plan. If the City grows faster than anticipated in the emissions inventories, it will become harder to achieve future targets without deeper implementation of CAP measures (or development of new ones). However, if the City grows more slowly, so too will its emissions; potentially making future targets easier to achieve through implementation of this CAP. All of these uncertainties illustrate the need for regular monitoring and revisions to the CAP, the City's emissions inventories, and reduction strategies. See Chapter 4 for further discussion of how the City should ensure the CAP's relevance in the future.

Implementation Table I-2: CAP Implementation and Monitoring

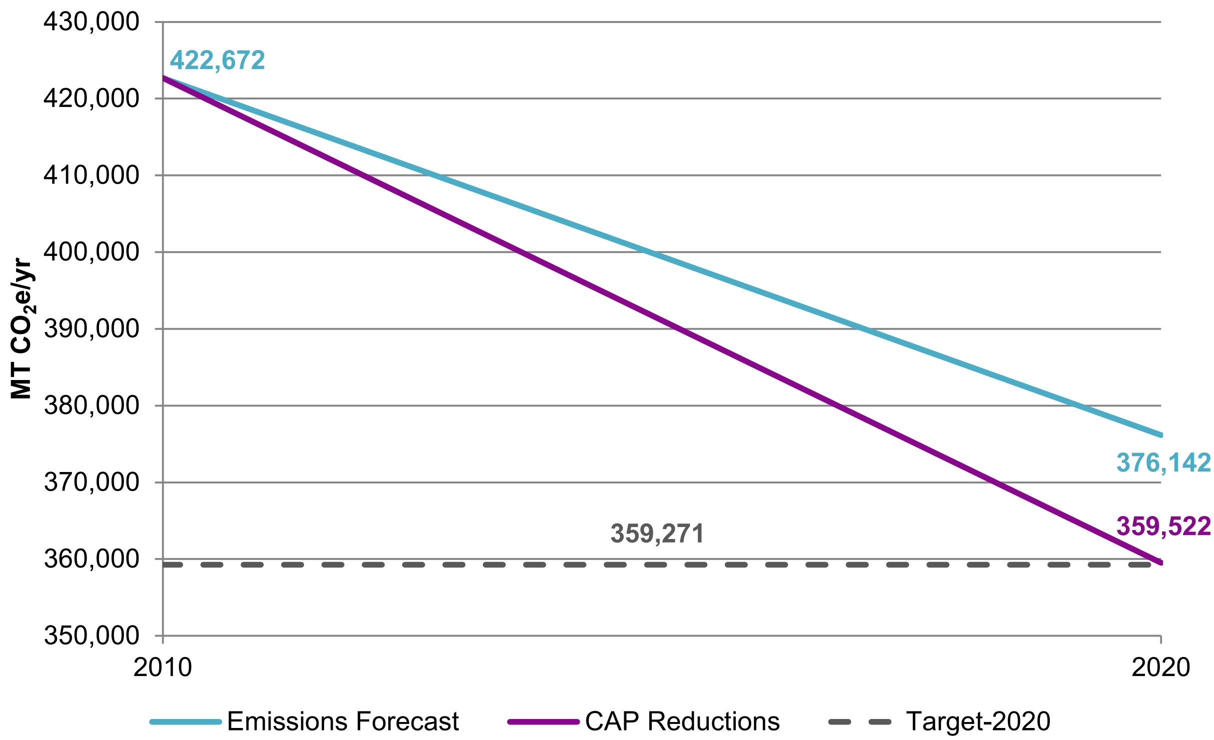
Action			Responsibility	Timeline
1	a.	City will prepare annual CAP implementation reports to be shared with City Council and posted on Sustain La Mesa webpage; reports will highlight achievements made, track progress towards reduction goals, identify barriers to implementation, and set timing for inventory and CAP updates	CD - Planning	Near-term
2	a.	City will prepare emissions inventory updates every 2-years	CD - Planning	Near-term
3	a.	City will monitor individual measure progress to identify opportunities to strengthen underperforming measures or enhance high-performing measures	CD - Planning	Near-term
4	a.	City will amend CAP every 5 years to reflect inventory and projection updates, measure revisions or additions, and identified pathway towards achievement of future targets	CD - Planning	Medium-term
	b.	City will update CAP more frequently than every 5 years, when necessary, based on results of annual CAP implementation report and / or inventory updates, changes to statewide actions on GHG mitigation, and/or to better align with CAP target years		

Target Achievement

PROGRESS TOWARD 2020 TARGET

The local reduction measures described above are estimated to reduce community-wide emissions by 16,620 MT CO_2e/yr from projected 2020 levels. This would result in emissions levels that are 15% below 2010 levels. Figure 3.2 illustrates the emissions forecast and estimated CAP reductions through 2020 compared to the City's GHG target.

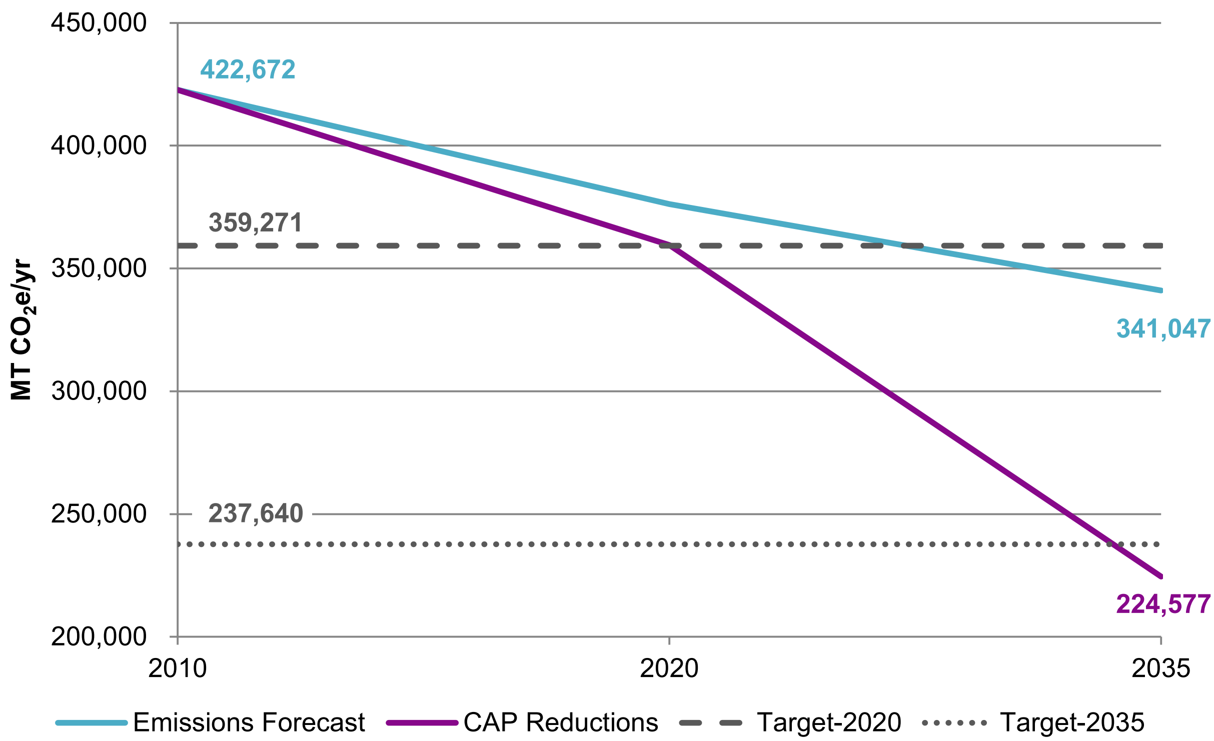
Figure 3.2 – Target Achievement – 2020



PROGRESS TOWARD 2035 TARGET

The local reduction measures described in Chapter 3 are estimated to reduce community-wide emissions by 116,470 MT CO_2e/yr from projected 2035 levels, resulting in 3.27 MT CO_2e per capita emissions levels. This would **achieve** the City's 2035 reduction target of 3.46 MT CO_2e per capita, and represent a 47% reduction from baseline emissions. Figure 3.3 shows the emissions forecasts and estimated CAP reductions through 2035, compared to the City's GHG targets. The 2035 efficiency target has been converted to a mass emissions value in Figure 3.3 to demonstrate all emissions values on the same axis (i.e., MT CO_2e/yr).

Figure 3.3 – Target Achievement – 2035



Long-Term Emissions Planning

This CAP focuses on achievement of a near-term 2020 reduction target because the City is implementing Mitigation Measure 4.5.5 from the General Plan EIR. The General Plan EIR calls for development of a CAP that achieves a 15% reduction target below a 2005 baseline by 2020. The State has established longer-term reduction targets of 40% below 1990 levels by 2030 and 80% below 1990 levels by 2050. Local governments will be integral partners in achieving these longer-term targets. To that end, some jurisdictions have started taking a long-term view of their emissions contributions and reduction opportunities, including La Mesa. Through this CAP, the City also prepared longer-range emissions forecasts for 2035.

Several variables will influence the City's ability to achieve future longer-term targets. First, the continued impact of statewide actions is constantly evolving, and at present, only outlines a pathway toward the State's 2030 target. In the future, the City could expect to have updated estimates of the effectiveness of statewide measures for years beyond 2030. With this information, it will be possible to estimate the local effectiveness of statewide measures.

Second, new technologies that support additional emissions reduction may be developed between now and future targets years. Existing technologies may also become more effective or financially viable for increased implementation. For example, the prevalence of solar photovoltaic panels may continue to increase greatly as costs are projected to continually fall. Similarly, solar hot water systems may become increasingly viable options if system costs experience the same downward trend as solar PV panels did over the previous decades. Increased renewable energy development could provide additional emissions reductions for future GHG targets, particularly solar thermal systems that can offset natural gas consumption.

Third, additional local CAP measures may be developed during future plan updates, or CAP measures may be implemented at higher rates than previously estimated. The 2020 and 2035 reduction estimates are based on the best available data and assumptions, but the future is difficult to predict accurately. Regular emissions inventory updates will be the best predictor of future target achievement, and will help the City to identify emissions sectors that need additional attention. Measure I-2 commits the City to prepare inventory updates on a two-year cycle.

Fourth, and final, future target achievement is based on numerous growth estimates, which may not exactly reflect reality. If the City's emissions grow faster than anticipated in the forecasts, it will become harder to achieve long-term targets without deeper implementation of CAP measures. Conversely, if growth in La Mesa is slower than anticipated in the CAP, then emissions growth will likely be lower than estimated, potentially making future targets easier to achieve.

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CHAPTER 4

Benchmarks and Implementation

This chapter presents, in the following sections, a framework for how the City will implement CAP emissions reduction measures and actions, monitor implementation progress, and update the CAP as a living document:

- **Implementation and Monitoring:** describes how City staff will implement CAP measures and related actions, and track the performance metrics identified for each measure.
- **Plan Evaluation and Evolution:** presents a framework to evaluate, update, and amend the CAP over time, so the plan remains effective and current.

Implementation and Monitoring

Ensuring that the CAP strategies translate from this document into on-the-ground results is critical to the success of the plan and the City reaching its emissions reduction targets. To facilitate this, measures described in Chapter 3 contain as associated table that identifies estimated greenhouse gas reduction potential, implementation actions that help to achieve those reduction levels, departments responsible for implementing those actions, and progress indicators used to quantify emissions reductions (where applicable).

These tables enable the City Council, City staff, and the public to track implementation and monitor overall CAP progress. The progress indicators are especially important, as they provide a checkpoint to evaluate if a measure is on target to achieving its anticipated emission reductions, and provide a framework from which the City can expand its CAP efforts in the future.

Each measure's estimated GHG emissions reductions are based on the corresponding progress indicators, which will help City staff track progress toward the GHG reduction targets. For example, Measure E-5 (shown in Table 4.1 on the following page) focuses on the installation of renewable energy systems. The measure's estimated GHG emissions reductions are based on various assumptions, including the generation capacity of additional solar photovoltaic systems to be installed community-wide by the 2020 and 2035 target years. For example, the 2020 performance goals are based on installation of approximately 6.1 MW of photovoltaic (PV) capacity, including the previously installed 3.8 MW of solar capacity. If the City is able to install more renewable energy capacity than estimated in this measure, additional emissions reductions will occur. Likewise, if the amount of renewable energy installed is less than the amount indicated in the progress indicator, then this measure will achieve less than its stated GHG reductions.

Upon adoption of the CAP, the City departments identified in the implementation tables shown in Chapter 3 will have responsibility for investigating or implementing their assigned actions. To assess the status of CAP efforts, implementation meetings will take place on a regular basis. Some actions will require inter-departmental cooperation or development of additional regional partnerships.

CAP implementation is an iterative process which will reflect changes in technology, available budget, and staff resources.

Table 4.1
Measure Implementation Tracking Template

E-5 Solar Photovoltaic Program

Install solar PV systems on residential and non-residential property in the community, and identify opportunities for municipal installations on City property.

	Actions	Department and Division Responsible	Phasing
1.	Review and revise all applicable building, zoning, and other codes and ordinances that are potential regulatory barriers to installation of solar PVs in residential and nonresidential construction	Department, Division	Establish a target date or timeframe for Implementing each action, (e.g., September 2015, Fall 2015, or FY 15/16)
2.	Streamline permitting process (e.g., building, electric, plumbing) for solar PV systems Train Building Department counter staff in City's solar permitting process in order to assist community members through process Provide training to Planning Department and Building Division counter staff regarding available sources for rebates / financing / incentives, as well as printed pamphlets or FAQ sheets for distribution to customers seeking permits for new construction or major renovation projects Provide links to similar information on City's Sustainability webpage	Department, Division	Establish a target date or timeframe for Implementing each action, (e.g., September 2015, Fall 2015, or FY 15/16)
3.	Work with Center for Sustainable Energy (CSE), Property Assessed Clean Energy (PACE) districts, and neighboring jurisdictions to develop comprehensive outreach campaign to increase participation in solar PV installation programs, including directory of existing rebates / incentive programs, explanation of simple-payback calculations for solar PV systems, and technical assistance Leverage existing solar PV informational materials from CSE, California Solar Initiative, SDG&E, and other organizations	Department, Division	Establish a target date or timeframe for Implementing each action, (e.g., September 2015, Fall 2015, or FY 15/16)
4.	Identify opportunity sites on City buildings or parking lots for municipal solar PV installation Partner with CSE to investigate interest in pursuing regional renewable energy procurement program with other area governments and public agencies	Department, Division	Establish a target date or timeframe for Implementing each action, (e.g., September 2015, Fall 2015, or FY 15/16)

Table 4.1 **Measure Implementation Tracking Template**	
E-5 Solar Photovoltaic Program	
Install solar PV systems on residential and non-residential property in the community, and identify opportunities for municipal installations on City property.	
Performance Indicator	**Year**
▪ 6.1 MW solar capacity installed community-wide since 2010 with systems generating 11 million kWh/yr	2020
▪ 12.9 MW solar capacity installed community-wide since 2010 with systems generating 23 million kWh/yr	2035
Tracking Mechanisms	
▪ Collect installation data annually from California Solar Initiative, SDG&E, and/or City permit data; analyze to gauge progress toward goals: ▪ Examples: o What was the total installed generation capacity (in kW or MW) of new photovoltaic systems? o How many kWh/yr of electricity are generated from the photovoltaic systems (empirical data to be collected from utility accounts)? o What is average annual capacity to be installed to achieve performance indicator?	
Progress Made (e.g., "x" kW of new capacity installed; "x" kWh/yr generated)	**Year**
	2018
	2019
	2020
	(Additional rows to be added for each year that data is collected)

Plan Evaluation and Evolution

This CAP represents the City's first plan and roadmap to reduce community-wide GHG emissions in alignment with adopted reduction targets. Staff will need to evaluate the plan's performance over time and be ready to make alterations if it is not achieving its stated target. Changes to the plan will be informed by the results of annual CAP implementation reports, inventory updates, and regulatory changes to climate planning in California. This section describes tracking individual measures to support development of the annual implementation reports, the inventory update schedule, and options for evaluating the local effect of statewide actions in climate planning.

Plan Evaluation: Ongoing Monitoring for Continued Success

Two types of performance evaluation are important: (a) evaluation of the City's overall ability to reduce GHG emissions, and (b) evaluation of the performance of individual CAP measures. Future emissions inventory updates provide a "big-picture" overview of the City's current emissions levels, and will provide the best indication of CAP effectiveness. Conducting these inventories periodically will enable direct comparison to the 2010 baseline inventory and measurement of progress toward meeting the City's reduction targets. Monitoring the implementation of individual measures will provide a more nuanced understanding of the CAP's successes and weaknesses, and help the City identify opportunities for plan enhancements, if the emissions inventories show that a change is needed (i.e., emissions are not trending toward the upcoming GHG target).

Inventory Updates

Inventory updates will allow the City to compare its actual future emissions levels to those forecasted in Chapter 2, and track the long-term trajectory of the City's emissions. As described in Measure I-2, the City will prepare community-wide inventory updates on a 2-year cycle to provide accurate emissions tracking and allow sufficient time for a course correction if the results indicate the City is not on track toward its targets. The City will also develop a procedure to share this new information with the public and City Council, report on progress made towards the next target, and compare the updated inventories to previous estimates presented in this CAP.

There are various challenges inherent when inventorying emissions, which can make it difficult to allow for direct comparisons from one inventory year to the next. For example, the state of the climate science industry is perpetually advancing and shifting, leading to revisions in inventory methodologies. Similarly, the emissions factors upon which inventories are developed are periodically refined by various agencies and entities (e.g., California Air Resources Board, International Panel on Climate Change). There are also instances in the inventory process where judgment calls must be made in order to interpret and apply the best available data at the time. While The Climate Registry (TCR) and International Council of Local Environmental Initiatives (ICLEI) have developed guidance on how communities should prepare their inventories, inconsistencies can arise and practitioners do have nuanced approaches to applying this guidance.

In order to best position itself to produce future inventories that can be compared to past inventories with relative consistency, the City will continue to develop its institutional knowledge in the area of emissions generation sources, reduction opportunities, and emissions inventory variables.

Tracking Individual Measure Progress

While GHG inventories provide information about overall emission reductions, it will also be important to understand the effectiveness of each measure. Evaluation of the emissions reduction progress of individual measures will improve staff and decision makers' ability to manage and implement the CAP. The City can reinforce successful measures and reevaluate or replace under-performing ones.

To track measure performance, City staff will need to collect data related to the progress indicators shown in the measure tables. The implementation tables from Chapter 3 can be collected in a consolidated document to serve as a CAP Implementation Tracking Framework. Table 4.1 (presented earlier in this chapter) provides a sample of how this framework could be formatted, and shows the types of information that will need to be collected in order for the City to monitor and track measure implementation progress.

Similar to the implementation tables, Table 4.1 presents a measure and its corresponding actions. It also provides a space to designate responsibility for individual actions (at the department level or individual staff assignments), establish phasing timelines, and track data related to the performance indicator. The Phasing column allows each responsible department to identify internal timelines for implementing specific action steps, which could be expressed as specific target years or more generally as short-, medium-, and long-term actions. The Tracking Mechanisms specify how implementation of the Performance Indicators will be monitored. The Performance Indicators will be evaluated regularly to ensure each measure is on track to achieve its stated emissions reductions. The table provides a space for annual progress reviews and note taking for relevant pieces of data.

If during the implementation review process a measure is found to be falling short of its performance goals, then additional attention can be given to modifying the implementation actions. Further, if implementation review indicates that a measure will be unable to achieve its stated reduction level, then new CAP measures would need to be developed to make up the difference, or other existing measures could be enhanced to increase their emissions reduction potential. CAP implementation is an iterative process which will reflect future changes in technology, available budget, and staff resources. City staff will use the Implementation Tracking Framework described above to develop a performance tracking system that covers each CAP measure and action.

Several CAP measure reduction estimates are based on continued participation in financing and/or rebate programs, which can be tracked through annual reports. These include SDG&E-sponsored energy efficiency programs, participation in PACE financing districts that operate within the City of La Mesa, and installation of solar PV and solar hot water systems. This CAP analyzed the past performance of these programs to estimate future participation levels. The following tables provide annual tracking metrics associated with Measures E-1, E-5, and E-6 that the City can use to evaluate how future participation in these programs compares to the CAP's underlying GHG reduction estimates. Appendix B describes how the 2020 and 2035 values were calculated. The interim years shown in Tables 4.2 and 4.3 were interpolated between the existing program performance values and the 2020 and 2035 estimated values.

Table 4.2 Energy Efficiency Retrofit Programs (Measure E-1)					
SDG&E-Sponsored Programs			**PACE Financing Programs**		
Year	**kWh/yr Savings (cumulative)**	**therms/yr Savings (cumulative)**	**Year**	**kWh/yr Savings (cumulative)**	**therms/yr Savings (cumulative)**
2010-2014	17,868,801	30,452	-	-	-
2015	20,808,331	76,130	-	-	-
2016	23,747,860	121,808	-	-	-
2017	26,687,390	167,485	2010-2017	416,956	28,151
2018	29,626,920	213,163	2018	568,995	37,420
2019	32,566,449	258,841	2019	721,033	46,688
2020	35,505,979	304,519	**2020**	873,072	55,957
2021	39,033,415	334,971	2021	1,031,352	65,641
2022	42,560,850	365,423	2022	1,189,632	75,325
2023	46,088,286	395,875	2023	1,347,912	85,010
2024	49,615,722	426,327	2024	1,506,192	94,694
2025	53,143,157	456,779	2025	1,664,472	104,379
2026	56,670,593	487,230	2026	1,822,753	114,063
2027	60,198,029	517,682	2027	1,981,033	123,748
2028	63,725,464	548,134	2028	2,139,313	133,432
2029	67,252,900	578,586	2029	2,297,593	143,116
2030	70,780,335	609,038	2030	2,455,873	152,801
2031	74,307,771	639,490	2031	2,614,154	162,485
2032	77,835,207	669,942	2032	2,772,434	172,170
2033	81,362,642	700,394	2033	2,930,714	181,854
2034	84,890,078	730,846	2034	3,088,994	191,539
2035	88,417,514	761,298	**2035**	3,247,274	201,223

Source: AECOM 2017

SDG&E program information for years 2010-2014 provided to City of La Mesa by SDG&E staff; PACE program participation information reflects actual participation results provided to City of La Mesa by staff from the HERO, Ygrene, and CaliforniaFIRST financing companies. PACE program future participation results include a 5% discount to avoid overlap with certain SDG&E program results reporting and excludes energy generation potential related to renewable energy system installations, as described in Appendix B.

Table 4.3 Renewable Energy Development Programs (Measures E-5 and E-6)				
Solar PV Installations			**Solar Hot Water Heater Installations**	
Year	**kW Installed (cumulative)**	**kWh Generated (cumulative)**	**Year**	**therms/yr savings**
2010-2014	3,873	6,926,861	-	-
2015	4,249	7,599,635	-	-
2016	4,625	8,272,409	2011-2016	4,876
2017	5,002	8,945,183	2017	4,946
2018	5,378	9,617,957	2018	5,016
2019	5,754	10,290,731	2019	5,086
2020	6,130	10,963,505	**2020**	5,156
2021	6,581	11,770,834	2021	5,230
2022	7,033	12,578,163	2022	5,305
2023	7,484	13,385,492	2023	5,379
2024	7,936	14,192,821	2024	5,454
2025	8,387	15,000,150	2025	5,528
2026	8,838	15,807,478	2026	5,603
2027	9,290	16,614,807	2027	5,678
2028	9,741	17,422,136	2028	5,752
2029	10,193	18,229,465	2029	5,827
2030	10,644	19,036,794	2030	5,901
2031	11,095	19,844,123	2031	5,976
2032	11,547	20,651,452	2032	6,050
2033	11,998	21,458,781	2033	6,125
2034	12,450	22,266,110	2034	6,199
2035	12,901	23,073,439	**2035**	6,274

Source: AECOM 2017

Solar PV installation data provided to City of La Mesa by SDG&E staff; Solar hot water installation data collected from California Solar Initiative (CSI) – Solar Thermal dataset

Annual CAP Implementation Progress Reports

Designated staff will evaluate measure performance on an annual basis as described in the preceding sections. A CAP implementation summary report that outlines progress toward the measures and actions will also be prepared. The report will cover areas such as estimated GHG emissions reductions to date, progress toward the current and future reduction targets, progress toward implementation of the actions, achievement of measure performance indicators, implementation challenges, and recommended next steps. Staff may want to deliver this report in conjunction with the State-required annual report to the City Council regarding implementation of the City's General Plan.

Plan Evolution: Adapting for Continuous Improvement

For it to remain relevant, the CAP also needs to be adapted over time. It is likely that new GHG reduction technologies and strategies will be developed, new financing mechanisms will be available, and State and federal legislation will change. It is also possible that future GHG emission inventories will indicate that the City is not on track toward achieving its adopted GHG reduction targets. If this is the case, the City can assess the implications of new scientific findings, explore new emission reduction technologies, respond to changes in State and federal climate change policy, and modify the CAP accordingly to help get back on track toward meeting the GHG targets.

Following the 2020 CAP target year, the City will begin to define the priority measures and implementation action steps that it will pursue to achieve the 2035 target. This process will begin with preparation of a 2020 emissions inventory update that can be used to compare progress made since the 2010 baseline inventory. The updated inventory will also be helpful in identifying priorities for new City actions. The City can refer to the reduction strategies included within this CAP for guidance on the types of strategies to be included in future CAP revisions. Future CAP updates will include the City's current emissions inventory, ongoing City actions, new State legislation, and emerging technologies to define the specific pathway towards achieving the next emissions reduction target.

Revisions to Statewide Actions

Updates to statewide reduction estimates will include revised quantification methodologies, as well as updated underlying activity data estimates. The following sections describe the options for updating the statewide actions presented in this CAP during future plan and inventory updates. At the time of future inventory updates, a variety of actions could be occurring or have already occurred that would affect local GHG reductions, including new statewide actions being implemented, termination or completion of previous statewide actions, or expansion of existing actions.

Renewables Portfolio Standard

The RPS reductions were calculated based on estimates of future electricity consumption, SDG&E's assumed compliance pathway with the legislation, and an estimated future electricity emissions factor based on the remaining non-renewable portion of SDG&E's electricity portfolio. Any one of these variables could influence the actual reductions achieved from implementation of this action. If future electricity consumption is greater than anticipated, then reductions from this action would increase, but total inventory emissions would also increase requiring a larger reduction to achieve the same target. If

SDG&E does not achieve the RPS requirements, then actual reductions would likely be lower since electricity would presumably be more carbon-intensive than anticipated under the RPS program. Similarly, SDG&E's estimated RPS compliance plan focuses on procurement options for the renewable portions of its portfolio. The remaining non-renewable portion of its portfolio could come from a variety of sources, including non-RPS-compliant emissions-free options (e.g., large-scale hydro) or carbon-intensive sources (e.g., natural gas-fired power plants). The actual composition of the electricity portfolio will determine its associated emissions factor, and therefore, the reduction potential of this action.

AB 1109

The AB 1109 Lighting Efficiency Program is quantified in this CAP to estimate the electricity reductions associated with full implementation of this program, which is expected to occur by 2018.[31] Therefore, future inventory updates that occur after 2018 will already reflect the emissions reductions associated with this action (i.e., reduced building electricity use from incorporation of higher-efficiency lighting), and would not need to be calculated separately. If the State decides to further increase lighting efficiency requirements, it may be possible to quantify the additional reductions that would be attributed to this action. The City will work with regional partners or future CAP update teams to determine if it is appropriate and feasible to estimate additional reductions from such an action.

Statewide Vehicle Programs

The vehicle-related statewide reductions included in this CAP (i.e., those programs included in the EMFAC2014 model) are incorporated into the emissions forecasts for 2020 and 2035, and are based on VMT estimates for La Mesa from the traffic model underpinning its General Plan Land Use plan, county-wide vehicle emissions factors, and the statewide emissions reduction potential estimates associated with the Scoping Plan Update baseline scenario. As with the RPS, if any of these factors are changed, the associated emissions reductions embedded within the City's emissions forecasts will also change. Future versions of EMFAC should be used in future inventory updates to evaluate the impact of statewide actions on local transportation emissions. Based on future technological advancements, the State could decide to increase vehicle-related emissions requirements through new legislation or additional Scoping Plan updates.

Funding Sources

One of the main barriers to an implementation and monitoring plan is lack of available funds. There are multiple grant and loan programs through state, federal, and regional sources to reduce GHG emissions. This section identifies potential funding sources that La Mesa could pursue to offset the financial cost of implementing the CAP measures.

[31] Estimated residential electricity use in the 2020 and 2035 horizon years was assumed to be reduced by 11.0% over baseline levels and commercial electricity use in the 2010 baseline year was reduced by 8.6% to calculate total kWh savings from implementation of the AB 1109 program. Total electricity savings were then multiplied by an RPS-compliant electricity emissions factor to estimate emissions reductions resulting from this program, and avoid double-counting with the RPS reduction calculations. Electricity savings estimates were found in the CEC's draft report *Achieving Energy Savings in California Buildings,* July 2011, as well as a technical report prepared for the CEC by Itron, Inc. titled *Incremental Impacts of Energy Efficiency Policy Initiatives Relative to the 2009 Integrated Energy Policy Report Adopted Demand Forecast: Attachment A: Technical Report,* January 2010.

The spectrum of public and private funding options for the measures outlined in this CAP is ever evolving. The programs listed below represent the current status of those options that are most relevant to the CAP. Funding may be available from:

- U.S. Department of Energy
- U.S. Environmental Protection Agency
- U.S. Department of Housing and Urban Development
- California Energy Commission
- California Strategic Growth Council
- California Public Utilities Commission
- Caltrans
- CAL FIRE
- California Statewide Communities Development Authority
- Foundation for Renewable Energy and Environment
- Center for Sustainable Energy
- SANDAG
- SDG&E

To reduce costs and improve the CAP's effectiveness, actions will be pursued concurrently whenever possible. Which funding sources the City decides to pursue will be addressed as implementation occurs. Funding can be accomplished through the City's annual budgeting and Capital Improvement Program process, which provides an opportunity for citizen input and guides decision-makers while helping them set priorities. The City can also partner with SANDAG, local jurisdictions within San Diego County, community-based organizations, and private companies for joint programs.

ENERGY-RELATED FUNDING SOURCES

Many of the financing and incentive programs relevant to the CAP concern energy infrastructure and conservation

California Alternative Energy and Advanced Transportation Financing Authority

California State Treasurer

The California Alternative Energy and Advanced Transportation Financing Authority works collaboratively with public and private partners to provide innovative and effective financing solutions for California's industries, assisting in reducing the state's greenhouse gas emissions by increasing the development and deployment of renewable energy sources, energy efficiency, and advanced transportation and manufacturing technologies to reduce air pollution, conserve energy, and promote economic development and jobs. Current programs include:

- California Hub for Energy Efficiency Financing (CHEEF) Pilot Programs
- Property Assessed Clean Energy (PACE) Loss Reserve Program
- Sales Tax Exclusion for Manufacturers
- Clean Energy Bond Financing
- Working Group on Energy Efficiency Financing Programs

Multifamily Affordable Housing Solar Roofs Program

In October 2015, Governor Jerry Brown signed Assembly Bill 693 (Eggman), which created the Multifamily Affordable Housing Solar Roofs Program**.** The program will allow low-income tenants of multifamily affordable housing projects to benefit from on-site solar installations, bringing solar power to low-income renters who are often last to realize the benefits of green technologies, while promoting local jobs, renewable energy and cleaner air for the state. The program is anticipated to launch in 2018.

Self-Generation Incentive Program (SGIP)

Center for Sustainable Energy (Program Administrator for SDG&E territory)

Since 2001, the Self-Generation Incentive Program (SGIP) has offered financial incentives for the installation of clean and efficient energy technologies, including renewable generation and energy storage. The SGIP plays a critical role in the deployment of distributed generation projects and the reduction of onsite electric demand and greenhouse gas emissions in California. To date, the program has paid over $1.2 billion in incentives statewide and was recently renewed with a statewide incentive collections through 2019 totaling $501,735.00, with 80% of the incentive funds allocated for energy storage projects. Additionally, the California Public Utilities Commission recently proposed a separate equity budget for disadvantaged and low-income communities.

California Feed-In Tariff

The California feed-in tariff allows eligible customer generators to enter into 10, 15 or 20-year standard contracts with their utilities to sell the electricity produced by small renewable energy systems – up to three megawatts at time-differentiated market-based prices. Time-of-use adjustments will be applied by each utility and will reflect the increased value of the electricity to the utility during peak periods and its lesser value during off-peak periods. For customers generating renewable energy not covered by the California Solar Initiative or Self-Generation Incentive Program (e.g., biomass or geothermal) the feed-in tariff is applicable. If customers prefer a long-term contract at a fixed price over a financial incentive paid in the short term, feed-in tariffs may be a beneficial financing tool.

Training and Technical Assistance Programs

Center for Sustainable Energy (CSE) and SDG&E

CSE and SDG&E conduct expert-facilitated workshops and seminars on a broad spectrum of energy topics and issues, from the latest in green building and advanced lighting technologies to do-it-yourself "energy smart" remodeling. A variety of technical resources and a schedule of workshops and events are available on the CSE website. CSE staff also conducts offsite outreach and educational activities by attending community and industry events to promote energy efficiency.

Home Energy and Water Tune Up program - Funded through the San Diego Regional Energy Partnership

Center for Sustainable Energy

The Home Energy and Water Tune Up program consists of two parts: an educational presentation and an in-home energy and water assessment. CSE provides energy consumers with a presentation about the benefits of energy efficiency, energy conservation, renewable energy options and water conservation measures. Participants learn how their home's appliances, building materials, and systems can all work together to make a home efficient and healthy. They also learn how to prioritize energy upgrades according to the state's approved loading order, which prioritizes energy efficiency and conservation first. CSE staff provides participants with the opportunity for a no-cost visual assessment of their home's energy and water systems and devices.

California Solar Initiative – Thermal Program

CSI-Thermal – Center for Sustainable Energy (Program Administrator for SDG&E territory)

The CSI-Thermal program provides incentives for solar water heating for new and existing single family, multifamily, commercial, industrial, and agricultural properties. Higher incentives are available for low-income communities.

California Investor Owned Utilities (IOUs) Programs

SDG&E

California IOU's, such as SDG&E, are required by the California Public Utilities Commission to offer energy efficiency programs to their customers. Each IOU program is unique; generally the programs offer rebates, financing assistance, design assistance, educational seminars, and other forms of assistance. Rebates are typically a set amount of financial assistance for a specific energy efficiency technology, although SDG&E also offers custom incentive programs that are more flexible. SDG&E also offers The Emerging Cities Program for eligible cities with assistance for energy efficiency related projects and funding for select energy related Climate Action Plan development, outreach, and implementation activities.

In conjunction with its rebates and incentives programs, SDG&E offers On-Bill Financing. On-Bill Financing provides interest-free, unsecured financing to qualified commercial and government-funded customers for the installation of energy-efficient upgrades. Financed equipment must qualify for a rebate or incentive from SDG&E's rebate/incentive program(s). Benefits for government-funded customers, such as the City of La Mesa, include: zero-percent financing on qualifying measures for up to fifteen years; offsets to energy efficient upgrade costs after rebates and incentives through SDG&E; loan amounts that range from a minimum of $5,000 up to $250,000 per meter; and loan installments that are added to monthly SDG&E bills.

Non-Residential On-Bill Financing Program

SDG&E

The SDG&E On-Bill Financing (OBF) program offers qualified business customers 0% financing from $5,000 to $100,000 per meter for qualifying equipment. All institutional customers may receive from $5,000 to $250,000 per meter. On-Bill Financing is available to any commercial or government-funded customer participating in an energy efficiency rebate or incentive program. The program is open to all non-residential customers, including owners of multi-family units who do not live on premises. Participants must have had an active account for the past two years and good credit standing as determined by the Utility. The funds may be used for a wide variety of efficiency improvement projects, and the monthly loan payments will be added directly to the customer's bill. Monthly energy savings help to offset the monthly loan charges.

Energy Conservation Assistance Account Program (ECAA) Energy Efficiency Financing

California Energy Commission

The California Energy Commission offers low-interest loans (1-3 percent) to help local jurisdictions and other public agencies finance energy-efficient projects as part of the Energy Conservation Assistance Account program. Projects with proven energy and/or capacity savings are eligible, provided that they meet the eligibility requirements. Examples of projects include: lighting systems, pumps and motors, energy efficient streetlights and traffic signals, automated energy management systems/controls, building insulation, renewable energy generation and combined heat and power projects, heating and air conditioning modifications, and waste water treatment equipment. The maximum loan amount is $3 million per application for 15 years. There is no minimum loan amount.

Low-Income Weatherization Program (LIWP)

Department of Community Services and Development

The California Low Income Weatherization Program, funded by the California Department of Community Services and Development, supports owners and residents to lower utility costs, save energy and reduce greenhouse gas emissions in large multifamily properties.

Low Income Home Energy Assistance Program (LIHEAP)

U.S. Department of Health & Human Services- Office of Community Services

LIHEAP, which stands for Low Income Home Energy Assistance Program, is a federal program that helps low income households pay for heating or cooling their homes. In most states, it also helps people make sure their homes are more energy efficient by paying for certain home improvements, known as weatherization.

Partners for Places Grant Program

The Funders' Network for Smart Growth and Livable Communities

A matching grant program initiated by a collection of foundations, Partners for Places creates opportunities for cities and counties in the United States and Canada to improve communities by building partnerships between local government sustainability offices and place-based foundations. National funders invest in local projects to promote a healthy environment, a strong economy, and well-being of all residents, by soliciting joint proposals from a local-place based foundation (such as The San Diego Foundation) and local government sustainability offices. The program provides grants between $25,000 and $75,000 for one year projects, or $50,000 and $150,000 for two year projects, with a 1:1 match required by one or more local foundations. Projects must either (1) advance implementation of a key aspect of the city's adopted climate/sustainability plan, (2) support creation of such a plan or (3) advance a green infrastructure project as part of the city's water-related sustainability goals.

TRANSPORTATION AND SUSTAINABLE COMMUNITIES-RELATED FUNDING SOURCES

Many federal, state, and regional grant programs are available to fund transportation and infrastructure improvements. The programs listed below represent the current status of the most relevant of these programs.

Affordable Housing and Sustainable Communities (AHSC)

Strategic Growth Council

Funding by the California cap-and-trade program, the Strategic Growth Council's Affordable Housing and Sustainable Communities (AHSC) Program provides grants and affordable housing loans for compact transit-oriented development and related infrastructure and programs that reduce greenhouse gas emissions. These projects increase the accessibility of housing, employment centers, and key destinations via low-carbon transportation options resulting in fewer vehicle miles traveled and mode shift.

Livability Grant Program

Federal Transportation Authority

The Federal Transportation Authority provides resources on sustainable communities and transit oriented development. This includes access to transit oriented development resources and training free of charge to local government employees. The Federal Transportation Authority's Livable and Sustainable Communities program supports initiatives that demonstrate ways to improve the link between public transit and communities. The Federal Transportation Authority offers a broad selection of Livability Grant Programs that fund projects for accessible, livable, and sustainable communities.

Alternative and Renewable Fuel and Vehicle Technology Program

California Energy Commission

Assembly Bill 118 created the Alternative and Renewable Fuel and Vehicle Technology Program, within the California Energy Commission. The statute authorizes the Energy Commission to develop and deploy alternative and renewable fuels and advanced transportation technologies to help attain the state's GHG reduction goals and reduce our dependence on foreign oil. The statute allows the Energy Commission to use grants, loans, loan guarantees, revolving loans, and other appropriate measures. Eligible recipients include: public agencies, private businesses, public-private partnerships, vehicle and technology consortia, workforce training partnerships and collaboratives, fleet owners, consumers, recreational boaters, and academic institutions. The Energy Commission must prepare and adopt an Investment Plan and convene an Advisory Committee to assist in preparing the Investment Plan. The Energy Commission has an annual program budget of approximately $100 million.

Clean Vehicle Rebate Project

Air Resources Board administered by Center for Sustainable Energy

CSE is statewide administrator of the Clean Vehicle Rebate Project (CVRP), an initiative of the California Air Resources Board providing rebates for the purchase or lease of zero-emission and plug-in hybrid light-duty vehicles. Since program inception in 2009, CSE has issued over $440 million to fund rebates for individuals, nonprofits, government entities and business owners.

In addition to issuing rebates, CSE facilitates clean vehicle education and outreach events, collects statistics and conducts ongoing surveys of CVRP recipients and encourages clean vehicle technology.

Transportation Planning Grant Program

Caltrans

Senate Bill 1, The Road Repair & Accountability Act of 2017 planning grant funds include: Transportation Planning Grants ($25 million annually) to encourage local and regional planning that further state goals, including, but not limited to, the goals and best practices cited in the regional transportation plan guidelines adopted by the California Transportation Commission. Adaptation Planning Grants ($20 million over three years) to local and regional agencies for climate change adaptation planning.

Local Assistance Program

Caltrans

Caltrans' Local Assistance Program oversees more than one billion dollars in federal and state funds annually available to over 600 cities, counties, and regional agencies for the purpose of improving their transportation infrastructure or providing transportation services.

Sustainable Transportation Planning Grant Program

Caltrans

The Caltrans Division of Transportation Planning provides the following sustainable transportation planning grants: Strategic Partnerships Grants and Sustainable Communities Grants.

The Sustainable Transportation Planning Grant Program was created to support the California Department of Transportation’s (Caltrans) current mission: Provide a safe, sustainable, integrated and efficient transportation system to enhance California’s economy and livability. Grant program overarching objectives were identified to ensure consideration of these major efforts in transportation planning, including: sustainability, preservation, mobility, safety, innovation, economy, health, and equity. Caltrans provides transportation planning grants to promote a balanced, comprehensive multimodal transportation system. The grant program was revised to reflect current goals that direct emphasis on transportation planning efforts that promote sustainability. These grants may be used for a wide range of transportation planning purposes, which address local and regional transportation needs and issues. The implementation of these grants should ultimately lead to the adoption, initiation, and programming of transportation improvements.

Active Transportation Program (ATP)

California Transportation Commission

The Active Transportation Program (ATP) was created by Senate Bill 99 and Assembly Bill 101 to encourage increased use of active modes of transportation, such as biking and walking. The ATP consolidates various transportation programs including the federal Transportation Alternatives Program, State Bicycle Transportation Account, and federal and state Safe Routes to School programs - into a single program to:

- Increase the proportion of biking and walking trips
- Increase mobility and safety for non-motorized users
- Advance the efforts of regional agencies to achieve greenhouse gas reduction goals
- Enhance public health, including the reduction of childhood obesity through the use of projects eligible for Safe Routes to Schools Program funding
- Ensure disadvantaged communities fully share in program benefits (25% of program)
- Provide a broad spectrum of projects to benefit many types of active transportation users

Program funding is segregated into three components and is distributed as follows:

- 50% to the state for a statewide competitive program
- 10% to small urban and rural regions with populations of 200,000 or less for the small urban and rural area competitive program, and
- 40% to Metropolitan Planning Organizations (MPO) in urban areas with populations greater than 200,000 for the large urbanized area competitive program.

Environmental Enhancement and Mitigation Program

Caltrans

The Environmental Enhancement and Mitigation Program offers a total of $10 million each year for grants to local, state, and federal government agencies and to nonprofit organizations for projects to mitigate the environmental impacts caused by new or modified public transportation facilities. Eligible projects must be directly or indirectly related to the environmental impact of the modification of an existing transportation facility or construction of a new transportation facility. Two of the grant categories include Highway Landscaping and Urban Forestry Projects, which are designed to offset vehicular emissions of carbon dioxide through the planting of trees and other suitable plants, and Roadside Recreation Projects, which provide for the acquisition and/or development of roadside recreational opportunities.

Highway Safety Improvement Program

Caltrans

The Highway Safety Improvement Program provides federal funding for work on any public road or publicly owned bicycle/pedestrian pathway or trail that corrects or improves the safety for its users. The program is intended to reduce traffic fatalities and serious injuries on all public roads. Local jurisdictions, such as counties and cities, may apply to Caltrans for funding ranging from $100,000 to $900,000 per project. Federal reimbursements cover up to 90 percent of total project costs. Eligible projects include, but are not limited to, improvements for pedestrian or bicyclist safety, intersection safety improvements, and shoulder widening.

Community Development Block Grant

California Department of Housing and Community Development

The Community Development Block Grant (CDBG) program funds projects and programs that develop viable urban communities by providing decent housing and a suitable living environment and by expanding economic opportunities, principally for persons of low and moderate income. Federal CDBG Grantees may use funds for activities that include, but are not limited to, acquiring real property; building public facilities and improvements, such as streets, sidewalks, and recreational facilities; and planning and administrative expenses, such as costs related to developing a consolidated plan and managing CDBG funds. The State makes funds available to eligible agencies through a variety of different grant programs.

Infill Infrastructure Grant Program California

Department of Housing and Community Development

The Infill Infrastructure Grant Program assists in the new construction and rehabilitation of infrastructure that supports higher-density affordable housing and mixed income housing in locations designated as infill. Eligible applicants include, but are not limited to, localities and public housing authorities.

National Recreational Trails Program

California Department of Parks and Recreation

In California, the National Recreational Trails Program is administered by the Department of Parks and Recreation to provide funding to develop recreational trails and related facilities for uses such as bicycling and hiking.

TransNet Smart Growth Incentive Program

SANDAG

SANDAG manages the TransNet Smart Growth Incentive Program, which funds transportation and transportation related infrastructure improvements and planning efforts that support smart growth development. The program awards two percent of the annual TransNet revenues to local governments through a competitive grant program.

TransNet Active Transportation Grant Program

SANDAG

SANDAG allocates funds under the Active Transportation Grant Program to support pedestrian and bicycle infrastructure and facilities that promote multiple travel choices for residents. The program awards $1 million per year of the annual TransNet revenues to local governments and community partners through a competitive grant program.

Infrastructure State Revolving Fund Program

California Infrastructure and Economic Development Bank

The Infrastructure State Revolving Fund Program provides low-cost financing to public agencies for a wide variety of infrastructure projects. Program funding is available in amounts ranging from $250,000 to $10 million, with loan terms of up to 30 years. Eligible project categories include city streets, county highways, state highways, drainage, water supply and flood control, educational facilities, environmental mitigation measures, parks and recreational facilities, port facilities, public transit, sewage collection and treatment, solid waste collection and disposal, water treatment and distribution, defense conversion, public safety facilities, and power and communications facilities.

SOLID WASTE-RELATED FUNDING SOURCES

Greenhouse Gas Reduction Grant and Loan Programs

California Department of Resources Recycling and Recovery (CalRecycle)

CalRecycle established the Greenhouse Gas Reduction Grant and Loan Programs to provide financial incentives for capital investments in infrastructure for aerobic composting, anaerobic digestion and recycling and manufacturing facilities that will reduce greenhouse gas emissions. A priority is to realize environmental and economic benefits in disadvantaged communities. These grants promote California infrastructure developments that achieve greenhouse gas emission reductions by diverting more materials from landfills and producing beneficial products such as soil amendments, renewable fuels or recycled-content products. Grants are targeted to build or expand organics infrastructure, such as composting and anaerobic digestion, or rescuing food to feed hungry people, as well as new or expanded infrastructure for manufacturing products with recycled content fiber, plastic, or glass.

Beverage Container Recycling Grant and Payment Programs

California Department of Resources Recycling and Recovery (CalRecycle)

CalRecycle administers funding programs to assist organizations with establishing convenient beverage container recycling and litter abatement projects, and to encourage market development and expansion activities for beverage container materials. The Beverage Container Recycling Grant provides funding to local governments, businesses, individuals, and non-profit organizations for projects that implement new programs or enhance existing programs to provide convenient beverage container recycling opportunities in various locations statewide. Eligible projects include, but are not limited to, the following locations: parks and recreational areas, sporting complexes, community events, office buildings, multifamily dwellings, restaurants, and schools and colleges. CalRecycle issues up to $1.5 million annually for this program. The City/County Payment Program provides a total of $10.5 million in grant funds annually to eligible cities and counties for beverage container recycling and litter abatement activities. Each city is eligible to receive a minimum of $5,000 or an amount calculated by the Department based on per capita, whichever is greater.

OTHER FUNDING SOURCES

Urban and Community Forestry Grant Program

CAL FIRE

The CAL FIRE Urban and Community Forestry Program works to expand and improve the management of trees and related vegetation in communities throughout California. These projects further the goals of the California Global Warming Solutions Act of 2006 (AB 32), result in a net greenhouse gas benefit, and provide environmental services and cost-effective solutions to the needs of urban communities and local agencies. Co-benefits of the projects include increased water supply, clean air and water, reduced energy use, flood and storm water management, recreation, urban revitalization, improved public health, and producing useful products such as bio-fuel, clean energy, and high quality wood.

TransNet Environmental Mitigation Program

SANDAG

The TransNet Environmental Mitigation Program provides funding for mitigating local and regional transportation projects, as well as additional funding for acquiring, managing, and monitoring natural habitats in ways that support the San Diego region's habitat conservation programs.

Community Assistance Grant

Bureau of Land Management

Funds are available to assist with hazardous fuels treatments, community wildfire protection planning, and education addressing wildfire safety and hazard risk reduction within the wildland-urban interface. Treatments may be focused on both Federal (with prior approval from local Bureau of Land Management field staff) and nonfederal lands and aimed toward protecting communities at risk and resource values identified within a Community Wildfire Protection Plan and/or Community Fire Plans with an interdisciplinary and interagency collaborative process.

Wildland Urban Interface Grant

Fish and Wildlife Service

Wildland Urban Interface funds are available for hazard mitigation projects that protect communities at risk of wildfire by reducing hazardous fuels (non-federal lands), developing Community Wildfire Protection Plans (includes associated planning and compliance documents), and implementing wildfire education and outreach initiatives.

PARTNERSHIPS WITH OTHER JURISDICTIONS AND COMMUNITY ORGANIZATIONS

Partnering with neighboring jurisdictions and community organizations is a key implementation strategy supporting the CAP. Various jurisdictions and organizations within the County could serve as potential partners in implementing the CAP strategies. The City seeks to partner with appropriate local governments, as identified within CAP measures.

Conclusion

The pattern of greenhouse gas (GHG) emissions differs greatly from community to community, reflecting the predominant economic activities, land use patterns, transportation needs and lifestyle of a community. The process of identifying GHG reduction measures is also unique to each community, and reduction planning must reflect not only the emissions sources in the community but also what solutions are available and feasible in a particular community. GHG emissions in La Mesa include the following features which are different than other parts of the greater San Diego area:

- Approximately 98% of the City's land area has been developed with residential and commercial land uses. The annual growth in population, housing, and employment in the City is projected to be approximately 2% or less (SANDAG Series 13 growth projections). As a result, new construction (and opportunities to build new and more energy efficient buildings) in the City are minimal.

- La Mesa is well-served by transit, with five trolley stations and seven bus routes. In addition, La Mesa has the third highest population density of any city in the entire San Diego region. La Mesa has the highest gross residential density of any city in the region. These characteristics are important for achieving relatively low VMT per capita – both under existing and future conditions.

- Where people live, work, shop, and play influences how far they have to travel daily and whether they choose to walk, bike, use public transit, or drive. Measures that support mixed land uses and opportunities for higher-density development along transit routes are essential to supporting alternative transportation options.

- The City’s policy and regulatory framework encourages development, reinvestment, and transportation planning that would reduce VMT and associated GHG emissions, including support for mixed use, transit-oriented developments in areas served by the San Diego Metropolitan Transit System (MTS) trolley and bus system.

- The City’s Mixed-Use Corridors represent another opportunity for development that would have the density, location, and mix of land uses to reduce travel demand (vehicles miles traveled [VMT]) and associated GHG emissions. The mixed use overlay zone, adopted in 2008, allows for increased development density, enhanced pedestrian space and parking modifications along the transit corridors. The CAP calls for expansion of the mixed use overlay zone.

- La Mesa’s land use policy has led to compact development and a baseline GHG inventory of 7.37 MT CO_2e per capita which is already significantly lower than the San Diego region’s baseline of 10 MT CO_2e per capita.

- Future policy development in La Mesa will also support VMT reductions. Senate Bill (SB) 743 directed the California Governor’s Office of Planning and Research (OPR) to provide guidance on an alternative to analyzing transportation-related impacts of projects using level of service (congestion).

- In La Mesa, approximately 80%[32] of the housing stock was built before California's energy code, Title 24 Part 6, was first adopted in 1978. Consequently, the building stock offers considerable opportunity for cost-effective energy efficiency retrofits to decrease the use of both electricity and natural gas. The City plans to achieve energy efficiency improvements in both existing and new buildings and lighting through:
  - a combination of new community-wide programs,
  - continuation or enhancement of existing efforts, and
  - additional public outreach and education.
- This CAP forecasts a high GHG reduction amount in the energy sector, which is largely driven by strong past participation in utility-sponsored building retrofit programs and community-wide solar PV installations, both of which are expected to continue into the future.
- Unlike larger municipalities, the City does not have sole control over large stationary emission sources such as landfills that could yield significant GHG reductions through the one-time installation of control technology.
- According to the City's 2010 baseline emissions inventory, approximately 5% of GHG emissions are associated with solid waste generation and disposal in landfills. As the City of La Mesa's solid waste franchise company, EDCO Disposal Corporation (EDCO) has the primary responsibility for the solid waste implementation strategy. At EDCO, all current programs are aligned to focus on diversion goals in order to obtain the goal of Zero Waste. The City of La Mesa plans to continue to implement the State of California's goal of 75 percent recycling, composting, or source reduction of solid waste by 2020 and supporting EDCOs efforts to achieve its waste diversion goals.
- The total GHG emission reduction potential of the Green Infrastructure Strategy is 50 MT CO_2e/yr in 2020 and 6,300 MT CO_2e/yr in 2035. This represents less than 1% of total 2020 reductions anticipated from local CAP measure implementation and nearly 5% of 2035 local CAP reductions (Table 3.7). As the urban forest continues to grow, its carbon sequestration potential increases, and its impact will provide greater benefits.
- The CAP may be used as a project tiering document for compliance with the California Environmental Quality Act (CEQA).

The measures contained in this CAP reflect La Mesa's unique character, economic base, strengths, and capitalize on the best locally-appropriate opportunities to assist the State of California in meeting the goals of AB 32 and SB 32. La Mesa has completed a GHG inventory, 2020 and 2035 GHG forecasts, and a plan for reducing GHG emissions to a level that is consistent with State goals. Together, these components are La Mesa's Climate Action Plan (CAP). The City of La Mesa Climate Action Plan is an enforceable document to the maximum extent of the law.

[32] US Census, 2013. American Community Survey 5-Year Estimates, *Year Structure Built.* Data represents occupied housing units constructed prior to 1980.

The CAP quantitatively demonstrates that through implementation of a list of specific actions the City will be able to reduce GHG emissions to 2020 and 2035 targets. This CAP fulfills commitments made with the City's General Plan and lays the foundation for a continued commitment to GHG mitigation in La Mesa. Finally, the CAP provides for a process of updates and improvements at regular intervals going forward.

CITY OF LA MESA

CLIMATE ACTION PLAN

APPENDIX A – Emissions Inventory and Forecast Methodology

This appendix describes the emissions sectors, data sources, and methodology used to prepare the CAP's 2010 baseline emissions inventory and the 2020 and 2035 emissions forecasts. In the future, inventory updates should follow the methodologies presented below to provide consistency between inventory versions and allow direct comparisons from one year to another. However, it is likely that inventory methodologies will continue to evolve, and the City may find it more beneficial to follow prevailing industry standards, even if those changes make direct comparisons to prior year inventories more difficult.

It should be noted that the 2010 baseline inventory and baseline methodology appendix were prepared by the University of San Diego's Energy Policy Initiatives Center (EPIC) as part of a separate project from the remainder of the CAP (i.e., emissions forecasts, CAP document). AECOM subsequently revised the transportation and solid waste inventory methodologies, and made corresponding revisions to the original baseline inventory methodology appendix. The 2010 inventory was then used as the baseline from which AECOM prepared the 2020 and 2035 emissions forecasts.

This appendix primarily represents EPIC's original baseline inventory methodology, with new descriptions of AECOM's revisions to the transportation and solid waste sector calculations, and a new section describing AECOM's emissions forecast methodology. EPIC's original methodology appendix included inventory data for three years (i.e., 2010-2012), which is still presented throughout this appendix. The CAP and baseline greenhouse gas (GHG) inventory were developed based on the 2010 data presented herein.

Baseline Emissions Inventory

Note: *Table A-1 presents global warming potential (GWP) values from the International Panel on Climate Change (IPCC) Fourth Assessment Report (4AR). The emissions forecasts prepared subsequent to this original baseline inventory incorporated the GWP values from the more recent Fifth Assessment Report (5AR), as presented in Appendix B – Reductions Methodology. Revisions to the baseline inventory transportation and solid waste sectors also incorporated the 5AR GWP values. Although a comprehensive update to the original baseline inventory was not completed as part of the CAP project, the changes from 4AR to 5AR would be minor.*

GHGs include the sum of carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) emissions and are known as CO_2 equivalents (CO_2e). Methane and nitrous oxide emissions are converted to carbon dioxide equivalents by multiplying by their Global Warming Potentials (GWP). In general, the GWPs used to estimate greenhouse gas emissions are consistent with 100-year GWPs reported by the Intergovernmental Panel on Climate Change (IPCC) in their Fourth Assessment Report (AR4) in 2007. The GWP values used are given in Table A-1.

Table A-1 Global Warming Potentials Used in La Mesa GHG Inventory	
Greenhouse Gas	**Global Warming Potential (GWP)**
Carbon Dioxide (CO_2)	1
Methane (CH_4)	25
Nitrous Oxide (N_2O)	298

Community-scale emissions are calculated using standard methods as published by the ICLEI Community Protocol.[1] The ICLEI Community Protocol recommends including emissions from six sectors for a typical community-scale GHG inventory. These sectors are: electricity, natural gas, transportation, water, solid waste, and wastewater. For all the sectors, activity data was multiplied by a GHG emissions factor specific to each year and sector. Where region or city-specific data was available, the method deviated from the ICLEI methodology, which provides for default emissions factors by region. For example, wastewater emissions were estimated using proxy emissions factor data from the City of San Diego's Point Loma Wastewater Treatment Plant, in addition to wastewater generation estimates for La Mesa. More details on method, input data, and emissions factor information are provided in each section below.

ELECTRICITY

EPIC estimated emissions from electricity using the Built Environment (BE.2) method from the ICLEI Community Protocol. Annual electricity demand for La Mesa was provided by the utility and grossed up by 6.6%[2] to account for transmission and distribution losses. The resulting value was multiplied by the average annual electricity GHG emission factor for San Diego County, expressed in pounds of CO_2e per Megawatt-hour (lbs CO_2e/MWh).

EPIC developed emission factors associated with electricity consumption for 2010, 2011, and 2012 using FERC Form 1 data on purchased power and U.S. EPA Emissions and Generating Resource Integrated Database (eGRID) for electric plant emissions and allocation of cogeneration emissions between electric production and thermal energy. The emissions factors derived from these reports were validated by SDG&E personnel for accuracy. The combined (CO_2 + CH_4 + N_2O in terms of CO_2e) emissions factors for each inventory year are expressed in pounds of CO_2e per megawatt-hour (lbs CO_2e/MWh). Total electricity consumption by La Mesa, the annual GHG emissions factors, and corresponding emissions are given in Table A-2.

Table A-2 Electricity Consumption, Emissions Factors, and Corresponding GHG Emissions for La Mesa			
Year	**Electricity**	**Emissions Factor**	**GHG Emissions**

[1] ICLEI U.S. Community Protocol for Accounting and Reporting of Greenhouse Gas Emissions, 2013, at http://www.icleiusa.org/tools/ghg-protocol/community-protocol

[2] California Energy Demand 2015-2025 Revised Forecast, Volume 1: Statewide Electricity Demand, End-User Natural Gas Demand, and Energy Efficiency. California Energy Commission, Electricity Supply Analysis Division. Publication Number: CEC-200-2014-009-SF-REV

	Consumption		
	(kWh)	(lbs CO_2e/MWh)	(MT CO_2e)
2010	296,069,929	680	96,604
2011	296,106,280	676	96,003
2012	304,250,152	778	113,711

The emissions factor is relatively high in 2012 due to the shutdown of electricity supply from the San Onofre Nuclear Generation Station (SONGS), a GHG emissions-free supply, and its replacement by electricity produced from two other plants based on natural gas.

Electricity emissions can be broken down further into residential and commercial/industrial categories, based on data provided by the utility. Figure A-1 below gives that breakdown.

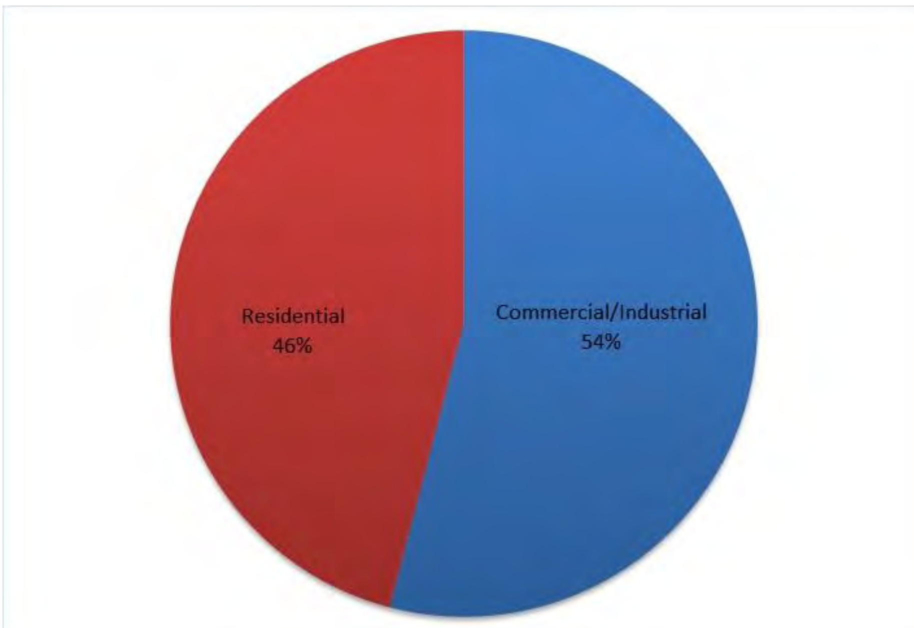

Figure A-1: GHG Breakdown of Electricity Sector

NATURAL GAS

Emissions from natural gas consumption by La Mesa were estimated using method Built Environment (BE.1) from the ICLEI U.S. Community Protocol. To estimate emissions from the combustion of natural gas, EPIC multiplied community fuel use by an emissions factor for natural gas[3], based on data from the California Air Resources Board. Table A-3 summarizes emissions from natural gas with the corresponding natural gas consumption.

Table A-3
Natural Gas Consumption and Corresponding GHG Emissions

Year	Natural Gas Consumption (Therms)	GHG Emissions (MT CO_2e)
2010	9,314,927	50,705
2011	9,506,014	51,745
2012	8,817,411	47,997

Emissions from the natural gas sector can be broken down further into residential and commercial/industrial categories, based on data provided by the utility. That breakdown is given in Figure A-2.

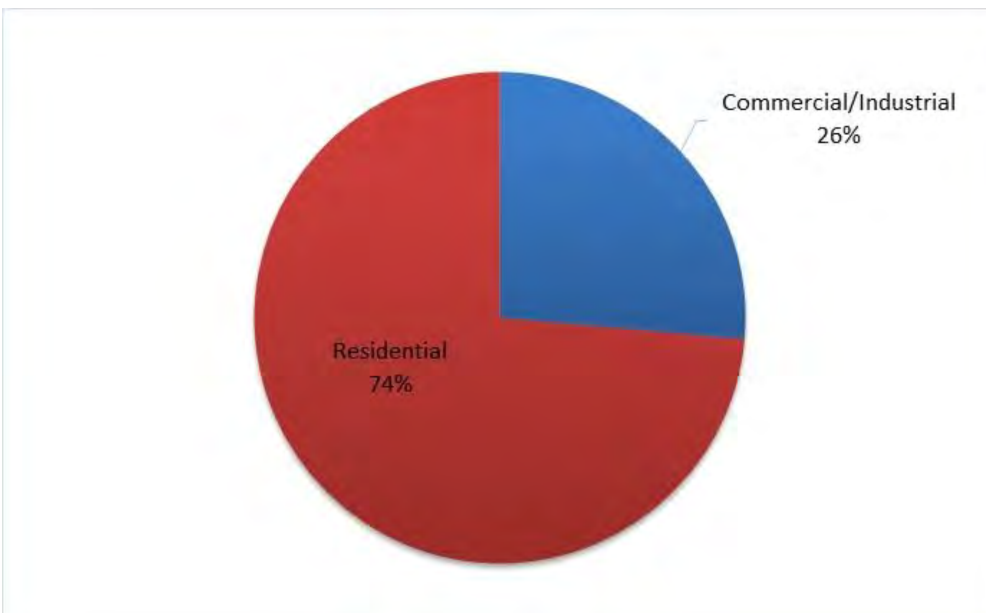

Figure A-2: GHG Breakdown of Natural Gas Sector

3 Natural Gas emissions factor: 0.00544342248 MMT CO_2e/Million Therms

TRANSPORTATION

Note: *Two changes were made to the original transportation sector calculations during revisions to the 2010 baseline inventory. First, AECOM revised the IE/EI value used to calculate the baseline inventory following guidance from SANDAG. The original value used did not represent La Mesa's complete share of IE/EI trips, so the value was revised upward from 270,964 miles per day to 1,279,147 miles per day.*

Second, transportation sector emissions were quantified using the most current version of ARB's EMFAC model, EMFAC2014, as opposed to an older version (EMFAC2011) that was used to prepare the original GHG inventory. This change made the 2010 transportation sector emissions directly compatible with the 2020 and 2035 forecasts, which were also estimated using EMFAC2014 emissions factor outputs.

To estimate GHG emissions associated with on-road transportation, EPIC uses vehicle miles traveled (VMT) and the emission rates associated with the vehicle classes. SANDAG provided regional VMT data for La Mesa for all vehicle types based on the Origin-Destination (O-D) method for 2010 and 2020. EPIC interpolated for the years not provided. The O-D VMT method as proposed by 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 as shown in Figure A-3. O-D VMT includes trips that originate and end within the designated boundary, in this case the La Mesa (Internal-Internal), and trips that either begin within the designated boundary and end outside of it (Internal-External), or vice versa (External-Internal). Internal-External and 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. Finally, 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. Table A-4 provides VMT data for 2010.[4]

[4] Table A-5 in the original inventory methodology prepared by EPIC incorrectly showed an Internal-External and External-Internal value of 541,927 DVMT for 2010, which was subsequently revised to 2,558,294 DVMT.

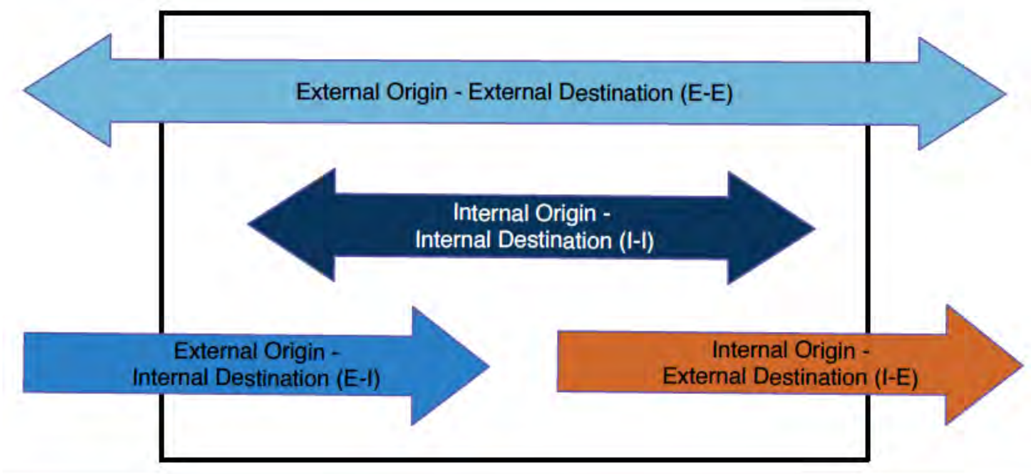

Figure A-3: Components of Origin Destination (O-D) method for calculation of Vehicle Miles Traveled (VMT) according to the ICLEI Community Protocol

Table A-4
Raw O-D VMT for La Mesa

Year	Internal-Internal	Internal-External and External-Internal [1]	External-External
	(miles/day)	(miles/day)	(miles/day)
2010	162,382	2,558,294	1,078,439

Note: The original baseline inventory methodology appendix from EPIC included data for years 2010, 2011, and 2012 in Table 4. When AECOM corrected the IE-EI DVMT value, revisions were only made to the 2010 data because it corresponds with the CAP 2010 baseline year. The original and incorrect 2011 and 2012 data have been deleted from this table to avoid confusion.

[1] The IE-EI value shown above represents the raw IE-EI value for La Mesa, which was multiplied by 0.5 per the O-D methodology described earlier in this section.

Emissions rates expressed in carbon-dioxide equivalent per mile driven (CO_2e/mi) were derived from the statewide EMFAC2014 model[5], which is the California Air Resources Board's (CARB) tool used to calculate air pollution emissions, including GHGs, on a metropolitan planning organization (MPO) basis. EMFAC2014 outputs were used to generate fleet-wide CO_2e/mi values for 2010. These emissions factors incorporate the effects of several statewide vehicle emissions reduction programs, including Pavley Regulations, the Advanced Clean Cars Program, Heavy-Duty GHG Phase 1, and Truck and Bus Regulations.[6] GHG emissions are calculated by multiplying VMT by the emissions factor.

[5] EMFAC is the Emissions Factor model developed and used by the State of California to estimate air pollutant and carbon dioxide gas emissions on a region-wide or Metropolitan Planning Organization (MPO) basis. SANDAG, the San Diego Regional Association of Governments, is the MPO for the San Diego region, which included 18 cities and 1 unincorporated county.

[6] Air Resources Board. *EMFAC2014 Volume III – Technical Documentation, v1.0.7*. May 12, 2015. Available: https://www.arb.ca.gov/msei/downloads/emfac2014/emfac2014-vol3-technical-documentation-052015.pdf

SOLID WASTE

Note: *This section describes the revised solid waste methodology and calculations prepared by AECOM, which replaced the original solid waste methodology prepared by EPIC.*

As part of the 2035 CAP revisions, AECOM recalculated solid waste emissions estimates for the 2010 base year, and the 2020 and 2035 forecast years using the methane commitment method outlined in the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC). The equations and inputs associated with that method are presented below, followed by additional data items used to estimate La Mesa's solid waste emissions.

AECOM applied equations 8.1, 8.3, and 8.4 from the GPC (shown on the following pages). The calculations assumed a baseline methane capture factor of 75% at landfills receiving La Mesa's solid waste, which corresponds to the f_{rec} value in equation 8.3.

Equation 8.1: Degradable organic carbon (DOC)

DOC = (0.15 x A) + (0.2 x B) + (0.4 x C) + (0.43 x D) + (0.24 x E) + (0.15 x F) + (0.39 x G) + (0.0 x H) + (0.0 x I) + (0.0 x J) + (0.0 x K)	
A	= Fraction of solid waste that is food
B	= Fraction of solid waste that is garden waste and other plant debris
C	= Fraction of solid waste that is paper
D	= Fraction of solid waste that is wood
E	= Fraction of solid waste that is textiles
F	= Fraction of solid waste that is industrial waste
G	= Fraction of solid waste that is rubber and leather
H	= Fraction of solid waste that is plastics
I	= Fraction of solid waste that is metal
J	= Fraction of solid waste that is glass
K	= Fraction of solid waste that is other, inert waste

Source: Default carbon content values sourced from IPCC Waste Model spreadsheet, available at: http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/5_Volume5/V5_2_Ch2_Waste_Data.pdf
Note: GPC Equation 8.1 includes factors A-F; AECOM added factors G-K using the default DOC content in % of wet waste from the same IPCC Waste Model spreadsheet referenced in the source above

Equation 8.3: Methane commitment estimate for solid waste sent to landfill

CH_4 emissions = MSW_x x L_0 x (1-f_{rec}) x (1-OX)		
Description		**Value**
CH_4 emissions	= Total CH_4 emissions in metric tons	Computed
MSW_x	= Mass of solid waste sent to landfill in inventory year, measured in metric tons	User input
L_0	= Methane generation potential	Equation 8.4 Methane generation potential
f_{rec}	= Fraction of methane recovered at the landfill (flared or energy recovery)	User input
OX	= Oxidation factor	0.1 for well-managed landfills; 0 for unmanaged landfills

Source: Adapted from *Revised 1996 IPCC Guidelines for National Greenhous Gas Inventories*

AECOM used the following values in Equation 8.3 for La Mesa's calculations:

- MSWx = see Table A-6
- frec = 75%
- OX = 0.1

Equation 8.4: Methane generation potential, L_0

L_0 = MCF x DOC x DOC_F x F x 16/12		
Description		**Value**
L_0	= Methane generation potential	Computed
MCF	= Methane correction factor based on type of landfill site for the year of deposition (managed, unmanaged, etc., fraction)	Managed = 1.0 Unmanaged (≥ 5 m deep) = 0.8 Unmanaged (<5 m deep) = 0.4 Uncategorized = 0.6
DOC	= Degradable organic carbon in year of deposition, fraction (tons C/tons waste)	Equation 8.1
DOC_F	= Fraction of DOC that is ultimately degraded (reflects the fact that some organic carbon does not degrade)	Assumed equal to 0.6
F	= Fraction of methane in landfill gas	Default range 0.4-0.6 (usually taken to be 0.5)
16/12	= Stoichiometric ratio between methane and carbon	

Source: *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (2000)*

AECOM used the following values in Equation 8.4 for La Mesa's calculations:

- MCF = 1.0

- DOCf = 0.6
- F = 0.5

Waste Disposal Data

EPIC obtained data on solid waste disposal in La Mesa from the California Department of Resources Recycling and Recovery (CalRecycle) Disposal Reporting System (DRS). Alternative Daily Cover (ADC) was not included in total tonnage. Waste disposal data are given in Table A-5.

Table A-5
Solid Waste Disposal and Corresponding GHG Emissions for La Mesa

Year	Solid Waste Disposed (Wet Short Tons)
2010	42,718
2011	35,709
2012	30,271

The solid waste disposal value from 2010 was used to estimate disposal amounts in 2020 and 2035 (see Table A-6). AECOM used the 2010 disposal value shown in Table A-5, and converted from short tons to metric tons for use in the preceding equations. The rate of disposal, expressed as metric tons per service population (MT/SP) was calculated based on 2010 values, and held constant to estimate future disposal values in the emissions forecasts.

Table A-6
Waste Disposal Forecasts

Year	Short Tons (ST)	Metric Tons (MT)	Service Population (SP) [3]	MT/SP [4]
2010	42,718 [1]	38,753 [2]	85,146	0.455
2020	-	41,394 [5]	90,949	0.455
2035	-	45,377 [5]	99,700	0.455

Source: AECOM 2016
Notes: Service population (SP) = population and jobs
[1] See Table A-5
[2] 1.0 short ton = 0.9072 metric tons
[3] See Table A-12 for demographic data sources
[4] Calculated for 2010 as MT/SP, and held constant for 2020 and 2035
[5] Calculated as SP * (MT/SP)

Waste Characterization

AECOM estimated landfill waste composition based on CalRecycle's statewide waste characterization studies. The 2010 baseline year inventory results are based on the *California 2008 Statewide Waste Characterization Study*. The 2020 and 2035 emissions forecasts were based on CalRecycle's *2014 Disposal-Facility-Based Characterization of Solid Waste in*

California report. Per the 2014 report, CalReycle's side-by-side analysis of the 2008 and 2014 study results identified an unexpected anomaly in the distribution of waste per sector (i.e., residential, commercial, and self-hauled). The report states that CalRecycle is currently obtaining additional data to verify the 2014 report results. In the interim, the 2014 report presents two sets of data: one reflecting the 2014 calculated sector percentages, and the other based on the 2008 report sector percentages. AECOM selected to use the set of data based on the 2008 report.

The CalRecycle studies estimate the percentage of different materials in California's waste stream. AECOM referred to *Table 7: Composition of California's Overall Disposed Waste Stream* in both studies to determine the distribution of waste by the material types included in Equation 8.1. Table A-7 shows the results of this data sorting.

Table A-7
Waste Characterization – Selected Material Categories

Material	Estimated % of Total Disposed Waste Stream		Material Categories/Sub-types from CalRecycle Reports [1, 2]
	2008	2014	
Paper	18.9%	18.1%	Paper category plus Gypsum Board sub-type from Inerts and Other category
Textiles	5.4%	5.6%	Textiles and Carpet sub-types from Other Organic category
Food	15.5%	16.5%	Food sub-type from Other Organic category
Garden and Park	10.9%	10.6%	Leaves and Grass, Prunings and Trimmings, Manures, and Remainder/Composite Organics sub-types from Other Organic category
Wood	15.1%	15.5%	Lumber sub-type from Inerts and Other category and Branches and Stumps sub-type from Other Organic category
Rubber and Leather	0.2%	0.1%	Tires sub-type from Special Waste category
Plastics	9.6%	10.4%	Plastic category
Metal	4.6%	3.1%	Metal category
Glass	1.4%	2.5%	Glass category
Other	18.4%	17.6%	Electronics category, Household Hazardous Waste (HHW) category, Mixed Residue category, Inerts and Other category (minus Lumber and Gypsum Board sub-types), and Special Waste category (minus Tires sub-type)
Total	100.0%	100.0%	

Source: AECOM 2016

[1] *California 2008 Statewide Waste Characterization Study,* California Integrated Waste Management Board 2009. Prepared by Cascadia Consulting Group. Available online at: <http://www.calrecycle.ca.gov/publications/Documents/General/2009023.pdf>

[2] *2014 Disposal-Facility-Based Characterization of Solid Waste in California,* CalRecycle 2015. Prepared by Cascadia Consulting Group. Available online at: <http://www.calrecycle.ca.gov/Publications/Documents/1546/20151546.pdf>

La Mesa Waste Disposal by Characterization Type

AECOM multiplied the solid waste disposal values (in metric tons) from Table A-6 by the waste characterization values presented in Table A-7 to estimate disposal values by waste type for the 2010, 2020, and 2035 inventory years. Table A-8 below presents the results, which were applied to Equations 8.1 and 8.3 to calculate La Mesa's solid waste emissions.

Table A-8
Waste Disposed by Waste Type

Waste Type	2010 (MT)	2020 (MT)	2035 (MT)
Paper	7,324	7,492	8,213
Textiles	2,093	2,318	2,541
Food	6,007	6,830	7,487
Garden and Park	4,224	4,388	4,810
Wood	5,852	6,416	7,033
Rubber and Leather	78	41	45
Plastics	3,720	4,305	4,719
Metal	1,783	1,283	1,407
Glass	543	1,035	1,134
Other	7,131	7,285	7,986
Total	**38,753**	**41,394**	**45,377**

Source: AECOM 2016
Notes: MT = metric tons

Table A-9 presents the emissions results by waste type and year.

Table A-9
Solid Waste Emissions by Waste Type

Waste Type	2010 (MT CO_2e)	2020 (MT CO_2e)	2035 (MT CO_2e)
Paper	7,383	7,552	8,279
Textiles	1,266	1,402	1,537
Food	2,271	2,582	2,830
Garden and Park	2,129	2,211	2,424
Wood	6,341	6,953	7,621
Rubber and Leather	76	41	45
Plastics	0	0	0
Metal	0	0	0
Glass	0	0	0
Other	0	0	0
Total	**19,465**	**20,741**	**22,736**

Source: AECOM 2016
Notes: MT CO_2e = metric tons of carbon dioxide equivalent

The results from Equation 8.3 were multiplied by a global warming potential (GWP) factor for CH_4 to convert to metric tons of carbon dioxide equivalent (MT CO_2e). The following GWP value was used from the UN IPCC 5th Assessment Report: CH_4 = 28.

WATER

To the extent possible, emissions from energy use associated with the conveyance and treatment of water consumed by the La Mesa Community were estimated using the WW.14 method from the ICLEI US Community Protocol. The method considers each element of the water cycle: (upstream [supply and conveyance], local conveyance/distribution, groundwater extraction, treatment, and distribution) separately, using a community-specific energy consumed per unit of water for each process of the water system given in Table A-10.

Table A-10
Commonly Used California Energy Commission (CEC) Estimates of Energy Intensity for Elements of Water Use Cycle, Southern California

Element of Water Use Cycle	Energy Intensity (kWh/Million Gallons)
Upstream[7]	9,727
Groundwater Extraction[8]	1,820
Distribution[9]	684
Local Conveyance/Distribution[10]	292
Treatment[11]	100

To estimate gallons of water consumed in La Mesa per year, an annual per capita consumption value[12] for the region for 2010 was multiplied by La Mesa's population.[13] The result was then split into groundwater and surface water using a breakdown for the Helix Water District from the 2010 San Diego County Water Authority Water Management Plan.[14] Total GHG emissions for La Mesa's water use were then estimated by taking a sum of the emissions from each process. About 90% of water sector emissions were a result of upstream energy use. The relative breakdown of emissions for the water sector is given in Figure A-4.

[7] California Energy Commission (CEC), Navigant Study, 2006

[8] Default ICLEI US Communities Protocol, assumed an extraction depth of 120 feet.

[9] California Energy Commission (CEC), 2006

[10] California Energy Commission (CEC), 2006

[11] Default estimate from ICLEI US Communities Protocol.

[12] Assumed per capita consumption was 150 gallons/person/day, equivalent to 2010 regional per capita water use as reported by San Diego County Water Authority, available at http://www.sdcwa.org/2010-urban-water-management-plan.

[13] Based on SANDAG Series 12 forecast.

[14] The split is based on the groundwater to surface water ratio for Helix Water District, which supplies water to La Mesa. 2010 Urban Water Management Plan of June 2011, Appendix F, Table F-2, available at http://www.sdcwa.org/2010-urban-water-management-plan.

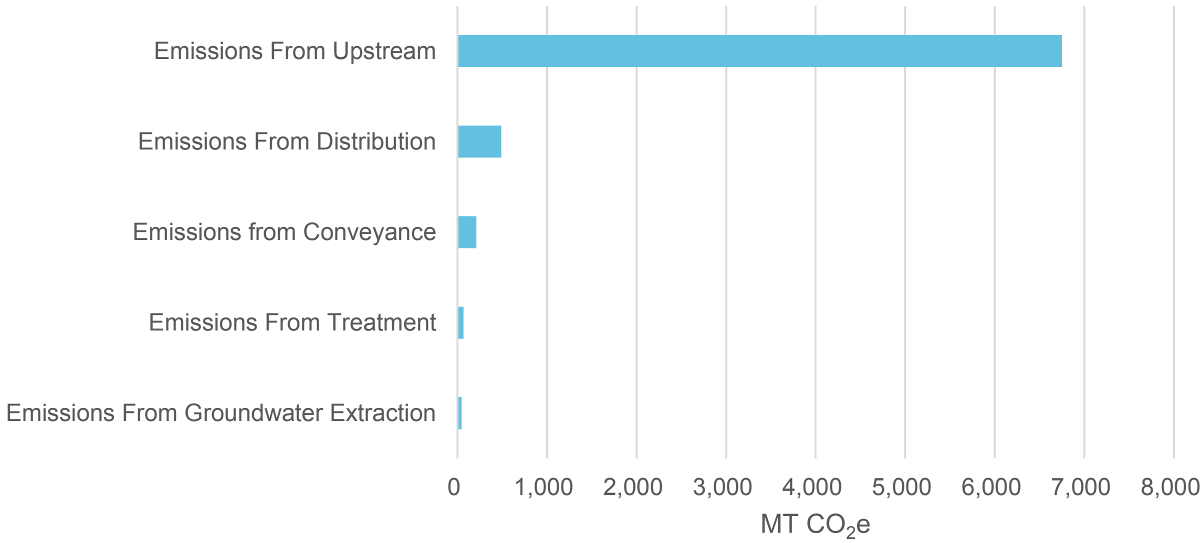

Figure A-4: Breakdown of Emissions from the Water Sector for La Mesa

WASTEWATER

Due to lack of data for wastewater treatment facilities used by the City of La Mesa, EPIC used energy intensity factors from the treatment of wastewater at the Point Loma Wastewater Treatment Plant in the City of San Diego as a proxy for other plants in the region. Note that if the City of La Mesa does not dispose its wastewater to the City of San Diego, these emissions estimates may underestimate La Mesa's wastewater treatment emissions. This is because the Point Loma facility is unique in that it is the only treatment plant in the state that has been given a waiver to treat to a lower standard than other newer treatment facilities in the state. Therefore, the energy use associated with Point Loma will generally be lower than that of other treatment facilities.

The City of La Mesa provided wastewater flow data. Table A-11 provides annual wastewater generated by La Mesa and corresponding GHG emissions.

Table A-11
Annual Wastewater Generated by La Mesa

Year	Wastewater Generated (Gallons/year)[15]	GHG Emissions (MT CO_2e/year)
2010	4,824,000	2,441
2011	4,978,000	2,519
2012	4,444,000	2,249

[15] Data provided by City of La Mesa

Community-wide Emissions Forecast Assumptions and Methodology

The baseline inventory presented above was used to project the future community-wide GHG emissions. La Mesa's GHG emissions were forecast for the years 2020 and 2035 assuming that historic trends describing energy and water consumption and solid waste generation will remain the same in the future, on a per service population (population plus employment) basis. Transportation growth estimates were provided separately by SANDAG from its Series 13 data. The emissions forecasts demonstrate what emissions levels are likely to be under a scenario in which no additional statewide or local actions are taken to curtail emissions growth (beyond the statewide transportation programs embedded within the EMFAC2014 model used to estimate transportation sector emissions).

Table A-12 presents the population and employment baseline and projection estimates used to develop the CAP's emissions forecasts. The 2020 and 2035 population and employment values come from SANDAG's Regional Transportation Plan/Sustainable Communities Strategy. The service population line represents the sum of the community's population and employment. The compound annual growth rate was calculated for the service population from 2010-2020 and 2010-2035, and was applied to all emissions sectors, except transportation and solid waste, to estimate future emissions levels, as described in the next section.

Solid waste emissions forecasts were based on service population growth and other factors, as described earlier in the Solid Waste baseline methodology section. Transportation emissions forecasts are described in the final section of this appendix.

Table A-12
Population and Employment Factors

	2010	2020	2035
Population	57,361	62,136	68,682
Employment	27,785	28,813	31,018
Service Population	85,146	90,949	99,700
Compound Annual Growth Rate from 2010	-	0.66%	0.63%

Source: AECOM 2016

Notes: MT CO_2e = metric tons of carbon dioxide equivalent

FORECAST METHODOLOGY

The projected population and employment growth described above was used to project the electricity, natural gas, water, and wastewater sector emissions.

The following formula describes how GHG emissions were projected using average annual growth rates:

$$Emissions_{PHY} = Emissions_{BASE} + (Emissions_{BASE} \times AAGR \times Years)$$

Where:

$Emissions_{PHY}$ = GHG emissions during the planning horizon year

$Emissions_{BASE}$ = GHG emissions during the baseline year

AAGR = average annual growth rate (service population)

Years = years of growth between the baseline and planning horizon year

The planning horizon year 2020 and 2035 emissions were projected from the baseline year 2010, which involves 10 years of growth and 25 years of growth, respectively (i.e., *Years* factor above).

Transportation Forecast Methodology

The 2020 and 2035 transportation emissions forecasts were based on SANDAG's VMT estimates from the Series 13 model revenue-constrained scenario. Consistent with the 2010 baseline inventory, the 2020 and 2035 transportation sector emissions forecasts were estimated using outputs from EMFAC2014 and the same methodology as described in the Transportation baseline methodology section of this appendix. Table A-13 shows the daily vehicle miles traveled (DVMT) inputs from the SANDAG models that were used to estimate the 2020 and 2035 transportation emissions.

Table A-13
Daily Vehicle Miles Traveled (DVMT)

Year	Internal-Internal	Internal-External and External-Internal	External-External	Total DVMT[1]
2010	162,382	2,558,294	1,078,439	1,441,529
2020 Revenue Constrained	99,181	3,105,697	851,458	1,652,030
2035 Revenue Constrained	117,073	3,486,581	941,615	1,860,364

Source: AECOM 2017, data from SANDAG Series 13 Revenue-Constrained scenario

[1] Total value = (50% of total Internal-External and External-Internal trips) + (100% of Internal-Internal trips), per the origin-destination methodology

CITY OF LA MESA

CLIMATE ACTION PLAN

APPENDIX B – Reduction Quantification Methodology

This appendix describes the assumptions and methodology used to estimate emissions reductions associated with implementation of the local CAP measures described in Chapter 3. Only those strategies with quantified reduction estimates provided in the CAP are presented here. Supporting tables may show emissions reduction totals that vary slightly from those presented in the CAP due to rounding.

In some instances, assumptions are described as "conservative" because they are based on the best available data at the time of CAP preparation, and greater emissions reductions may occur, but there is currently a lack of data available to fully substantiate increased reduction estimates. In these instances, the CAP is likely to underestimate emissions reduction potential.

Baseline and Mitigated Scenarios

Several of the emissions reduction calculations described throughout this section are based on a baseline scenario (e.g., how much energy would be consumed if the strategy *is not* implemented) and a mitigated scenario (e.g., how much energy would be consumed if the strategy *is* implemented). The difference between the baseline and mitigated scenarios represents a strategy's reduction potential (i.e., baseline scenario - mitigated scenario = reduction potential).

Energy Strategy Inputs

Calculations for energy strategies estimate electricity or natural gas savings. These energy savings (expressed as kWh and therms) were multiplied by energy emissions factors expressed as MT CO_2e/kWh and MT CO_2e/therm, as shown in Table B-1. The electricity emissions factor used in these calculations is based on SDG&E's reported RPS-eligible energy procurement through 2020, and assumes SDG&E's compliance with the RPS requirements for 50% of the utility's electricity to come from RPS-eligible, emissions-free sources by 2030. Using an estimated 2020 and 2035 electricity emissions factor (as opposed to the 2010 baseline factor used in the emissions inventory) allows the electricity-related reduction estimates to be combined with the reductions estimated to occur as a result of implementing the RPS (included in the emissions forecasts presented in Chapter 2 of the CAP), without double-counting reduction potential.

The 2020 electricity emissions factor was based on SDG&E's reported RSP procurement value of 45.2% for 2020.[1] The emissions factor was then calculated based on SDG&E's 2010 emissions factor and the increase in RPS procurement over the 2010 baseline, and shows that SDG&E's electricity portfolio would reduce its carbon-intensity from 736 lbs. CO_2e/MWh to approximately 450 lbs. CO_2e/MWh. The emissions inventory and reduction estimates are

[1] California Public Utilities Commission, accessed July 2017. Available online: <http://www.cpuc.ca.gov/RPS_Homepage/>

expressed as MT CO_2e/yr throughout the CAP, so the carbon-intensity values were converted from lbs. CO_2e/MWh to MT CO_2e/kWh, as shown in Table B-1.

The 2035 electricity emissions factor was estimated based on SDG&E's *Final 2016 Renewables Portfolio Standard Procurement Plan*, which shows the pathway toward an electricity portfolio that comprises 50% renewable sources by the 2030 RPS target year. AECOM conservatively assumed that the amount of renewables in 2035 would not be expanded beyond the current 2030 requirement (i.e., 50%). Combined cycle natural gas power plants were assumed to provide the remaining 50% of the electricity portfolio in 2035, based on the CEC's utility planning guidance.[2]

The natural gas emissions factor is consistent with that used in the CAP's emissions inventory (prepared by EPIC), which references the California Air Resources Board as the emissions factor source (see Appendix A).

Emissions reduction estimates were calculated by multiplying a measure's total energy savings by the associated emissions factors. Electricity and natural gas emissions reductions were then combined (where applicable) to estimate total emissions reductions, expressed as MT CO_2e/yr.

Table B-1
Energy Emissions Factors

Energy Type	Metric Tons CO_2e/kWh	Metric Tons CO_2e/therm
Electricity – 2020	0.000204[1]	-
Electricity – 2035	0.000202[2]	-
Natural Gas	-	0.005443

Source: AECOM 2017

[1] Estimated based on the 2010 SDG&E emissions factor of 736 lbs/MWh with a portfolio with 10% renewable energy sources, improving to the 2020 RPS requirement of 45% renewable energy sources: 736 / ((1-10%) / (1-55%)) = 449.8 lbs/MWH. Note that the 2010 electricity emissions factor used in the baseline inventory was derived from eGRID values, which are regional in nature, and was not an SDG&E-specific emissions factor. The 2010 SDG&E emissions factor was collected from the City of San Diego's Climate Action Plan Appendices for use in this equation (Available online: < https://www.sandiego.gov/sites/default/files/final_july_2016_cap_all_appendices.pdf>, pg. A-7) to provide a more context-specific estimate of how electricity emissions will change based on SDG&E's renewables procurement plan.

[2] Estimated based on *San Diego Gas & Electric Company Final 2016 Renewables Portfolio Standard Procurement Plan (Public Version)*, which shows a procurement pathway toward 50% RPS compliance; assumes remaining 50% of portfolio is met through combined-cycle natural gas generation. EPA natural gas fuel emissions factor is 0.050304 MT CO_2e/GJ (rounded), and EIA heat rate for combined cycle natural gas plants is 0.008 GJ/kWh, resulting in an emissions factor of 0.000404 MT CO_2e/kWh. If 50% of the electricity portfolio is emissions-free per RPS requirements, and the remainder is provided by combined cycle natural gas facilities as calculated herein, then the resulting electricity emissions factor is 0.000202 MT CO_2e/kWh (i.e., [50% * 0.0] + [50% * 0.000404])

[2] Pers. comm. between AECOM staff and Roseville Electric Utility staff, May 2017.

Note on Solid Waste Calculations

The three solid waste measures are each calculated based on the methane commitment methodology equations described in the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC), and replicated in Appendix A – Emissions Inventory and Forecast Methodology. Specifically, the calculations follow Equation 8.3, and use the same default factors as described in Appendix A. The methodological descriptions of the measures in this appendix describe the process for calculating other inputs needed in the GPC equation. Please refer to Appendix A for a full description of the methane commitment method and its corresponding equations and default assumptions.

Reduction Quantification

E-1 Building Retrofit Program

This measure estimates the reduction in energy-related emissions (i.e., electricity and natural gas) resulting from retrofits to existing residential units and commercial properties.

SDG&E Energy Efficiency Programs

SDG&E provided energy savings related to residential and commercial efficiency programs that were installed in La Mesa homes, businesses, and municipal buildings from 2010 (the CAP's baseline year) through 2014 (the most current data available at the time of plan preparation). The data identified the utility program-related energy savings within the La Mesa community shown in Table B-2.

Table B-2
SDG&E Retrofit Energy Savings – 2010-2014

	Residential / Commercial	Municipal	Total	Savings/yr[1]
kWh/yr	17,637,178	231,623	17,868,801	3,527,436
therms/yr	152,260	-	152,260	30,452

Source: SDG&E, 2015

[1] Calculated as Residential/Commercial savings divided by 5 years of activity data

In addition to these past reductions that have already been realized since the CAP's 2010 baseline year, this measure estimates additional future building retrofits that could be implemented by 2020 and 2035. As described in Measure E-1, there are several retrofit-oriented programs available to La Mesa residents, including PACE financing programs that could drive additional program participation. Utility-sponsored programs are planned to continue into the near future through SDG&E and Energy Upgrade California, and new program could also be developed during the planning horizon of this CAP. This measure conservatively assumes that similar levels of program participation would occur through the 2020 and 2035 horizon years for residential and commercial customers, as was seen from 2010-2014 (see column Savings/yr in Table B-2).

To avoid overlap with statewide reductions accounted for elsewhere, the electricity savings estimated to occur as a result of implementing AB 1109 Lighting Efficiency were subtracted from Measure E-1, as shown in Table B-3. AB 1109 does not affect natural consumption, so no deductions were made to future natural gas retrofit savings. Net energy savings shown in Table B-3 were multiplied by applicable emissions factors from Table B-1 to estimate total reductions from implementation of this measure.

Table B-3 Estimated Future Retrofit Energy Savings – SDG&E				
	Residential / Commercial[1]	AB 1109 Deductions	Net Energy Savings	Reductions (MT CO_2e/yr)
2010-2020				
kWh/yr	35,505,979	-31,472,931	4,033,048	823
therms/yr	304,519	-	304,519	1,658
Total	**-**	**-**	**-**	**2,480**
2010-2035				
kWh/yr	88,417,514	-35,587,889	52,829,625	10,676
therms/yr	761,298	-	761,298	4,144
Total	**-**	**-**	**-**	**14,820**

[1] 2010-2020 savings values calculated as (total existing energy savings from Table B-2) + (savings/yr from Table B-2 * 5 years); 2010-2035 savings values calculated as (2010-2020 energy savings as shown above) + (savings/yr from Table B-2 * 15 years)

PACE Program Energy Efficiency

Residential energy efficiency retrofit participation data was collected from three PACE financing districts that operate in the City of La Mesa. Data was provided by HERO, Ygrene, and CaliforniaFIRST. Three other PACE programs operate within La Mesa, but have had no participation in the City to date or could not provide participation data in a format that would support accurate emissions reduction calculations. Therefore, emissions reductions from this measure could be higher than estimated if additional participation is occurring, but is not being actively monitored at present.

HERO provided total electricity and natural gas savings on an annual basis from 2010 through the 2nd quarter of 2017. Ygrene reported total electricity savings on an annual basis during the same time period, but did not provide natural gas savings (or had none to report). CaliforniaFIRST provided total electricity and natural gas savings in aggregate for the same time period (i.e., energy savings were not provided by year). Each PACE provider also included the total number of homes improved.

Following conversations with staff from HERO, future participation rates were estimated. Full participation in the HERO program is typically estimated as 1.0% of total eligible residential properties per year. Based on historic program performance and a recommendation from a HERO program analyst, a more conservative participation rate for La Mesa was selected as 0.7% of total eligible residential properties per year, or 110 projects per year (i.e., 15,709 total eligible properties * 0.7%). An average annual electricity and natural gas savings rate was calculated from the historic La Mesa participation data to estimate future energy savings from participation in HERO programs. Electricity savings were estimated as 930 kWh/yr per project and natural gas savings were estimated as 93 therms/yr per project. A 5% energy savings discount was also applied to the previous and future electricity and natural gas savings to avoid double counting with the energy retrofit programs captures in the previously presented SDG&E

data (see Table B-3). This discount factor was recommended by a HERO program analyst based on research conducted by HERO. Table B-4 shows the estimated energy savings and emissions reductions from continued participation in the HERO program.

Table B-4
Estimated Future Retrofit Energy Savings – HERO Program

Target Year	Homes Improved	kWh Savings	Therms Savings	Reductions ($MT\ CO_2e/yr$)
2010-2020				
2014-2017	273	254,199	25,315	-
2017-2020	330[1]	307,274	30,601	-
Total	603	561,473	55,916	-
Discounted	5%	533,400	53,121	-
Emissions Factor	-	0.000204	0.005443	-
Reductions	-	**109**	**289**	**398**
2010-2035				
2014-2017	273	254,199	25,315	-
2017-2035	1,979[1]	1,842,712	183,513	-
Total	2,252	2,096,912	208,829	-
Discounted	5%	1,992,066	198,387	-
Emissions Factor	-	0.000202	0.005443	-
Reductions	-	**403**	**1,080**	**1,482**

[1] Estimated as (2020-2017) * 110 projects per year and (2035-2017) * 110 projects per year, respectively.

Energy savings were similarly calculated for the Ygrene PACE program. Actual program energy savings were provided for 2015-2017, and a Ygrene program analyst agreed that a similar approach to forecasting future participation as described in the HERO program could be applied to the Ygrene program. Ygrene participation was approximately 5.75 projects per month (based on actual participation data), or 69 projects per year, which was used to estimate future participation levels. A 5% energy savings reduction was also applied to the Ygrene estimates to avoid double counting with the SDG&E program estimates. The Ygrene data provided only identified electricity savings from previous participation, so future program participation estimates also only include electricity savings. It is possible that actual future participation in Ygrene programs could result in natural gas savings, as well, that are not captured in these estimates. Future CAP monitoring and updates will help to capture this possibility, but this CAP conservatively does not include natural gas savings. Table B-5 shows the estimated energy savings and emissions reductions from continued participation in the Ygrene program.

Table B-5 Estimated Future Retrofit Energy Savings – Ygrene Program		
Target Year	**Homes Improved**	**kWh Savings**
	2010-2020	
2015-2017	133	123,841
2017-2020	207[1]	192,745
Total	340	316,585
Discounted	5%	300,756
Emissions Factor	-	0.000204
Reductions	-	**61**
	2010-2035	
2015-2017	133	123,841
2017-2035	1,242[1]	1,156,467
Total	1,375	1,280,308
Discounted	5%	1,216,292
Emissions Factor	-	0.000202
Reductions	-	**246**

Source: AECOM 2017

[1] Estimated as (2020-2017) * 69 projects per year and (2035-2017) * 69 projects per year, respectively.

The CaliforniaFIRST PACE program also provided data on past participation. However, the data was aggregated at a very high level, and could not be accurately annualized to support the same type of future participation estimates as with the HERO and Ygrene data described above. To be conservative, the CAP only quantified the emissions reductions associated with past participation in this program and held those reductions constant through the 2020 and 2035 target years. Table B-6 shows the energy savings and reductions associated with actual participation in the CaliforniaFIRST program.

Table B-6 Estimated Future Retrofit Energy Savings – CaliforniaFIRST Program				
Target Year	**Homes Improved**	**kWh Savings**	**Therms Savings**	**Reductions ($MT\ CO_2e/yr$)[1]**
2015-2017	45	38,916	2,836	**23**
2020	45	38,916	2,836	**23**
2035	45	38,916	2,836	**23**

[1] 2020 electricity emissions factor is 0.000204 MT CO_2e/kWh, 2035 electricity emissions factor is 0.000202 MT CO_2e/kWh, and natural gas emissions factor is 0.005443 MT CO_2e/therm, as shown Table B-1.

Grossmont Hospital Co-Generation Facility Project

In 2016, a new co-generation (co-gen) facility went online at the Grossmont Hospital with a significant improvement in operational efficiency over the previous facility. Energy reductions associated with the new co-gen facility were estimated for the CAP based on conversations with, and data provided by a facility analyst. The new facility is larger than the previous one, and consumes a greater amount of natural gas, but is also able to generate a proportionally larger amount of electricity for use on-site. Energy reductions were quantified by calculating the net energy change from operational data before and after installation of the new co-gen facility (i.e., electricity and natural gas consumption for one year prior to and following co-gen facility installation). Reductions from this project total 1,236 MT CO_2e/yr.

Table B-7 summarizes the total reductions from these energy efficiency programs. Reductions in 2020 are estimated as 4,198 MT CO_2e/yr (rounded to 4,200 MT CO_2e/yr in the CAP), and reductions in 2035 are estimated as 17,807 MT CO_2e/yr (rounded to 17,810 MT CO_2e/yr in the CAP).

Table B-7
Retrofit Energy Savings Summary

Energy Efficiency Program	2020 Reductions (MT CO_2e/yr)	2035 Reductions (MT CO_2e/yr)
SDG&E	2,480	14,820
HERO PACE	398	1,482
Ygrene PACE	61	246
CaliforniaFIRST PACE	23	23
Grossmont Hospital Co-gen Facility	1,236	1,236
Total	**4,198**	**17,807**

Source: AECOM 2017

E-2 SHADE TREE PROGRAM

This measure is based on estimates of the energy savings associated with installing shade trees next to single-family residential units. The measure assumes that an equal number of shade trees would be planted from 2010 through the 2020 and 2035 target years until the total number of trees shown in the progress indicator table in Chapter 3 is achieved. The measure also assumes that the trees' ability to offset electricity use (through increased shade generation) increases as the trees get older and grow larger.

The measure calculated the total annual electricity savings in 2020 and 2035 associated with shade trees based on their relative age from the planting year (i.e., trees planted in 2010 offset more electricity by 2020 than those planted in 2019). Total electricity savings of approximately 11,000 kWh/yr by 2020 and 60,600 kWh/yr by 2035 were estimated. These savings were multiplied by the applicable electricity emissions factors from Table B-1 to calculate reductions of approximately 2 MT CO_2e/yr in 2020 (which was rounded down to <1 MT CO_2e/yr in the CAP) and 12 MT CO_2e/yr in 2035 (which was rounded down to 10 MT CO_2e/yr in the CAP).

E-3 Municipal Energy Efficiency Goal

As described in the CAP, the City participated in SANDAG's Energy Roadmap program to identify municipal energy efficiency opportunities based on building energy audits. The Roadmap identified near-term retrofit projects that, once implemented, will result in municipal energy and utility cost savings. The City also set a goal of 10% electricity savings, which could be achieved through implementation of the Energy Roadmap. The 2035 reductions assume that the electricity savings goal is doubled (i.e., 20% savings from the 2010 baseline levels), but that natural gas savings do not increase. Table B-8 presents the municipal energy savings estimated as part of the Roadmap program and their corresponding emissions reductions based on the energy emissions factors presented in Table B-1. Reductions of 32 MT CO_2e/yr are estimated for 2020 (rounded to 30 MT CO_2e/yr in the CAP), and 57 MT CO_2e/yr in 2035 (rounded to 60 MT CO_2e/yr in the CAP).

Table B-8
Measure E-3 Inputs

	Energy Savings	Reductions (MT CO_2e/yr)
2020		
kWh/yr	124,000	25
therms/yr	1,275	7
Total	-	**32**
2035		
kWh/yr	248,000	50
therms/yr	1,275	7
Total	-	**57**

E-4 Public Lighting

This measure estimates the reduction in electricity-related emissions resulting from the City's past installation of high-efficiency traffic signal bulbs (i.e., LED red and green bulbs) and on-going street light retrofits (i.e., high-efficiency induction lights). The City's 2005 municipal inventory identified electricity consumption from traffic signals/controllers and streetlights, which were used as a proxy to estimate current consumption levels. This is a conservative methodology since it is possible that the City has increased its traffic signal and/or street light system since 2005, which would increase the total electricity consumption that could be affected by this measure (and result in a higher reduction potential). However, at the time of CAP preparation, the 2005 municipal inventory provided the best available data related to this measure.

Table B-9 shows the total electricity consumed by these two lighting sources, and the underlying assumptions that 100% of associated lighting would be retrofitted to provide 50% electricity savings by the 2020 target year (and maintained at that energy consumption level through the

2035 horizon year). The 2020 and 2035 electricity emissions factor from Table B-1 were used to calculate total emissions reductions related to the lighting retrofits. Reductions of 168 MT CO_2e/yr are estimated for 2020 (rounded to 170 MT CO_2e/yr in the CAP), and 167 MT CO_2e/yr in 2035 (rounded to 170 MT CO_2e/yr in the CAP). The emissions reduction amount is slightly lower in 2035 than in 2020, even though the kWh savings is the same, because the 2035 emissions factor is lower than the 2020 factor.

Table B-9
Measure E-4 Inputs

2005 Municipal Inventory Sectors	**kWh/yr**
Traffic Signals/Controllers	581,090
Streetlights	1,069,794
Total	1,650,884
Measure Assumptions	**%**
Lights Retrofitted	100%
Electricity Savings	50%
Measure Results	**Values**
Mitigated Energy Use (kWh/yr)	825,442
2020 Reductions (MT CO2e/yr)	**168**
2035 Reductions (MT CO2e/yr)	**167**

E-5 Solar Photovoltaic Program

This measure estimates the reduction in electricity-related emissions resulting from installation of grid connected photovoltaic (PV) systems in residential and commercial uses. The measure uses National Renewable Energy Laboratory (NREL) solar insolation data specific to the City's geographic location and climate to estimate future PV-related reductions.

This measure considers reductions resulting from solar PV systems already installed community-wide from 2010-2014, and potential additional community-wide installations to occur by 2020 and 2035.

Similar to the retrofit-related energy savings described in Measure E-1 above, SDG&E also provided data on the amount of solar PV generation capacity installed community-wide from 2010-2014. Based on this data, approximately 3.9 MW of solar capacity were installed during that timeframe, including 1.6 MW in the commercial sector and 2.3 MW in the residential sector. In 2017, Helix High School installed 2.3 MW of new solar PV in their parking lot. In addition, currently available tax credits, utility rebates, and financing programs make solar PV installations increasingly economically viable, which will likely lead to additional residential and non-residential installations in the future. The CAP conservatively based future PV installations on only the historic residential sector installation data to assume installation of another 2.5 MW of solar PV capacity by 2020 and 9.0 MW by 2035 (i.e., in addition to the capacity installed since

2010). Continued PV installations within the commercial sector would provide additional emissions reductions above those currently estimated in this measure.

Table B-10 shows the inputs and calculations used to convert estimated installed solar PV capacity to electricity generation potential and emissions reductions. Reductions of 2,346 MT CO_2e/yr are estimated for 2020 (rounded to 2,240 MT CO_2e/yr in the CAP), and 4,663 MT CO_2e/yr in 2035 (rounded to 4,660 MT CO_2e/yr in the CAP).

Table B-10 Solar PV Generation Capacity	
2020	
MW Installed Capacity	6.43
kW per MW	1,000
Solar Hours per Day [1]	4.9
Days per Year	365
Electricity Generation Capacity (kWh/yr)	11,500,055
Electricity Emissions Factor [2]	0.000204
Reductions (MT CO_2e/yr)	**2,346**
2035	
MW Installed Capacity	12.90
kW per MW	1,000
Solar Hours per Day [1]	4.9
Days per Year	365
Electricity Generation Capacity (kWh/yr)	23,073,439
Electricity Emissions Factor [2]	0.000202
Reductions (MT CO_2e/yr)	**4,663**

[1] Solar Insolation data: National Renewable Energy Laboratory Renewable Resource Data Center, 2011
[2] From Table B-1

E-6 Solar Hot Water Heater Program

Solar thermal system installation data was collected from the California Solar Initiative – Solar Thermal dataset for years 2011-2016, as shown in Table B-11.

Table B-11
Solar Thermal Installations – 2011-2016

Therms/yr savings	Budget Program	Approved Date
129	Single Family Residential	6/23/2011
118	Single Family Residential	7/11/2011
70	Single Family Residential	7/25/2013
414	Low Income Multifamily Residential	5/1/2014

Table B-11 Solar Thermal Installations – 2011-2016		
Therms/yr savings	**Budget Program**	**Approved Date**
363	Low Income Multifamily Residential	5/1/2014
363	Low Income Multifamily Residential	5/1/2014
363	Low Income Multifamily Residential	5/1/2014
414	Low Income Multifamily Residential	5/1/2014
699	Commercial Pools	2/26/2014
1,794	Commercial Pools	12/10/2014
88	Single Family Residential	7/21/2015
61	Single Family Residential	9/27/2016
4,876	**-**	**TOTAL**

Single-family residential system installations total 466 therms/yr savings for the five years of program data shown in Table B-11, for an approximate average of 93 therms in savings per program year. This measure assumes additional single-family residential systems will be installed to provide savings of 93 therms/yr.

As shown in Table B-12, total annual natural gas savings were estimated to be 5,156 therms/yr in 2020 and 6,274 therms/yr in 2035. Each value was multiplied by the natural gas emissions factor shown in Table B-1 to estimate total reductions of 28 MT CO_2e/yr in 2020 (rounded to 30 MT CO_2e/yr in the CAP), and 34 MT CO_2e/yr in 2035 (rounded to 30 MT CO_2e/yr in the CAP).

Table B-12 Estimated Future Solar Thermal Installations		
Timeframe	**Therms saved/yr**	**Reductions (MT CO_2e/yr)**
2010-2020	5,156	28
2010-2035	6,274	34

E-8 Zero Net Energy Construction

Zero net energy construction reductions were estimated for new residential construction forecast to occur after 2020 and new non-residential construction forecast to occur after 2030. Table B-13 shows the 2020 and 2035 activity data forecasts for residential and non-residential electricity (MWh) and natural gas (therms), which correspond to the emissions forecasts presented in the CAP and described in Appendix A.

For residential reductions from this measure, the difference between the 2035 and 2020 forecasts represents the new energy consumption that will be displaced through this measure. That is, new residential construction built after 2020 will achieve zero-net energy standards and will not consume this energy, as assumed in the inventory forecasts. The electricity savings were multiplied by the 2035 emissions factor and the natural gas savings were multiplied by the natural gas emissions factor shown in Table B-1.

For non-residential reductions from this measure, the 2030 energy consumption values were interpolated between the 2020 and 2035 forecast levels. The difference between the 2035 and 2030 values represents the new energy consumption that will be displaced through this measure. The electricity savings were multiplied by the 2035 emissions factor and the natural gas savings were multiplied by the natural gas emissions factor shown in Table B-1.

Reductions from this measure total 8,471 MT CO_2e/yr, which was rounded to 8,470 MT CO_2e/yr in the CAP.

Table B-13
Measure C-9 Inputs

	2020	2030	2035	New Consumption (2020-2035)	Emissions Reduction (MT CO_2e/yr)
Residential					
Electricity (MWh)	153,891	-	168,698	14,807	2,992
Natural Gas (therms)	7,362,831	-	8,071,274	708,443	3,856
Subtotal	-	-	-	-	6,849
Non-Residential					
	2020	2030	2035	New Consumption (2030-2035)	Emissions Reduction (MT CO_2e/yr)
Electricity (MWh)	180,654	192,242	198,036	5,794	1,171
Natural Gas (therms)	2,586,941	2,752,882	2,835,853	82,971	452
Subtotal	-	-	-	-	1,623
Total	-	-	-	-	**8,471**

Source: AECOM 2017

E-9 Community Choice Aggregation (CCA) or Similar Program

This measure quantifies the additional reductions that could occur through development of a Community Choice Aggregation CCA program or similar clean electricity program that is available to all residents and businesses in La Mesa. The CCA reductions were calculated from the difference between the 2035 forecast electricity consumption estimate and the electricity savings from CAP measures and AB 1109. The resulting electricity consumption value represents the remaining electricity in 2035 that could be influenced by a CCA program. The CAP assumes that 80% of utility customers in La Mesa would participate in the CCA program, consistent with the participation assumptions used in the *City of San Diego Feasibility Study for a Community Choice Aggregate.*[3] The remaining electricity consumption was multiplied by 80% to determine the amount of electricity that would be purchased through the CCA program, which is assumed to provide 100% clean electricity to its customers by 2035. The CCA electricity consumption was multiplied by the 2035 electricity emissions factor from Table B-1 to avoid double counting reductions with the RPS program. The result is reductions totaling 37,235 MT CO_2e/yr in 2035, which was rounded to 37,240 MT CO_2e/yr in the CAP. See Table B-14.

Table B-14
CCA Program Demand Estimation

Electricity Programs	Electricity Consumption and Savings (kWh/yr)	Reductions (MT CO_2e/yr)[1]
2035 Forecast Consumption	366,734,222	-
AB 1109	-35,587,889	-
Retrofits - SDG&E	-52,829,625	-
Retrofits - PACE	-3,247,274	-
Muni Energy Efficiency	-248,000	-
Streetlights	-825,442	-
Solar PV	-23,073,439	-
ZNE	-20,601,267	-
Remaining Consumption	**230,321,286**	**46,543**
CCA Participation – 80%	184,257,029	**37,235**

[1] Based on 2035 electricity emissions factor from Table B-1

T-1 Bicycle and Pedestrian Infrastructure Development

This measure quantifies reductions resulting from increasing La Mesa's bicycle mode share through expansion of its bicycle infrastructure, primarily Class I and II bicycle facilities. Based on the City's Bicycle Facilities and Alternative Transportation Plan (Bicycle Plan), it was assumed that there were 12.8 miles of existing bike lanes within the community, and an additional 12.8 miles planned for future installation. It was assumed that the additional bike lanes would be completed by 2035. This would require 0.64 miles of new bike lanes to be completed each year (i.e., 2015-2035), and would result in 3.2 new miles by the CAP's 2020 target year.

Emissions reductions were calculated based on vehicle miles traveled (VMT) differences between the inventory forecast scenario and a mitigated scenario in which these VMT reductions are realized (see Table B-15). Methodology assembled by the California Air Pollution Control Officers Association (CAPCOA) based on academic research on travel demand was

[3] Available online:
<https://www.sandiego.gov/sites/default/files/san_diego_cca_feasibility_study_final_draft_main_report_7-11-17.pdf>

used to help quantify VMT reductions based on the proposed bicycle infrastructure improvements.[4] A mode share study conducted by Dill and Carr was also used to help define assumptions regarding how additional bicycle lane installations translate into increased bicycle mode share. The methodology assumes that the ratio of additional bicycle lane mileage per community area correlates to increased bicycle mode share above levels reported in the 2010 US Census.

Table B-15
Community-wide VMT Reductions – Bicycle Infrastructure Improvements

Inventory Forecast Scenario – Vehicles Miles Traveled		
	Community Travel (miles)	Fuel Consumption (gallons)
Gasoline	158,288,534	8,500,995
Diesel	9,212,560	1,164,673
Total	167,501,094	9,665,668
Mitigated Scenario – Vehicles Miles Traveled		
	Community Travel (miles)	Fuel Consumption (gallons)
Gasoline	158,196,975	8,496,078
Diesel	9,207,231	1,163,999
Total	167,404,206	9,660,077
Inventory Forecast minus Mitigated Scenario		
	Community Travel (miles)	Fuel Consumption (gallons)
Gasoline	91,558.8	4,917
Diesel	5,328.8	674
Total	96,888	5,591

Sources:
CAPCOA. *Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emissions Reductions from Greenhouse Gas Mitigation Measures.* August, 2010.
Dill, J and Carr, T. *Bicycle Commuting and Facilities in Major U.S. Cities: If You Build Them, Commuters Will Use Them*. 2003.

[4] For details, please see the 2010 document, “Quantifying Greenhouse Gas Mitigation Measures,” available online at: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf.

T-3 Transportation Demand Management Program

Based on conversations with SANDAG traffic modelers, off-model GHG reductions were included in the CAP to fully capture the planned effect of regional transportation system improvements described in San Diego Forward: The Regional Plan. *Appendix C, Sustainable Communities Strategy Documentation and Related Information* includes estimates of daily VMT (DVMT) reductions associated with several programs and infrastructure improvements for 2020, 2035, and 2050.[5]

CAP Measure T-3 includes the DVMT reductions from carshare (Table 1 in Appendix C), vanpool, (Table 2), and carpool (Table 3) programs. CAP Measure T-5 includes the reductions from plug-in hybrid electric vehicles (Table 4). The total DVMT reductions from these programs were converted into VMT per year following the same approach used to prepare the transportation sector emissions (described in Appendix A).

La Mesa's share of these total annual VMT reductions was then calculated for the 2020 and 2035 target years based on the ratio of La Mesa's total VMT compared to the SANDAG regional total VMT for each year (i.e., 1.81% in 2020 and 1.85% in 2035). La Mesa's total VMT reductions per year are estimated as approximately 7.4 million in 2020 and 15.8 million in 2035. The proportional share of each SANDAG off-model program was also calculated to attribute GHG reductions among the applicable CAP measures.

La Mesa's VMT reductions were then split into gasoline and diesel based on the 2020 and 2035 output data from EMFAC2014. The VMT reductions from this measure were assumed to only apply to light-duty passenger vehicles, which correspond with the LDA vehicle classification in EMFAC2014. The ratio of gas to diesel VMT in LDA vehicles was calculated and applied to the total La Mesa VMT reductions.

The gasoline and diesel VMT were then subtracted from the total 2020 and 2035 VMT values used to calculate the emissions forecasts to determine the total reductions associated with implementation of these SANDAG programs. The ratio of each program's contribution to total VMT reductions in La Mesa was used to apportion total GHG reductions to the individual programs. See Table B-16 on the following page for the values used in this calculation. The three off-model programs included in this CAP measure have total reductions of 2,000 MT CO_2e/yr in 2020 and 2,719 MT CO_2e/yr in 2035 (which was rounded to 2,720 MT CO_2e/yr in the CAP).

[5] SANDAG. *Appendix C, Sustainable Communities Strategy Documentation and Related Information*. Available online: < http://www.sdforward.com/pdfs/RP_final/AppendixC-SustainableCommunitiesStrategyDocumntationandRelatedInformation.pdf>

Table B-16
SANDAG Off-Model VMT Reductions

SANDAG Regional Share

SANDAG Travel Model – Off-Model Programs	2020 DVMT Reductions[1]	2035 DVMT Reductions[1]	2020 VMT/yr Reductions[2]	2035 VMT/yr Reductions[2]
Table 1 - Carshare	369,536	1,028,398	129,485,414	360,350,659
Table 2 - Vanpool	678,339	972,797	237,689,986	340,868,069
Table 3 - Carpool	36,986	36,986	12,959,894	12,959,894
Table 4 - Plug-In Hybrid Electric Vehicles	82,418	411,126	28,879,267	144,058,550
Total	**1,167,279**	**2,449,307**	**409,014,562**	**858,237,173**

DVMT Totals

	2020	2035
La Mesa Total[3]	1,550,197	1,732,934
SANDAG Region Total[3]	85,453,093	93,872,064
La Mesa Proportion	1.81%	1.85%

La Mesa's Share

SANDAG Travel Model – Off-Model Programs	2020 VMT/yr[4]	2035 VMT/yr[4]	2020 Share of Total VMT/yr	2035 Share of Total VMT/yr
Table 1 - Carshare	2,348,983	6,652,287	32%	42%
Table 2 - Vanpool	4,311,913	6,292,627	58%	40%
Table 3 - Carpool	235,104	239,247	3%	2%
Table 4 - Plug-In Hybrid Electric Vehicles	523,896	2,659,406	7%	17%
Total	**7,419,897**	**15,843,567**	**100%**	**100%**

LDA Gas-to-Diesel VMT Ratio

	2020 DVMT[5]	2035 DVMT[5]	2020 VMT/yr	2035 VMT/yr
LDA Gas	46,477,370	48,408,570	98.9%	98.6%
LDA Diesel	538,420	665,027	1.1%	1.4%
LDA Gas VMT Reductions	-	-	7,334,925	15,628,861
LDA Diesel VMT Reductions	-	-	84,972	214,706
Total LDA Reductions	**-**	**-**	**7,419,897**	**15,843,567**

GHG Reductions

	2020 MT CO_2e/yr	2035 MT CO_2e/yr
Table 1 - Carshare[6]	681	1,372
Table 2 - Vanpool[6]	1,250	1,298
Table 3 - Carpool[6]	68	49

Table 4 - Plug-In Hybrid Electric Vehicles[6]	152	548
Total Reductions[7]	**2,152**	**3,268**

Source: AECOM 2017

[1] From SANDAG *Appendix C, Sustainable Communities Strategy Documentation and Related Information*. Available online: < http://www.sdforward.com/pdfs/RP_final/AppendixC-SustainableCommunitiesStrategyDocumntationandRelatedInformation.pdf>

[2] Calculated as DVMT * 0.96 * 365, per SANDAG staff guidance

[3] SANDAG 2020 and 2035 VMT estimates from the Series 13 model revenue-constrained scenario

[4] Calculated as SANDAG Regional Share of VMT/yr * 1.81% for 2020, and SANDAG Regional Share of VMT/yr * 1.85% for 2035 (per DVMT Totals section of Table B-16)

[5] From EMFAC2014 2020 and 2035 output files, respectively, for LDA_GAS and LDA_DSL vehicle types

[6] Calculated as Total Reductions * Share of Total VMT/yr (from La Mesa's Share section of Table B-16)

[7] Calculated using the same methodology as that used to estimate the transportation sector inventory, as described in Appendix A. The difference between the original emissions forecasts for 2020 and 2035 and the mitigated transportation emissions scenario (i.e., original VMT/yr estimates - VMT/yr reductions identified in this table) represents the total reductions from this measure.

T-4 Mixed-Use and Transit-Oriented Development

Senate Bill (SB) 743 directs the Governor's Office of Planning and Research (OPR) to identify a new metric and to recommend analysis methodology and thresholds for transportation analysis under CEQA. Rather than a focus on congestion, which is often described through an assessment of level of service (LOS), the impacts of transportation are attributable to travel demand, often measured as VMT. OPR selected VMT as the preferred metric and, as of the writing of this document, is still working to finalize guidance material that is anticipated to go into effect in 2019. Regardless of OPR's guidance, lead agencies such as La Mesa maintain the discretion to select methodology for analysis and define their own significance thresholds for transportation and all other impact analyses. Analysis and mitigation that focuses on VMT rather than LOS will have GHG reduction benefits.

To estimate the potential benefit of the City's SB 743 implementation, the City used estimates of land use change developed by SANDAG (which are used consistently throughout the CAP). The 2010 (baseline) VMT per capita in La Mesa was multiplied by the anticipated number of new residents added between 2017 and 2020. This yields an estimate of potential new VMT attributable to new development entitled between 2017 and 2020. OPR draft guidance suggests a threshold of a 15% reduction in VMT compared to regional or citywide average VMT per capita or per service population. Again, La Mesa can develop its own guidance for analyzing VMT impacts of new development, but the draft OPR guidance was used for the purposes of estimating VMT reduction potential in the near term (between 2017 and 2020). The City multiplied 15% by the estimated new VMT attributable to new development to estimate the amount of VMT that could be avoided through implementation of this program. The result is a reduction of 20,000 DVMT or approximately 7.0 million VMT/yr.

As with the calculations used to quantify Measure T-3 Transportation Demand Management Program, the VMT reductions were split into gas and diesel fuel. The VMT reductions were then subtracted from the LDA (light-duty passenger) vehicle fuel estimates according to their fuel type (i.e., gas and diesel) to calculate the change in overall emissions. Implementation of this measure is estimated to reduce GHG emissions by 1,892 MT CO_2e/yr, which was rounded to 1,890 MT CO_2e/yr in the CAP. See Measure T-3 for more detail on this quantification approach, and Table B-17 for the supporting information used in this calculation.

Table B-17 Measure T-4 Inputs – 2020		
	2020 DVMT Reductions[1]	**2020 VMT/yr Reductions**[2]
	20,000	7,008,000
LDA Gas-to-Diesel VMT Ratio		
	2020 DVMT[3]	**2020 VMT/yr**
LDA Gas	46,477,370	98.9%
LDA Diesel	538,420	1.1%
LDA Gas VMT Reductions	-	6,927,745
LDA Diesel VMT Reductions	-	80,255
Total LDA VMT Reductions	**-**	7,008,000
	2020 MT CO_2e/yr	
Total Reductions[4]	**1,892**	

Source: AECOM 2017

[1] Derived from a 15% reduction in DVMT from new residents added between 2017 and 2020.

[2] Calculated as DVMT * 0.96 * 365, per SANDAG staff guidance

[3] From EMFAC2014 2020 output file for LDA_GAS and LDA_DSL vehicle types

[4] Calculated using the same methodology as that used to estimate the transportation sector inventory, as described in Appendix A. The difference between the original emissions forecast for 2020 and the mitigated transportation emissions scenario (i.e., original VMT/yr estimates - VMT/yr reductions identified in this table) represents the total reductions from this measure.

The 2035 reductions from this measure are calculated based on achievement of the per capita VMT reduction target established in Table 3-3 of the CAP, which calls for a 6% per capita VMT reduction from 2010 baseline levels by 2035. The resulting target is approximately 23.6 DVMT/capita. This would require reductions of approximately 83.36 million VMT per year in 2035. The GHG reductions attributed to this mitigated VMT scenario were calculated using the same methodology used to prepare the transportation sector emissions and forecasts (see Appendix A). The difference between the CAP's 2035 transportation sector emissions forecast and the mitigated transportation emissions from implementation of this measure would result in GHG reductions of 23,075 MT CO_2e/yr. See Table B-18 on the following page for the supporting information used in this calculation.

Table B-18 Measure T-4 Inputs – 2035		
	2010	**2035**
Population[1]	57,361	68,682
VMT/yr[2]	505,111,707	651,871,405
DVMT/capita	25.1	27.1
Target DVMT/capita[3]	-	23.6
Reduction Needed (DVMT/capita)	-	3.5
Reduction Needed (VMT/yr)	-	83,356,956
Mitigated VMT	-	568,514,449
GHG Reductions[4]	**-**	23,075

Source: AECOM 2017

[1] SANDAG

[2] SANDAG traffic model, Series 13 results

[3] Calculated as 6% reduction from 2010 baseline DVMT/capita

[4] Calculated using the same methodology as that used to estimate the transportation sector inventory, as described in Appendix A. The difference between the original emissions forecast for 2020 and the mitigated transportation emissions scenario (i.e., original VMT/yr estimates - VMT/yr reductions identified in this table) represents the total reductions from this measure.

T-5 Alternative Refueling Infrastructure Development

This measure includes SANDAG's off-model reductions related to expansion of plug-in hybrid electric vehicle use in the region. See the methodological description in Measure T-3 Transportation Demand Management Program and Table B-16 for supporting calculations (this measure includes reductions associated with the Table 4 – Plug-In Hybrid Electric Vehicles rows from Table B-16). The off-model program included in this CAP measure has total reductions of 152 MT CO_2e/yr in 2020 and 548 MT CO_2e/yr in 2035 (which were rounded to 150 and 550 MT CO_2e/yr in the CAP, respectively).

T-6 Municipal Fleet Transition

This measure estimates reductions associated with transitioning the municipal fleet towards alternative fuel vehicles. As described in the CAP, the City analyzed alternative fuel vehicle opportunities within its municipal fleet through the Energy Roadmap Program. This analysis identified five potential opportunities for vehicle fleet transitions toward alternative fuel options. Of those five opportunities, it was assumed that two could be pursued prior to the CAP's 2020 target year, while the other three would require additional refueling infrastructure development before CNG or propane vehicles could be pursued. The CAP conservatively assumes that no further municipal fleet transition occurs beyond the 2020 target year.

Table B-19 shows the inputs used to estimate emissions reductions from pursuing the two identified vehicle replacement options. The measure assumes that a 1998 Ford Taurus and a

1996 Ford Explorer are replaced with hybrid electric vehicle options. Total reductions of 5.2 MT CO_2e/yr were calculated, which were rounded to 10 for use in the CAP.

Table B-19 Measure T-6 Inputs					
Replacement Vehicle Inputs[1]					
Alt Fuel Vehicle	**Mileage**	**MPG (Old)**	**MPG (New)**	**Gallons Displaced (Gasoline)**	**Emissions Reduced (MT CO_2e/yr)**
Hybrid Electric	10,000	22	42	216.5	2.0
Hybrid Electric	6,000	10.3	25	342.5	3.2
				Total	**5.2**
Global Warming Potentials[2]					
CO_2			1		
CH_4			28		
N_2O			265		
Emissions Factors[3]					
Motor Gasoline		8.81	kg CO_2/gallon		
1998 Passenger Vehicle					
N_2O		0.0393	g/mile		
CH_4		0.0249	g/mile		
1996 Light-Duty Truck					
N_2O		0.0871	g/mile		
CH_4		0.0452	g/mile		

[1] City of La Mesa Energy Roadmap, Appendix D, pg. D-8.
[2] IPCC (https://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html)
[3] California Climate Action Registry. 2009. General Reporting Protocol Version 3.1.

W-1 Urban Water Management Plan Programs

Senate Bill X7-7 established a goal to reduce per capita water consumption by 20% by December 31, 2020. The Helix Water District 2015 Urban Water Management Plan (UWMP) identifies the district's adopted per capita water targets to comply with this legislation. During CAP preparation, staff from Helix noted that the district has already exceeded its adopted 2020 target of 114 gallons per capita per day (gpcd), and has a goal to permanently maintain the levels achieved as of 2015 and stated in the District's 2015 UWMP (i.e., 103 gpcd).

As described in Appendix A, the water sector emissions were forecast based on the City's service population growth forecasts (i.e., population plus employment growth). The result is future water consumption estimates of approximately 109 gpcd in 2020 and 108 gpcd in 2035. The 2020 target year reductions for this measure were quantified based on the difference between the 2020 forecast consumption estimate and the Helix Water District's soft goal to maintain 2015 per capita water consumption levels. As shown in Table B-20, the result is a reduction of approximately 6 gpcd, or 140 million gallons per year (MG/yr). The same emissions rate per MG of water consumption from the baseline inventory was applied to the water savings estimate to calculate GHG reductions. 2020 emissions reduction were estimated as 448 MT CO_2e/yr, which was rounded to 450 MT CO_2e/yr in the CAP.

The CAP sets a water conservation target for 2035 that is 20% below the 2010 baseline year per capita water consumption levels. This would result in water savings of 20 gpcd or 494 MG/yr, as shown in Table B-20. This target would provide GHG reductions of approximately 1,585 MT CO_2e/yr, which was rounded to 1,590 MT CO_2e/yr in the CAP.

Table B-20
Measure W-1 Inputs

	2010	2020	2035	Units
Water Consumption	2,318	2,476	2,714	MG/yr
Population	57,361	62,136	68,682	Persons
Water Consumption	110.70	109.16	108.26	gpcd
Water Consumption Target	-	103.00	88.56	gpcd
Water Savings	-	6.16	19.70	gpcd
Water Savings	-	139.66	493.76	MG/yr
GHG Reductions[1]	-	448	1,585	MT CO_2e/yr

[1] Calculated as water savings in MG/yr * 3.2109 MT CO_2e/MG, where the emissions factor per MG of water was derived from the City's 2010 baseline GHG inventory by dividing water sector emissions by MG of water consumed.

SW-1 Food Scrap and Yard Waste

As described in Appendix A, an inventory of the community's organic waste was created using CalRecycle waste volume and characterization data and the methane commitment method. Solid waste measure reductions were estimated by calculating the changes in the emissions forecast model that would occur from implementation of the CAP measures.

This measure assumes that 5% of food scraps and compostable paper waste are diverted from landfills by 2020. The measure further assumes that 85% of residential and commercial landscape waste is diverted from the solid waste stream, either through on-site composting/mulching or disposal in green waste bins. These calculations are also based on an EPA default landfill gas collection assumption of 75% methane capture efficiency.

The City's 2010 waste inventory was modeled using community-wide waste disposal data collected from CalRecycle. As described in Appendix A, the 2010 baseline waste disposal rate, calculated as metric tons per service population (MT/SP), was held constant to estimate waste disposal volumes in 2020 and 2035 (i.e., MT/SP disposal rate from 2010 * 2020 and 2035 SP values). In lieu of a City-specific waste characterization study, it was assumed that the City's waste composition is comparable to that of the statewide average (as represented in the State

Waste Characterization Study). The 2020 and 2035 solid waste emissions forecasts were based on CalRecycle's *2014 Disposal-Facility-Based Characterization of Solid Waste in California* report. See Appendix A for further description of the methane commitment method, CalRecycle's waste characterization studies, and the calculation of La Mesa's solid waste emissions scenarios for 2010, 2020, and 2035.

Table B-21 shows the emissions reductions inputs for calculation of this measure. The CalRecycle waste characterization studies are organized into waste material types and sub-types. The waste sub-types that are affected by this measure are shown in Table B-21, along with their corresponding characterization total (i.e., their share of the total waste stream). The baseline scenario shows the characterization of the sub-types as listed in the CalRecycle 2014 statewide characterization study. The mitigated scenario shows the characterization of each sub-type following implementation of this measure. As shown, the food sub-type will be reduced by 5% in the mitigated scenario. The remaining sub-types (Leaves and Grass, Prunings and Trimmings, Manures, and Remainder/Composite Organic) are combined into the Garden and Park waste type category for calculation of the emissions forecasts (as described in Appendix A), and would be reduced by 85% in the mitigated scenario. The Tons columns are calculated by multiplying the Characterization columns by the 2020 disposal estimate of 41,394 MT. The methane emissions columns are calculated based on the methane commitment methodology equations described in the GPC and replicated in Appendix A. Specifically, the calculations follow Equation 8.3, using the same default factors as described in Appendix A. The Emissions columns then convert metric tons of methane into MT CO_2e using a global warming potential (GWP) value of 28 for methane from the UN IPCC 5th Assessment Report. The difference in the baseline and mitigated scenarios totals 2,009 MT CO_2e/yr, which is rounded to 2,010 MT CO_2e/yr in the CAP.

Table B-21
Measure SW-1 Inputs

Baseline Scenario				
Waste Sub-Types	**Characterization (% of Total Waste)[1]**	**Tons (MT)[2]**	**Methane Emissions (MT)[3]**	**Emissions (MT CO_2e)[4]**
Food	0.165	6,830	92	2,582
Leaves and Grass	0.034	1,407	25	709
Prunings and Trimmings	0.028	1,159	21	584
Manures	0.007	290	5	146
Remainder/Composite Organic	0.037	1,532	28	772
Subtotal	**-**	**11,218**	**171**	**4,793**
Mitigated Scenario				
Waste Sub-Types	**Characterization (% of Total Waste)[5]**	**Tons (MT)**	**Methane Emissions (MT)**	**Emission (MT CO_2e)**
Food	0.15675	6,489	88	2,453
Leaves and Grass	0.0051	211	4	106

Table B-21 Measure SW-1 Inputs				
Prunings and Trimmings	0.0042	174	3	88
Manures	0.00105	43	1	22
Remainder/Composite Organic	0.00555	230	4	116
Subtotal	**-**	**7,147**	**99**	**2,784**
Baseline Scenario – Mitigated Scenario				
Difference	-	-	-	**2,009**

Source: AECOM 2017

[1] *2014 Disposal-Facility-Based Characterization of Solid Waste in California,* CalRecycle 2015. Prepared by Cascadia Consulting Group. Available online at: <http://www.calrecycle.ca.gov/Publications/Documents/1546/20151546.pdf>

[2] Calculated as solid waste disposal tonnage (41,394) * Baseline Characterization value

[3] Calculated using methane commitment method Equation 8.3 as shown in Appendix A – Emissions Inventory and Forecast Methodology, where MSW_x (mass of solid waste sent to landfill in inventory year) = values shown in Baseline Scenario - Tons column of Table B-21 above.

[4] Calculated as Baseline Methane Emissions * methane GWP of 28

[5] Calculated based on Measure SW-1 assumptions: Food sub-type is reduced by 5% from Baseline Characterization value, and the remaining waste sub-types, which together comprise the Garden and Park category, are reduced by 85%.

SW-2 Construction and Demolition Waste Diversion Program

This measure assumes community-wide compliance with the City's requirement for 75% of construction and demolition (C&D) waste to be diverted from landfills. A similar methodology as described in Measure SW-1 above was applied to calculate reductions from implementation of this measure using the methane commitment method.

This calculation assumes that CalRecycle's 2014 waste characterization study results reflect a baseline condition in which the State's 50% construction and demolition (C&D) waste diversion requirements are achieved. Table B-22 shows how the marginal additional C&D tonnage reductions were estimated. Based on the waste type categories in the waste characterization study, it was assumed that this measure would affect the lumber and gypsum board sub-types. The scenario represents 50% diversion achievement for the waste types shown, and the corresponding tonnage is calculated by multiplying the total 2020 solid waste disposal value (41,394 MT) by the waste characterization ratios for lumber and gypsum (13.7% and 1.3%, respectively). The 75% diversion scenario shows the total tonnage of each waste sub-type that would remain if this measure is implemented (i.e., 50% of the 50% scenario is diverted). The difference between the 50% and 75% scenarios is the marginal increase in waste diversion to occur after implementing this measure.

Table B-22 Measure SW-2 Inputs			
Waste Sub-Types[1]	50% Diversion Scenario (MT)[2]	75% Diversion Scenario (MT)[4]	Additional Diversion (MT)[5]
Lumber	5,671	2,836	2,836
Gypsum Board	538	269	269

Source: AECOM 2017

[1] Waste sub-types from *2014 Disposal-Facility-Based Characterization of Solid Waste in California,* CalRecycle 2015. Prepared by Cascadia Consulting Group. Available online at: <http://www.calrecycle.ca.gov/Publications/Documents/1546/20151546.pdf>

[2] Calculated as total 2020 waste disposal * waste characterization ratios for each waste sub-type. 2020 waste total is 41,394 MT. Lumber characterization is 13.7%. Gypsum Board characterization is 1.3%. See Appendix A – Emissions Inventory and Forecast Methodology for further detail on the waste disposal calculations. See note 1 above for link to CalRecycle waste characterization study.

[3] Calculated as 50% diversion scenario * 50%

[4] Calculated as 50% diversion scenario - 75% diversion scenario (results are rounded)

The emissions reductions associated with diverting the additional waste shown in Table B-22 are estimated using the methane commitment method described in Appendix A and represented in Table B-23. The Lumber waste sub-type in Table B-22 corresponds to the Wood waste type in Table B-23 and described in the emissions inventory calculations in Appendix A. Similarly, the Gypsum Board sub-type corresponds to the Paper/Cardboard waste type. The methane emissions column is calculated based on the methane commitment methodology equations described in the GPC and replicated in Appendix A. Specifically, the calculations follow Equation 8.3, using the same default factors as described in Appendix A. The Emissions column converts metric tons of methane into MT CO_2e using a GWP value of 28 for methane from the UN IPCC 5th Assessment Report. Implementation of this measure will result in reductions of 3,344 MT CO_2e/yr, which is rounded down to 3,340 MT CO_2e/yr in the CAP.

Table-23 Measure SW-2 Calculations			
Waste Types[1]	Tons (MT)[2]	Methane Emissions (MT)[3]	Emissions (MT CO_2e)[4]
Paper/Cardboard	269	10	271
Wood	2,836	110	3,073
Total	3,105	120	**3,344**

Source: AECOM 2017

[1] Waste types used in calculating solid waste baseline and forecast emissions. See Appendix A – Emissions Inventory and Forecast Methodology for further information.

[2] From Table B-22, where Gypsum Board corresponds with Paper/Cardboard and Lumber corresponds with Wood.

[3] Calculated using methane commitment method Equation 8.3 as shown in Appendix A – Emissions Inventory and Forecast Methodology, where MSW_x (mass of solid waste sent to landfill in inventory year) = values shown in Tons column.

[4] Calculated as Methane Emissions * methane GWP of 28

SW-3 75% Waste Diversion Goal

This measure assumes that 75% of the total 2035 forecast solid waste stream is diverted from landfills. Table B-24 shows the 2035 forecast waste disposal by waste type in metric tons, and a 75% waste diversion reduction applied to each of those categories. The total emissions from each scenario were calculated using the methane commitment method, as described in Appendix A. The difference between the forecast and mitigated scenario is 17,052 MT CO_2e/yr, which was rounded to 17,050 MT CO_2e/yr in the CAP.

Table B-24
Measure SW-3 Inputs

Waste Type	2035 Forecast Landfill Waste Composition (MT)	2035 Mitigated Scenario Landfill Waste Composition (MT)
Paper/Cardboard	8,213	2,053
Textiles	2,541	635
Food	7,487	1,872
Garden and Park	4,810	1,202
Wood	7,033	1,758
Rubber and Leather	45	11
Plastics	4,719	1,180
Metal	1,407	352
Glass	1,134	284
Other	7,986	1,997
Total	45,377	11,344
Emissions (MT CO_2e/yr)[1]	22,736	5,684
Difference (MT CO_2e/yr)	-	**17,052**

Source: AECOM 2017

[1] Calculated using the methane commitment method as described in Appendix A – Emissions Inventory and Forecast Methodology

GI-1 Urban Forest Master Plan

This measure estimates reductions associated with the carbon sequestration potential of new trees planted as part of City landscaping requirements and development agreements. The calculations are based on extrapolating the carbon potential of a typical tree planting palette. The measure assumes that nearly 500 net new trees will be planted community-wide from 2010-2020. Trees planted to achieve implementation of this Urban Forest Program measure might be found in decorative landscaping, new City street planting strips, or parks and recreation areas.

A sample plant palette was created, including Lemon Bottlebrush, Brazilian Pepper, Victorian Box, Sweetgum, and Carob. There are myriad tree palette options, and the tree types included in this measure's calculations may not correlate exactly with those selected for planting in the community. Carbon sequestration rates specific to the species and age of the sample plant palette were collected from the Center for Urban Forest Research (CUFR) Tree Carbon Calculator and used to calculate the annual sequestration potential of the trees from 2010 – 2020. For purposes of the calculation it was assumed that an equal number of trees will be planted each year, though the exact number of trees planted per year may vary.

GI-2 Expanded Urban Forestry Program

This measure estimates the carbon sequestration potential of expanding the City's urban forest. Based on an October 2016 San Diego Tree Canopy Assessment presentation using 2014 LiDAR data, the San Diego region has 13% existing tree canopy, 21% of area that is not suitable for tree canopy, and 66% for additional possible tree canopy.[6] The assessment lists La Mesa's existing canopy as approximately 18% of the City area, and shows a possible tree canopy in the City ranging from 48%-83%.

The i-Tree software program (developed by the USDA Forest Service) shows a total area of approximately 5,835 acres in the City. This corresponds to existing canopy coverage of 1,050 acres. La Mesa's maximum coverage was assumed to be 66% (the mid-point of the possible range shown in the Tree Canopy Assessment), or 3,851 acres. The increase in urban tree canopy under this maximum scenario would be 2,801 acres (i.e., 3851-1,050). Calculations for this measure assume 50% of the maximum urban forest coverage could be achieved by the 2035 target year, or 1,400 additional acres of urban forest by 2035.

The carbon sequestration potential of the new urban forest was calculated based on inputs from the i-Tree Canopy module, which assume a carbon sequestration potential of 9,970.817 lbs/acre/year.[7] Based on this assumption, 1,400 new acres of urban forest would sequester nearly 14 million lbs of CO_2/year, or 6,333 MT CO_2e/yr, which is rounded to 6,300 MT CO_2e/yr in the CAP.

[6] https://www.sandiego.gov/sites/default/files/san_diego_tree_canopy_assessment_05oct2016.pdf

[7] USDA Forest Service i-Tree Canopy tool: https://canopy.itreetools.org/report.php

Climate Action Plan

Appendix C

Cost-Effectiveness and Benefit-Cost Analyses

February 2018

Prepared for the City of La Mesa

Prepared by the Energy Policy Initiatives Center

About EPIC

The Energy Policy Initiatives Center (EPIC) is a non-profit research center of the USD School of Law that studies energy policy issues affecting California and the San Diego region. EPIC's mission is to increase awareness and understanding of energy- and climate-related policy issues by conducting research and analysis to inform decision makers and educating law students.

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

Prepared in partnership with the San Diego Association of Governments (SANDAG) and the Energy Roadmap Program. This Program is partially funded by California utility customers and administered by San Diego Gas & Electric Company under the auspices of the California Public Utilities Commission.

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EXECUTIVE SUMMARY

Introduction

This report summarizes the findings of the City of La Mesa Draft Climate Action Plan (CAP) cost-effectiveness analysis (CEA) and benefit-cost analysis (BCA) conducted by the Energy Policy Initiatives Center (EPIC) at the University of San Diego for 16 of the 23 measures included in the CAP.[1]

The goals of this report are to:

- Estimate the cost of each CAP measure to reduce a unit of greenhouse gas emissions to comparatively evaluate the cost-effectiveness of CAP measures; and
- Identify the benefits received and costs incurred by the City of La Mesa and home and business owners in the City of La Mesa to assess the impact of implementing CAP measures.

These goals form the overall structure of the report. The first part presents results from the cost-effectiveness analysis (CEA) that determines the net cost for each CAP measure to reduce one metric ton of carbon dioxide equivalent ($/MT CO_2e). The second part of the report presents results from the benefit-cost analysis (BCA) that evaluates the benefits received and costs incurred by the City of La Mesa and home and business owners in the City of La Mesa to participate in CAP measures.

Cost-Effectiveness and Benefit-Cost Analyses Overview

A framework adapted from the California Standard Practice Manual (SPM)[2] was applied to both the CEA and BCA to estimate the benefits and costs associated with each measure. The SPM identifies four major perspectives, which help focus results on who is experiencing costs and benefits. This analysis presents results for the following perspectives adapted from the SPM:

- The City of La Mesa, who administers and implements the CAP measures (**administrator**)[3];
- Homes, businesses, and the City of La Mesa who participate in activities defined in CAP measures (**participant**);
- Local taxpayers or utility ratepayers that fund subsidies for activities defined in CAP measures (**non-participants**); and
- **Society** in general, which may receive benefits or incur costs related to external impacts associated with activities defined in CAP measures, such as public health effects.

The **measure perspective** combines the administrator, participant, and non-participant perspectives, resulting in a comprehensive, programmatic view of CAP measures. CEA results presented in this Executive Summary are for the measure perspective; BCA results are for the participant perspective.

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[1] Measure E-9 CCA Program requires a detailed analysis outside the scope of this report. Measures SW-1 Food Scrap and Yard Waste Diversion and SW-2 Construction and Demolition Waste Diversion have limited supporting data for analysis; measure SW-3 75% Waste Diversion Strategy is used as a proxy for both. The remaining four of the seven measures not included are supporting measures with no quantified GHG reductions in CAP target years 2020 and 2035.

[2] CPUC. 2001. California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects. California Public Utilities Commission.

[3] Detailed staffing costs to the City of La Mesa to implement the CAP are included in the Climate Action Plan Implementation Cost Report conducted by EPIC.

The CEA uses a dollar per metric ton of carbon dioxide equivalent (\$/MT CO_2e) to analyze the relative cost-effectiveness of CAP measures. This metric standardizes results and allows for comparison across all measures to determine the most cost-effective approaches to reducing emissions. Primary metrics used in the BCA include the benefit-cost ratio (BCR) and discounted payback period. The BCR shows the relationship between the costs and benefits to perform an activity defined in a CAP measure (e.g. the cost of installing a solar photovoltaic system relative to the energy savings received from that system). A BCR that is greater than one means the anticipated benefits of the measure outweigh anticipated costs; if it is less than one, costs outweigh benefits. The payback period describes how many years it would take for the home or business owner to recover the costs they paid to engage in the activity.

Key Findings

- **CAP measures needed to achieve GHG reduction targets have an overall net cost** – The measures included in the CAP to reach GHG reduction targets would have a net cost of \$61/MT CO_2e reduced in 2020 and reduce an estimated 18,171 MT CO_2e[4]. This represents a combined net cost of \$61 to the CAP administrator, participants, and non-participants (measure perspective) to reduce one metric ton of carbon dioxide equivalent in the year 2020.
- **Measure cost-effectiveness ranges from a benefit of \$551/MT CO_2e to a cost of \$2,192/MT CO_2e** – Of the 16 measures included in the cost-effectiveness analysis, measure W-1 Urban Water Management Plan Programs is the most cost-effective at \$427/MT CO_2e and reduces 450 MT CO_2e. Measure E-2 Shade Tree Program is the least cost-effective measure at reducing GHGs (-\$2,194/MT CO_2e) and reduces the least amount of GHGs (<1 MT CO_2e).
- **CAP measures provide an overall net benefit to participants** – Combined, CAP measures provide a net benefit of \$8/MT CO_2e to those who participate in CAP measure activities. Eight measures provide a net benefit to participants, with measure E-3 Municipal Energy Efficiency Goal having the highest benefit-cost ratio (4.36) followed by measure T-6 Municipal Fleet Transition (2.38). For residents and businesses as participants, measures W-1 Urban Water Management Plan Programs and E-5 Solar Photovoltaic Program have the highest BCRs (1.93 and 1.49 respectively).

[4] Total GHG reductions in 2020 include estimated CAP reductions of 16,620 MT CO_2e plus an additional 1,551 MT CO_2e reduced from measures with 2035 only targets that are started early (E-8 and G-2). SW-3 activity is scaled to capture SW-1 and SW-2 2020 GHG reductions only.

GLOSSARY OF TERMS

$/MT CO_2e – The dollar per metric ton of carbon dioxide equivalent $/MT CO_2e) represents the ratio of the Net Present Value of the benefit or cost to the total GHG emissions reduced over the Useful Life of a project.

Administrator Perspective – This perspective represents staffing costs to the City of La Mesa to implement CAP measures, including administrative activities and program development and management. It does not include capital expenditures.

Benefit-Cost Analysis (BCA) – An evaluation of the direct financial benefits and costs associated with an activity.

Benefit-Cost Ratio (BCR) – A metric used to assess the relationship of cumulative discounted benefits and cumulative discounted costs. A BCR that is greater than one means anticipated benefits of the measure outweigh anticipated costs; if it is less than one, costs outweigh benefits.

Cost-Effectiveness Analysis (CEA) – An evaluation of the benefits and costs to achieve a particular outcome (e.g., reduce a ton of GHG emissions). Results are expressed as dollar per unit (e.g. $/MT CO_2e).

Direct Benefit/Cost – A financial impact of a project or action. Direct costs include the upfront purchase of equipment or services and ongoing operation and maintenance costs. Direct benefits include reductions in utility bills and fuel savings.

Discount Rate – A rate used to convert future values to present worth. The higher the discount rate, the less a future value is worth today.

Externality – A positive or negative impact that is external to a transaction and generally not included in the price.

Installation Year – The initial year in which an action occurs (also referred to as install year).

Measure Perspective – The sum of the Administrator, Participant, and Non-Participant Perspectives. The Measure Perspective represents a comprehensive, programmatic view of costs and benefits.

Net Present Value (NPV) – The total present value of the benefits and costs related to an action over its useful life. An NPV greater than zero represents a net benefit. An NPV less than zero represents a net cost.

Non-Participant Perspective – The perspective of those not participating in a CAP measure but still incurring costs. This perspective represents the costs to taxpayers and utility ratepayers to subsidize activities related to CAP measures through rebates and incentives.

Participant Perspective – The perspective of residents and businesses in the cost-effective analysis. This perspective represents the cost to homeowners and business owners to participate in or comply with CAP measures. In some cases, the City of La Mesa is also a participant.

Payback Period – The amount of time required for the cumulative benefits of a project to equal or surpass the cumulative costs.

Social Cost of Carbon (SCC) – The marginal cost of a ton of CO_2 emissions in a given year as calculated by the United States Environmental Protection Agency. It is meant to be a comprehensive estimate of climate change damages.

Societal Perspective – The sum of the Measure Perspective and externalities. This is the broadest view of a cost analysis.

Target Year – The point in time when the CAP measure impacts are considered. This analysis examines measures in target year 2020.

Useful Life – The operating life of a project before it must be replaced.

1 INTRODUCTION

The City of La Mesa has developed a draft Climate Action Plan (CAP) for public review. The CAP contains measures, or activities, that can be implemented to reduce greenhouse gas (GHG) emissions within the City of La Mesa.

The purpose of this report is to analyze the cost-effectiveness of CAP measures and the benefits and costs associated with activities defined in each CAP measure. Understanding the monetary implications associated with implementing the measures and the potential impact to City of La Mesa residents and businesses can be helpful for decision makers. This report summarizes the findings of the City of La Mesa Draft CAP cost-effectiveness analysis (CEA) and benefit-cost analysis (BCA) conducted by the Energy Policy Initiatives Center (EPIC) at the University of San Diego.

These analyses determine the benefit and cost impacts of CAP measures to achieve GHG reduction targets in 2020. The main goals of this report are to:

- Estimate the cost of each CAP measure to reduce a unit of greenhouse gas emissions to comparatively evaluate the cost-effectiveness of CAP measures; and
- Identify the benefits received and costs incurred by the City of La Mesa and home and business owners in the City of La Mesa to assess the impact of implementing CAP measures.

The CAP comprises five GHG reduction categories and 23 measures. This report includes results for both the CEA and BCA for the 2020 CAP target year.[5] Those measures with 2035 GHG reduction targets only are assumed to start in 2018 with an incremental level of GHG reductions achieved by 2020.

This report addresses 16 of the 23 measures. Measure E-9 CCA Program requires a detailed analysis outside the scope of this report. Measures SW-1 Food Scrap and Yard Waste Diversion and SW-2 Construction and Demolition Waste Diversion have limited supporting data for analysis; measure SW-3 75% Waste Diversion Strategy is used as a proxy for both. The remaining four[6] measures not included are supporting measures with no quantified GHG reductions in CAP target years 2020 and 2035.

Staffing costs to the City of La Mesa to implement CAP measures are included in this report under the administrator perspective. A detailed analysis of estimated implementation costs are included in the Climate Action Plan Implementation Cost Report prepared by EPIC.

1.1 Organization of Report

This report is divided into seven sections and four appendices. This section provides an introduction. Section 2 provides a CEA and BCA overview. Results of the CEA are provided in Section 3 followed by BCA results in Section 4. Section 5 outlines limitations and Section 6 provides the conclusion. References cited in this document are in Section 7. Appendices detail methods used in both analyses, provide an extended set of tabular results with data and assumptions for individual measures, and include the Implementation Cost Report.

[5] Both analyses consider all activity leading up to the target year used to estimate 2020 GHG reductions. This includes past activity that was started no later than in 2010.

[6] Measures E-7 Solar Ready Construction, T-2 Bicycle Safety Program, W-2 Water Sensitive Landscape Design, and W-3 Pure Water Program

2 COST-EFFECTIVENESS AND BENEFIT-COST ANALYSES OVERVIEW

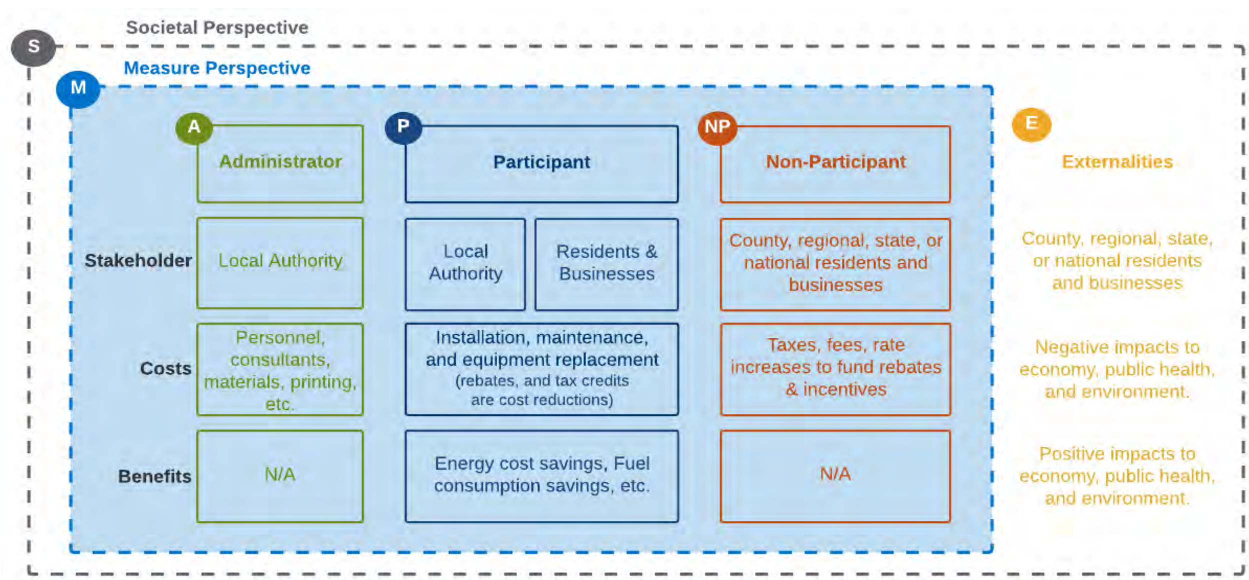
This cost-effectiveness analysis (CEA) and benefit-cost analysis (BCA) of the CAP is designed to assist City staff, decision makers, and the public to understand the potential benefit and cost impacts of CAP measures. The CEA answers the question: **What is the benefit or cost for each measure to reduce one metric ton of carbon dioxide equivalent (MT CO_2e)?** The BCA answers the question: **What are the financial impacts associated with each measure to Participants (e.g., home and business owners)?** This section summarizes key concepts related to both the CEA and BCA.

2.1 Perspectives

One consideration, when evaluating the benefits and costs of CAP measures, is to determine whose benefits and costs are being evaluated. In the context of a CAP measure, there are multiple perspectives that determine the scope of analysis, including the administrator of the program (e.g., City of La Mesa), the participants in the program (e.g., City residents and business), and those who pay the cost to subsidize programs, so called non-participants (e.g., taxpayers or utility ratepayers). The measure perspective, which combines these three main perspectives, allows for a more comprehensive view and includes City costs to administer the program, the costs to homes and businesses, and any subsidies provided. Adding externalities, which are not accounted for in the direct costs and benefits, provides a broad societal perspective.

The framework in Figure 1 summarizes these five perspectives and identifies who is affected by a measure and examples of their respective benefits and costs.[7]

Figure 1. Conceptual Framework of BCA Cost Attribution Categories



[7] Adapted from the California Standard Practice Manual, a resource used by public utilities to analyze the cost-effectiveness of energy efficiency programs and has recently been adapted into a National Standard Practice Manual (CPUC 2001; NESP 2017).

2.1.1 Administrator Perspective

The Administrator Perspective answers the question: **What are the financial benefits and costs to the City of La Mesa as a result of implementing CAP measure(s)?** While there are no direct monetary benefits associated with CAP implementation, there are staffing costs incurred for CAP related activities. Activities to administer the CAP include research, development, implementation, monitoring, and enforcement of CAP measures. The Climate Action Plan Implementation Cost Report provides further discussion on total costs for the City of La Mesa to implement the draft CAP.

2.1.2 Participant Perspective

The participant perspective answers the question: **What are the financial benefits and costs to residents, businesses, and the City to participate in or take action to comply with a CAP measure?** There are benefits and costs associated with a home or business owner participating in or complying with an action defined in a CAP measure. For example, a homeowner who chooses to participate to the full extent in the residential energy efficiency retrofit measure would incur costs for the audit and capital needed for installation of energy efficiency equipment. The reduction in energy consumption due to the retrofit would provide the homeowner with benefits in the form of energy bill reductions over the lifetime of that retrofit. Participants can also receive cost reductions in the form of rebates, fee waivers, incentives, and tax credits, which are considered a cost to non-participants in this analysis.

For the City of La Mesa, this perspective includes all capital costs directly associated with the City's participation in, or compliance with, a CAP measure, as well as the resulting benefits.

2.1.3 Non-Participant Perspective

The non-participant perspective answers the question: **What are the financial benefits and costs, if any, to subsidize activities of participants?** Residents, businesses, and the City of La Mesa could incur indirect costs or realize indirect benefits even though they are not engaging in an activity defined in a CAP measure. For this analysis, non-participant costs represent the cost to subsidize activities of participants through rebates, incentives, and tax credits. Non-participants incur this cost through taxes, fees, and/or utility surcharges, and are not limited to those within the geographic boundary of the City (Figure 2).

Figure 2. Examples of Non-Participants at Various Levels

Level	Incentive Type	Revenue Source	Geographic Scope	Non-Participants
National	Federal tax credit	U.S. tax revenue	U.S.	U.S. taxpayers
State	State grant	California tax or other revenue	California	California taxpayers
Regional	Utility incentive	SDG&E surcharge	SDG&E territory	SDG&E customers
City	City rebate	Local tax	City	City residents & businesses

2.1.4 Measure Perspective

The measure perspective answers the question: **What are the total financial benefits and costs associated with a CAP measure?** Together, the three perspectives defined in previous sections represent a comprehensive view of the monetary impacts of a CAP measure. The measure perspective combines the administrator, participant, and non-participant perspectives for a more programmatic view at the direct benefits and costs associated with a CAP measure. For example, only looking at the participant perspective does not adequately capture costs for subsidies paid by non-participants; that is, these subsidies are a cost reduction to the participant, but a cost to taxpayers and/or utility ratepayers (non-participants). Understanding the costs of subsidies, particularly if the subsidy is paid by taxpayers, can be important.

2.1.5 Societal Perspective

The societal perspective answers the question: **What is the overall financial benefit or cost to society as a whole for a given CAP measure?** This is the broadest perspective; it adds the benefits and costs associated with external impacts to the measure perspective. The difference between the measure and societal perspectives is the total benefit or cost of externalities. Externalities valued in this analysis include benefits from criteria pollutant reductions, reductions in storm water treatment, and avoidance of climate change related damages.

2.2 Types of Benefits and Costs

The benefits and costs associated with a CAP measure fall into two broad categories: direct or external. Each type represents the benefit and/or cost impact on different groups.

2.2.1 Direct Benefits and Costs

Direct benefits and costs are those directly related to implementing a CAP measure or engaging in an action defined by a CAP measure. Direct benefits include cost savings, such as utility bill or fuel purchase reductions. Direct costs include the purchase, installation, and maintenance of equipment or other services. Financial incentives or subsidies, such as rebates, fee waivers, and tax credits, are considered cost reductions, or negative direct costs, for participants.

2.2.2 External Benefits and Costs

Benefits and costs associated with positive or negative externalities are the result of indirect effects of an action. Positive externalities associated with the CAP include public health benefits from reduced air pollution, increased ecosystem service value, and reductions in storm water treatment. Negative externalities include public health costs associated with poor air quality from fossil fuel combustion, and pollution created from the disposal of solar panels at the end of their Useful Life. External benefits and costs associated with CAP measures can be difficult to quantify.

2.3 Key Concepts

Several key concepts related to the analysis conducted for this report are described below.

2.3.1 Target Year

The target year represents a point in time when the CAP measure impacts are considered. While the CEA and BCA consider all benefits and costs over the useful life of specified actions, results are specific to the target year. This report analyzes the CAP impacts during target year 2020 corresponding with the first GHG reduction target year identified in the CAP. For those measures planned to start after 2020 (no 2020 GHG reductions), this analysis assumes they start earlier to achieve the same level of

GHG reductions in the next CAP target year (2035) and an incremental level of GHG reductions are reported here for 2020.

Dollar values expressed in a target year are *anticipated values* of a CAP measure, not necessarily actual benefits or costs to be realized in that particular year. The total benefits and costs accrued over the useful life are apportioned to the GHG reductions associated with that measure. The anticipated values in the target year reflect the value of the GHGs reduced in that year.

Anticipated values are used in lieu of actual cash flows assigned to the target year because costs and benefits in earlier years are partially responsible for GHG reductions in that year. For instance, a photovoltaic (PV) system installed in 2015 will still be reducing GHGs in the 2020 target year; however, the bulk of the capital costs were experienced earlier on.

2.3.2 Installation Year

The installation[8] year (install year) is the initial year in which an action occurs. Measures can include multiple installation years. For example, the year in which a household installs a solar photovoltaic (PV) system is that household's install year; however, not all solar PV systems will be installed in a single year to achieve GHG reductions in the CAP, but over a number of years.

This analysis considers the benefits, costs, and GHG reductions associated with all installation years leading up to each target year. For most measures, the installation year is not included as part of the useful life and no benefits or GHG reductions are achieved in that year. This accounts for construction periods during which GHG reductions are not achieved, but capital is being outlaid.

2.3.3 Useful Life

The useful life (project life) is the operating life of a project and represents how long a project will last before it must be replaced. Some actions identified in the City's CAP measures have project lives that extend well past the target year analyzed. This analysis examines the benefit and cost streams over the entire useful life to accurately capture all benefits and costs associated with a measure. Restricting the analysis to the target year would significantly undervalue or overvalue an action; ending the analysis before the project has reached its useful life typically reduces the associated benefits and places a higher emphasis on costs.

2.3.4 Normalized Dollars

Dollar values are normalized to a constant year to accurately analyze historic and current benefit and cost data.[9] This process reduces the interannual impact of external influencers, such as inflation and deflation, on the value of a good or service. The base year 2010 is used to normalize values for all measures for consistency and to allow for comparison across measures.

2.4 Cost-Effectiveness and Benefit-Cost Analyses Metrics

The metrics used to analyze the results of the CEA and BCA are shown in Figure 3. Metrics are analyzed together in coordination with GHG reductions to understand the potential effects of a given measure.

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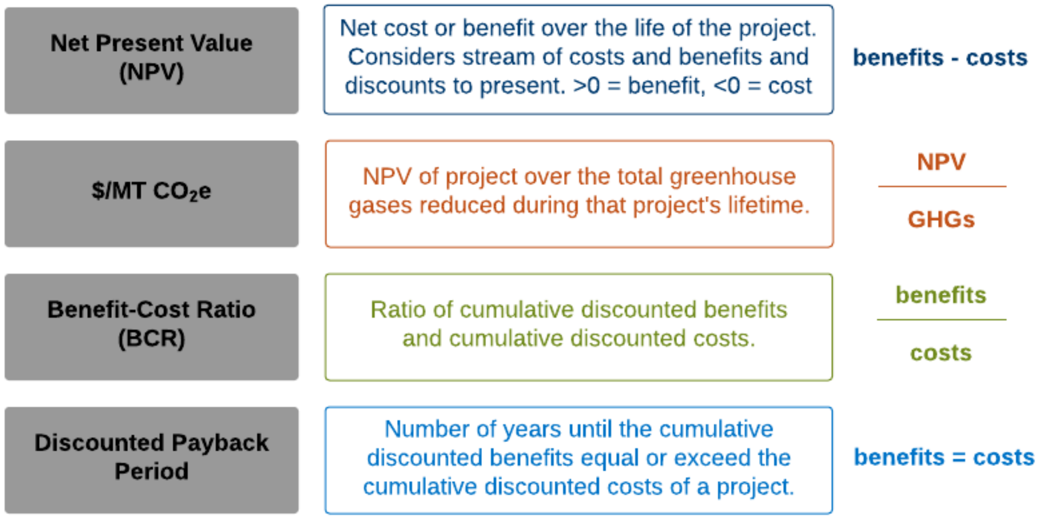
[8] The term 'installation' is being used here to refer to any general type of activity that begins, not necessarily the direct install of equipment. This can also include an alternative fuel vehicle purchase, home retrofit, etc.

[9] The Consumer Price Index (CPI), one of the most common indices (FRB Dallas 2017), is used for this analysis.

Figure 3. Metrics for the CAP Cost-Effectiveness and Benefit-Cost Analyses



All metrics are not appropriate to describe results for all perspectives or impacts of CAP measures. For example, there are no direct benefits associated with the administrative aspects of implementing the CAP, so several metrics will not apply. Since there are no benefits, it is not possible to calculate a payback for this perspective. This also would apply to the non-participant perspective, because only costs are considered. Similarly, any measure that does not have a net benefit, will not have a payback.

However, two metrics can be calculated across all categories: net present value (NPV) and dollar per metric ton of carbon dioxide equivalent ($/MT CO_2e). The benefit-cost ratio (BCR) and payback period are only appropriate and available to the participant, measure, and societal perspectives.

The NPV is used for calculating the other metrics for both the CEA and BCA. The CEA uses the $/MT CO_2e to compare the cost-effectiveness of measures as they relate to metric tons of CO_2e reduced. The BCA uses the BCR and payback period to analyze the benefit and cost impacts of measures on the five perspectives.

2.4.1 Net Present Value (NPV)

Net present value, or NPV, is a common way to express BCA results. Calculating the NPV addresses the time value of money (e.g. receiving ten dollars today is worth more than receiving ten dollars in the future) by applying a discount rate to both the benefits and costs. This metric represents the total present value of the benefits and costs related to an action over its useful life.[10]

A discount rate is used to convert future values to present worth. A five percent discount rate is applied as the default value with a three percent and seven percent discount rate used for sensitivity analyses.[11] Higher discount rates lessen the impact of future dollars in the analysis relative to lower discount rates.

[10] Present value in this context and going forward represents the value in the start year of the analysis, not the current year.
[11] According to the Federal Environmental Protection Agency (EPA), projects within a short to medium lifespan are assigned a Discount Rate of approximately three percent, derived from consumer-time preferences based on the interest rate of a risk-free asset such as a government bond (US EPA 2010). Conversely, the Federal Office of Management and Budget (OMB) assigns a standard Discount Rate of seven percent, derived from the opportunity cost of capital, measured by the before-tax

When calculating the total of all benefits and costs of an action over its useful life, a positive NPV is considered a net benefit and a negative NPV is a net cost. A net benefit indicates that benefits received outweigh the costs incurred over its lifetime and a net cost indicates the reverse. To assist in identifying a cost versus a benefit, in tables and figures costs are identified in (red).

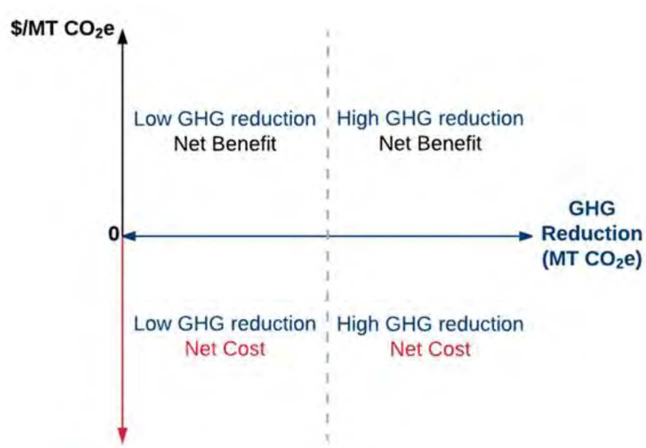
2.4.2 Dollar per Metric Ton of CO_2e

The dollar per metric ton of carbon dioxide equivalent ($/MT CO_2e) is used to show the cost-effectiveness of measures in reducing one metric ton of CO_2e. Dollar per metric ton standardizes the results of all measures to allow for comparisons across measures and provides a way to estimate the annual value of a measure in relation to its GHG reductions in that year. A positive value indicates a net benefit per ton reduced, whereas a negative value indicates a net cost per ton reduced.

A weighted average $/MT CO_2e of all the activities that contribute to GHG reductions is used since the GHGs reduced in the target year are not always equal for all actions in previous years. Most measures will have multiple install years associated with their defined action(s), and the benefits, costs, and GHGs reduced from an activity in one year could be different from the same type of activity in the following year (e.g. changes in installation price, rebates that have since expired, etc.). For example, for all PV systems that reduce emissions in 2020 but were installed between 2015 and 2020, a weighted average of the $/MT CO_2e for all these systems would be used. By calculating the weighted average, all benefits and costs associated with the actions taken to achieve the GHG reductions in the target year are scaled according to their contribution of GHG reductions in the target year.

While the $/MT CO_2e results allow for comparison across all CAP measures, this metric can be misleading if not presented in combination with the total amount of GHG emissions that would be reduced. Plotting the $/MT CO_2e for each measure in conjunction with its GHG reductions shows a comparison of cost-effectiveness (Figure 4). The higher a measure is on the plot, the more cost-effective it is; the lower a point is, the less cost effective it is. Measures to the right reduce more GHGs than measures on the left. Each scatterplot shows results for a single perspective (e.g., measure perspective).

Figure 4. Interpreting Results of a Scatterplot



rate of return to investment (OMB 2000). Both the EPA and OMB suggest performing a sensitivity analysis with multiple Discount Rates to identify how results respond to different time-value preferences

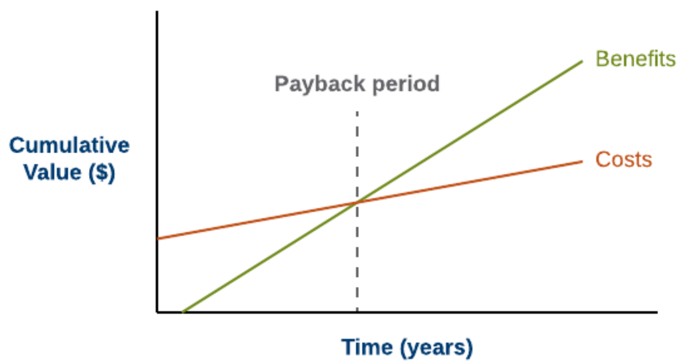
2.4.3 Benefit-Cost Ratio (BCR)

The benefit-cost ratio (BCR) is used to assess the relationship between the benefits and costs of a project or action. A BCR that is greater than one means the anticipated benefits of the measure outweigh anticipated costs; if it is less than one, costs outweigh benefits. This metric illustrates the relative cost-effectiveness when comparing multiple measures; measures with higher BCR values tend to be more cost-effective. How subsidies (rebates and incentives) are calculated for the participant perspective will impact the result; this analysis identifies all subsidies as cost reductions to the participant. Also, results for perspectives or CAP measures that have either no direct benefits or no direct costs cannot be expressed using a BCR.

2.4.4 Payback Period

A payback period is the amount of time required for the cumulative benefits of a project to equal or surpass the cumulative costs of an action or measure (Figure 5). Payback periods can only be shown for measures or perspectives that have a positive NPV; a negative NPV indicates that the benefits will never equal or outweigh the costs over an action's lifetime.

Figure 5. Conceptual Diagram of an Action's Payback Period



There are two types of payback periods: simple and discounted. The simple payback period is the easiest to calculate but ignores the time value of money. The discounted payback period is a more conservative estimate and is used in this analysis. By discounting future values, the time required for benefits to exceed costs is extended further into the future.

3 COST-EFFECTIVENESS ANALYSIS RESULTS

This section presents cost-effectiveness analysis (CEA) results for CAP measures in target year 2020. Results of this analysis demonstrate the cost-effectiveness of measures to reduce greenhouse gas emissions. GHG reductions are based on calculations in the CAP Appendix B (Reduction and Quantification Methodology). GHG reductions shown in this report are *rounded* estimates provided in the CAP, not necessarily specific estimates identified in CAP Appendix B calculations. For measures with 2035 GHG reduction targets only, this analysis assumes those measure start in 2018 and an incremental level of activity is achieved each year 2018-2035 necessary to achieve 2035 target reductions identified in the CAP. See Appendix B for measure specific data inputs and an extended set of tabular results. All results shown here are in present value dollars using a five percent discount rate and are normalized to 2010 dollars (2010$). See Appendix C for sensitivity analysis results for all measures using a range of discount rates. Values in tables may not sum due to rounding.

Table 1 summarizes results in $/MT CO_2e by perspective for each measure to achieve anticipated 2020 GHG reductions. Results indicate an overall net cost for all but the participant perspective and an estimated 18,171 MT CO_2e reduced in 2020[12].

At the measure perspective, the CAP incurs a net cost of $61 per MT CO_2e reduced. The most cost-effective measure is W-1 Urban Water Management Plan Programs with a net benefit of $427/MT CO_2e followed by measure T-3 Transportation Demand Management Program ($182/MT CO_2e). These compare to measure E-2 Shade Tree Program, which is the least cost-effective for reducing GHGs at a cost of $2,194/MT CO_2e. Measure E-2 is not only least cost-effective, but it reduces the fewest GHGs relative to other CAP measures (<1 MT CO_2e).

Eight of the measures analyzed are considered cost-effective at the participant level and have a positive $/MT CO_2e. Measure W-1 Urban Water Management Plan Programs is again considered the most cost-effective followed by measure E-3 Municipal Energy Efficiency Goal ($644/MT CO_2e and $232/MT CO_2e respectively). Of these eight measures, four are still considered cost-effective when administrator and non-participant costs are included (measure perspective): measures E-3 Municipal Energy Efficiency Goal, E-4 Public Lighting, T-3, Transportation Demand Management Program, and W-1 Urban Water Management Plan Programs.

[12] Total GHG reductions in 2020 include estimated CAP reductions of 16,620 MT CO_2e plus an additional 1,551 MT CO_2e reduced from measures with 2035 only targets that are started early (E-8 and G-2). SW-3 activity is scaled to capture SW-1 and SW-2 2020 GHG reductions only.

Table 1. Dollar per MT CO_2e to Achieve 2020 GHG Reductions for CAP Measures

CAP Measure	Administrator	Participant	Non-Participant	Measure	Society	GHGs Reduced in 2020 (MT CO_2e)
	A	*P*	*NP*	*A+P+NP=M*	*M+E=S*	
Energy						
E-1: Building Retrofit Program	($1)	($160)	($126)	($287)	($262)	4,200
E-2: Shade Tree Program	($1,783)	($410)	-	($2,194)	($1,761)	<1
E-3: Municipal Energy Efficiency Goal	($59)	$232	($17)	$157	$179	30
E-4: Public Lighting	($13)	$125	-	$112	$142	170
E-5: Solar Photovoltaic Program	($1)	$146	($181)	($36)	($14)	2,240
E-6: Solar Hot Water Program	($59)	($39)	($118)	($215)	($191)	30
E-8: Zero Net Energy Construction	($1)	($143)	($69)	($212)	($189)	806*
Transportation and Land Use						
T-1: Bicycle and Pedestrian Infrastructure Development	($95)	$21	-	($73)	($23)	50
T-3: Transportation Demand Management Program	($21)	$229	($26)	$182	$245	2,000
T-4: Mixed-Use and Transit-Oriented Development	($43)	$22	-	($21)	$46	1,890
T-5: Alternative Refueling Infrastructure Development	($80)	($22)	($28)	($129)	($94)	150
T-6: Municipal Fleet Transition	($800)	$84	-	($716)	($692)	10
Water						
W-1: Urban Water Management Plan Programs	($8)	$644	($209)	$427	$453	450
Solid Waste						
SW-3: 75% Waste Diversion Strategy	($3)	($55)	-	($58)	($29)	5,350*
Agriculture and Conservation						
G-1: Urban Forest Management	($21)	($94)	-	($115)	($75)	50
G-2: Expanded Urban Forestry Program	($0)	($162)	-	($162)	($143)	745*
Total	**($11)**	**$8**	**($58)**	**($61)**	**($26)**	**18,171**

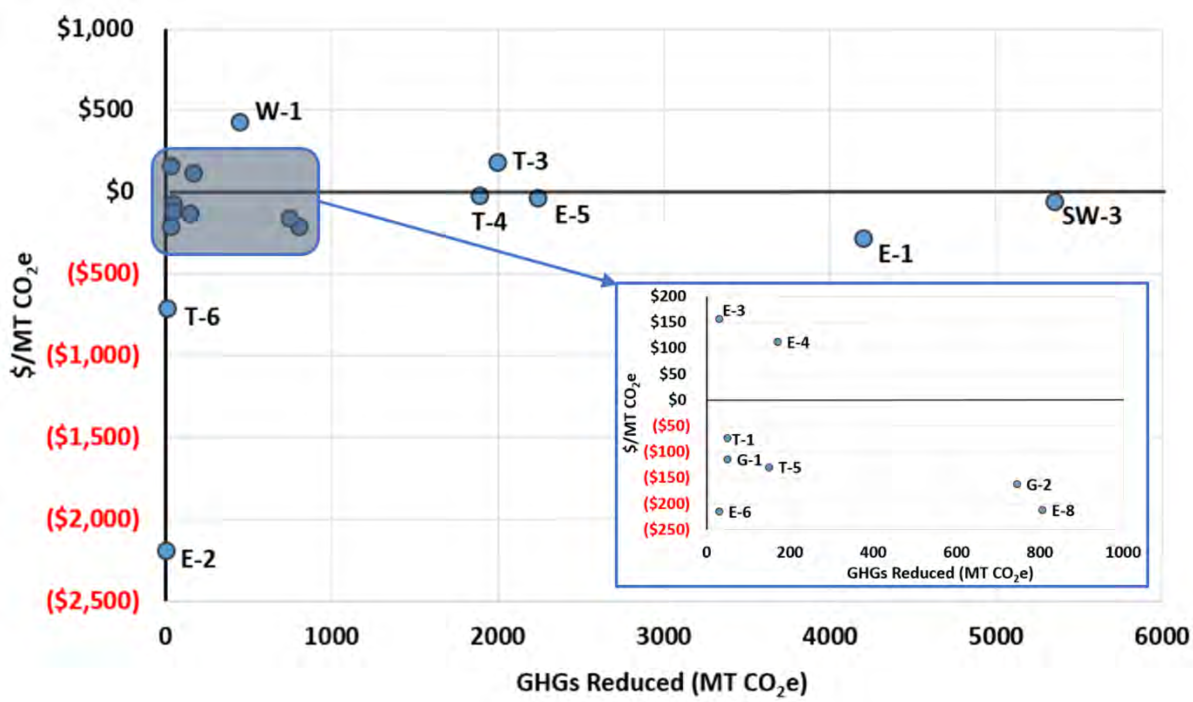
*Measures E-8, SW-3, and G-2 have 2030 GHG reduction targets only, assumed incremental level of activity starting in 2018 to achieve 2030 target.
**E* represents quantified externalities
*All dollar values are in 2010$

Energy Policy Initiatives Center, USD 2018

Figure 6 presents results for the measure perspective and illustrates the relationship between a measure's $/MT CO_2e and corresponding GHG reductions (MT CO_2e) in 2020; it is important to consider both the cost-effectiveness and GHG reduction potential of each measure when comparing across measures. Measures further to the right have higher GHG reductions. Measures above zero dollars indicate a net benefit per MT CO_2e reduced and measures below zero indicate a net cost. An inset is included to better illustrate those measures clustered closer together with low GHG reductions and relatively low benefit or cost per MT CO_2e.

Measures SW-3 75% Waste Diversion Strategy and E-1 Building Retrofit Program have the highest estimated GHG reductions (5,350 and 4,200 MT CO_2e respectively) and both have a cost per metric ton reduced. This compares to measure W-1 Urban Water Management Plan Programs, which has the highest benefit per metric ton reduced, but relatively few GHG reductions (450 MT CO_2e). Additionally, measure T-6 Municipal Fleet Transition and E-2 Shade Tree Program have the highest cost per ton reduced and reduce few GHGs (10 and <1 MT CO_2e respectively).

Figure 6. Measure Perspective Scatterplot for CAP Measures in 2020



4 BENEFIT-COST ANALYSIS RESULTS

This section presents benefit-cost analysis (BCA) results for CAP measures in target year 2020. The purpose of this analysis is to identify the benefits received and costs incurred by the City of La Mesa and home and business owners in the City of La Mesa associated with engaging in activity defined in CAP measures. For measures with 2035 GHG reduction targets only, this analysis assumes those measure start in 2018 and an incremental level of activity is achieved each year 2018-2035 necessary to achieve 2035 target reductions identified in the CAP. See Appendix B for measure specific data inputs and an extended set of tabular results. All results shown here are in present value dollars using a five percent discount rate and are normalized to 2010 dollars (2010$).

Participants for CAP measures can be categorized into one of three groups: residents, businesses, and the City of La Mesa. Residents are participants for measures that impact residential housing units (e.g., E-5 Solar Photovoltaic Program) and commuter travel (e.g., T-3 Transportation Demand Management Program). Businesses are participants for measures that impact commercial spaces (e.g., E-1 Building Retrofit Program). For those measures that affect new residential and/or commercial construction, developers could also be the 'resident' or 'business' affected. The third group is the City of La Mesa. The City of La Mesa is a participant for those measures that affect City operations (e.g., E-3 Municipal Energy Efficiency Goal) or require City capital be outlaid to achieve GHG reductions (e.g., T-1 Bicycle and Pedestrian Infrastructure Development). Additionally, measures can impact more than one participant group (e.g., E-6 Solar Hot Water Program).

Table 2 shows the participant level BCA results for all CAP measures in 2020 along with the corresponding participant group(s); the participant $/MT CO_2e and GHGs reduced for each measure are included for added context. Seven of the CAP measures have been identified to affect the City of La Mesa, five affect businesses, and 11 affect residents. Results indicate that eight measures have a net benefit to the participant over their respective useful lives. These measures have a benefit-cost ratio (BCR) greater than one. The eight remaining measures have a net cost to the participant.

For measures where the City of La Mesa is the only participant, measure E-3 Municipal Energy Efficiency Goal has the highest BCR (4.36) and shortest payback period (4.1 years). This is followed by measure T-6 Municipal Fleet Transition, which has a BCR of 2.38 and a payback period of 6.4 years. Measures G-1 Urban Forest Management and G-2 Expanded Urban Forestry Program only have costs associated with CAP activities and therefor no BCA metrics are provided. These results show activity as it relates to GHG reductions; however, measures included in the CAP might also be done for non-monetary benefits not included in this analysis (habitat conservation, aesthetics, etc.).

For measures where residents and businesses are participants only, measures W-1 Urban Water Management Plan Programs and E-5 Solar Photovoltaic Program have the highest BCRs (1.93 and 1.49 respectively). Measure T-3 Transportation Demand Management Program includes the fuel savings of commuters as a result of switching to alternative forms of transportation. This analysis assumes that commuters affected by this measure would fill excess capacity on existing alternative transportation modes with no incremental costs. As a result, BCA metrics are not available for this measure.

Two measures affect the City as a participant in addition to residents and/or businesses. Measures T-1 Bicycle and Pedestrian Infrastructure Development and T-5 Alternative Refueling Infrastructure Development consider the capital costs paid by the City for installing and maintaining bicycle lanes and potential costs for installing electric vehicle (EV) charging stations. Additional costs include those paid out by residents and business for installing EV charging stations. Participant benefits for both measures include fuel savings reductions resulting from the shift in transportation mode. Measure T-1 provides a net benefit when considering all participant groups (BCR = 1.08) and T-5 a net cost (BCR = 0.90).

Table 2. Participant Benefit-Cost Metrics by CAP Measure in 2020

CAP Measure	Participant Type	$/MT CO_2e (Participant)	BCR	Payback (yrs)	GHGs Reduced in 2020 (MT CO_2e)
Energy					
E-1: Building Retrofit Program	Residents & Businesses	($160)	0.58	-	4,200
E-2: Shade Tree Program	Residents	($410)	0.61	-	<1
E-3: Municipal Energy Efficiency Goal	City	$232	4.36	4.1	30
E-4: Public Lighting	City	$125	1.84	8.5	170
E-5: Solar Photovoltaic Program	Residents & Businesses	$146	1.49	12.8	2,240
E-6: Solar Hot Water Program	Residents & Businesses	($39)	0.68	-	30
E-8: Zero Net Energy Construction	Residents	($143)	0.63	-	806*
Transportation and Land Use					
T-1: Bicycle and Pedestrian Infrastructure Development	City & Residents	$21	1.08	17.8	50
T-3: Transportation Demand Management Program	Residents	$229	-	-	2,000
T-4: Mixed-Use and Transit-Oriented Development	Residents	$22	1.11	<1	1,890
T-5: Alternative Refueling Infrastructure Development	City, Residents, & Businesses	($22)	0.90	-	150
T-6: Municipal Fleet Transition	City	$84	2.38	6.4	10
Water					
W-1: Urban Water Management Plan Programs	Residents	$644	1.93	5.8	450
Solid Waste					
SW-3: 75% Waste Diversion Strategy	Residents & Businesses	($55)	0.63	-	5,350*
Agriculture and Conservation					
G-1: Urban Forest Management	City	($94)	-	-	50
G-2: Expanded Urban Forestry Program	City	($162)	-	-	745*

*Measures E-8, SW-3, and G-2 have 2030 GHG reduction targets only, assumed incremental level of activity starting in 2018 to achieve 2030 target.

*All dollar values are in 2010$

Energy Policy Initiatives Center, USD 2018

5 LIMITATIONS

There are inherent limitations with any cost analysis that result in a degree of uncertainty that should be taken into account. This cost analysis uses the best information, data, and methods available at the time. Nonetheless the following limitations should be considered.

5.1 Available Data and Literature

When considering the benefit and cost impacts of a particular CAP measure, the limitations outlined in the following sections apply.

5.1.1 Data Availability

Estimates for current and future costs and benefits are limited to the data presently available. For some measures, extensive datasets exist with historic costs associated with installation and operation that can be applied at a local level. However, not all measures have readily available data to apply to CEA and BCA calculations. Case studies are applied in these analyses where necessary, as they are representative of the best available literature; however, they may not be entirely reflective of current and/or future conditions experienced. Additionally, costs and benefits associated with CAP measures are subject to changes in future conditions, such as:

- Population growth and demands;
- Technological advancements and available technology;
- Energy/fuel availability;
- Residential and commercial development stock; and
- Trends in consumer demands and producer supply.

5.1.2 Monetizing Externalities

Methods described here emphasize the inclusion of as many externalities as possible within the geographic scope of the City of La Mesa. However, not all externalities can be readily monetized and their lack of inclusion in the quantitative assessment can skew the results of the BCA by reducing the potential benefits and/or costs experienced under the societal perspective. For example, little is known about how increasing the number of bicycle lanes will affect the number of bicycle-auto accidents and how that translates to a medical cost or savings. Externalities included in these analyses were restricted to best available data and literature; not all externalities were captured, potentially under or overvaluing the cost-effectiveness of measures at the societal perspective.

5.2 Scope of Impacts

The approach detailed in this document considers only those benefits and costs anticipated to be experienced within the City of La Mesa. There are other benefits and costs that can accrue outside of La Mesa as a result of implementing the CAP. For instance, the production and disposal of materials (e.g. solar photovoltaic panels and hybrid vehicle batteries) can have multiple costs and benefits associated with them. This can include:

- Financial gain by manufacturers;
- Increase in sector jobs;
- Pollution external impacts from hazardous waste disposal at end of useful life; and
- Reduction in pollution caused by traditional energy production (e.g. coal).

While the methods described in this document can be applied to these additional benefits and costs, the time and resources needed to consider benefits and costs outside of the City of La Mesa are prohibitive.

5.3 Timeframe Analyzed

5.3.1 Application of Historic Data

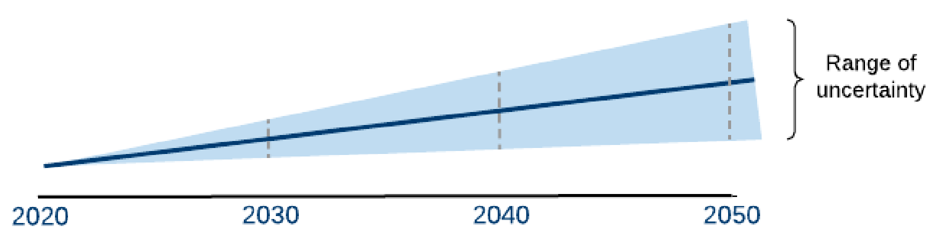
The CAP considers activities that have occurred after the 2010 baseline year. This includes activity that has already happened (2010-2017). CEA and BCA calculations incorporate historic data where applicable to account for past activity that leads to 2020 GHG reductions identified in the CAP. It is important to note that this activity is pre-CAP adoption and is thus not an impact on the City of La Mesa or its residents and businesses as a result of the CAP.

Past activity incorporated into the analysis can under or overestimate the impact of a CAP measure as prices, rebates, and other variables change over time. For instance, the installation of solar photovoltaic systems (measure E-5) are shown to incur a net cost at the measure perspective (-$35/MT CO_2e) in the CEA analysis for all installation years 2010-2020. When looking at individual installation years in this timeframe, results indicate a net benefit for this same perspective beginning in 2016. Continuing with current trends, solar PV installations post CAP adoption would be expected to have an overall net benefit for the measure perspective.

5.3.2 Target Year Selection

Any analysis that involves future projections will have to acknowledge some level of uncertainty, which typically increases the further out into the future the projection goes (Figure 7). To reduce increased uncertainty associated with projections made further out, the CEA and BCA are restricted to a near-term target year (i.e. 2020 instead of 2035). As an example, a photovoltaic system measure has a useful life of 25 years. Using a target year of 2020, future projections extend to 2045 to capture the benefits and costs of that measure. If 2035 is selected as the target year for the BCA analysis, projections would need to extend to 2060. For measures with even longer useful lives, this would require extending projections even further into the future, significantly increasing the uncertainty associated with the results.

Figure 7. Increasing uncertainty with future projections



6 CONCLUSION

This report summarized the findings of the City of La Mesa Draft Climate Action Plan (CAP) cost-effectiveness analysis (CEA) and benefit-cost analysis (BCA) conducted by the Energy Policy Initiatives Center (EPIC) at the University of San Diego. The overall goal of the report is to examine the cost-effectiveness of and benefits and costs related to measures included in the CAP.

The measures included in the CAP to reach GHG reduction targets would have a net cost of $61/MT CO_2e reduced in 2020 and reduce an estimated 18,171 MT CO_2e[13]. This represents a combined net cost of $61 to the CAP administrator, participants, and non-participants (measure perspective) to reduce one metric ton of carbon dioxide equivalent in the year 2020.

Of the 16 measures included in the cost-effectiveness analysis, measure W-1 Urban Water Management Plan Programs is the most cost-effective at $427/MT CO_2e and reduces 450 MT CO_2e. This is followed by measure T-3 Transportation Demand Management Program ($182/MT CO_2e and 2,000 MT CO_2e reduced). Measure E-2 Shade Tree Program is the least cost-effective measure at reducing GHGs (-$2,194/MT CO_2e) and reduces the least amount of GHGs (<1 MT CO_2e).

Combined, CAP measures provide a net benefit of $8/MT CO_2e to those who participate in CAP measure activities. On their own, eight measures provide a net benefit to participants, with measure E-3 Municipal Energy Efficiency Goal having the highest benefit-cost ratio (4.36) followed by measure T-6 Municipal Fleet Transition (2.38). For residents and businesses as participants, measures W-1 Urban Water Management Plan Programs and E-5 Solar Photovoltaic Program have the highest BCRs (1.93 and 1.49 respectively). Measure E-2 Shade Tree Program has the highest cost for participants to reduce GHGs ($441/MT CO_2e) and a BCR less than one (0.61).

Given the uncertainty associated with future conditions, updates may be necessary to incorporate updated forecasts based on actual benefits and costs experienced within the City of La Mesa as measures are implemented and to integrate any changes to measures and actions over time.

[13] Total GHG reductions in 2020 include estimated CAP reductions of 16,620 MT CO_2e plus an additional 1,551 MT CO_2e reduced from measures with 2035 only targets that are started early (E-8 and G-2). SW-3 activity is scaled to capture SW-1 and SW-2 2020 GHG reductions only.

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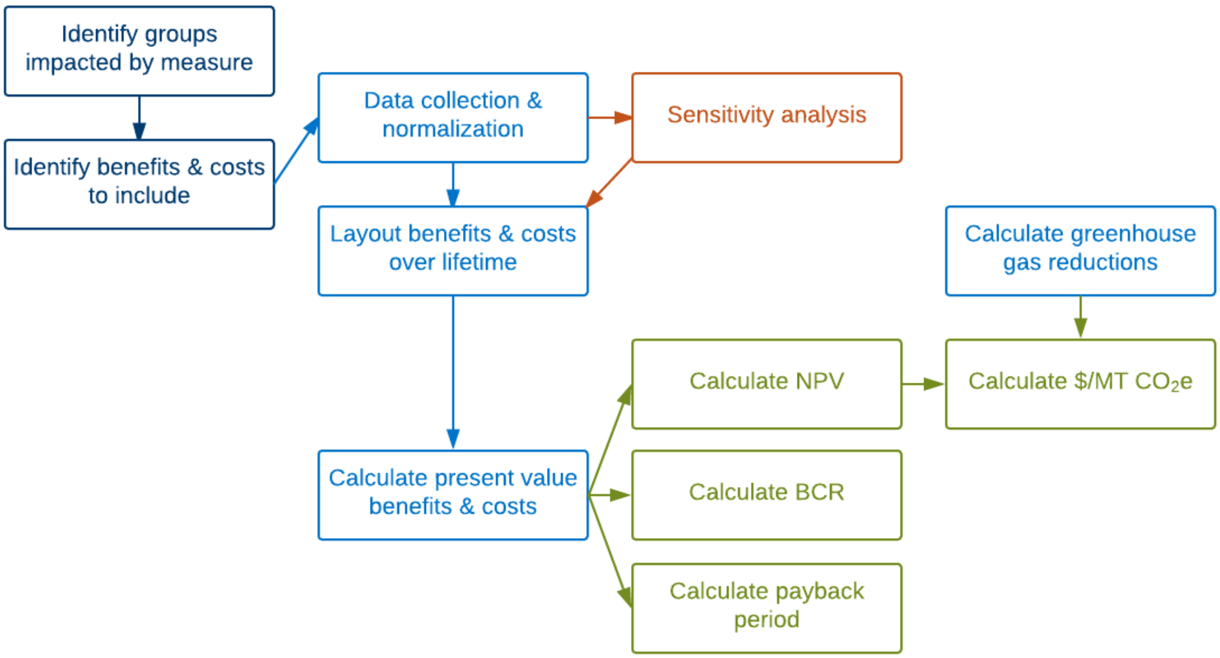
Appendix A. METHODS FOR ANALYZING BENEFITS AND COSTS

The Cost-Effectiveness and Benefit-Cost Analyses for each measure included in the City of La Mesa Draft Climate Action Plan (CAP) follow the same general methods outlined in Figure A1.

Figure A1. General Methods for Climate Action Plan Cost-Effectiveness and Benefit-Cost Analyses



For all measures, greenhouse gas (GHG) calculations are consistent with those used in estimating GHG reductions for the CAP.[14] In some instances, additional data were required beyond what is used to estimate GHG reductions in order to apply calculated GHG reductions at an individual activity level (e.g. average GHGs per solar photovoltaic system installed). Requirements vary by measure, but defining assumptions and collecting data all follow the same methods detailed in this appendix.

A.1 Identify Groups Impacted by Measure

The data collection process is guided by understanding those groups which are impacted in each perspective. The following sections help to identify those groups and the benefits/costs included in the analysis that are received/incurred by each.

A1.1 Administrator Perspective

The administrator perspective comprises only City of La Mesa departments that will experience staffing costs associated with a CAP measure or measures.

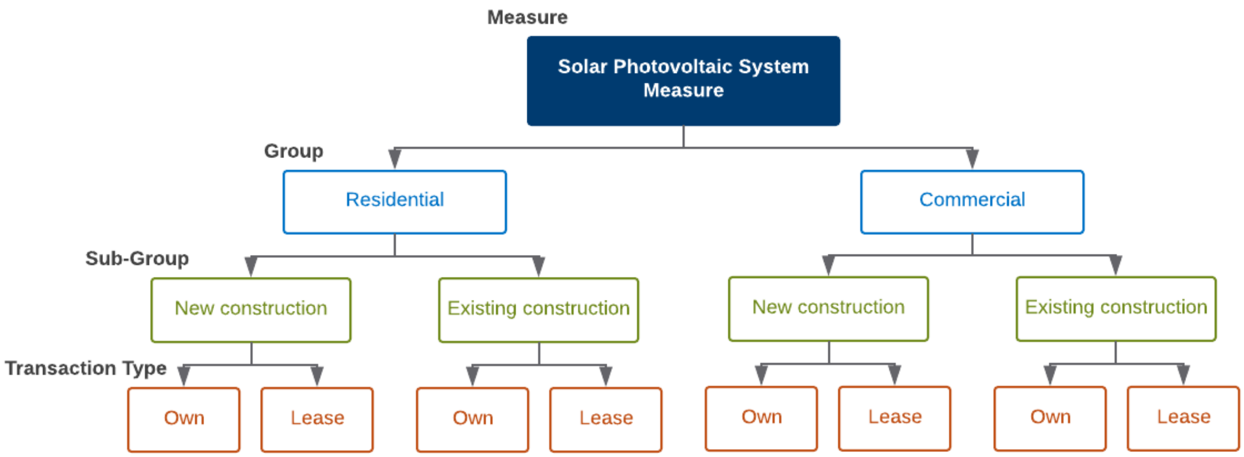
Staffing costs incurred by the City of La Mesa to implement and administer the CAP are gathered from the Climate Action Plan Implementation Cost Report. All costs in the implementation cost report are included here with their respective measure.

[14] City of La Mesa Draft Climate Action Plan Appendix B – Reduction Quantification Methodology

A1.2 Participant Perspective

An individual measure can have multiple participant groups that are impacted depending on the level of specificity for each CAP measure. The PV system example in Figure A2 shows that, at a higher level, groups include residential and commercial customers, and more specific sub-groups are identified based on the type of construction. For the PV measure, the costs associated with installations on existing development can vary greatly compared to the costs of installing PV systems during construction of a home or office building. The individuals who comprise the two types of construction groups can also vary; existing construction typically refers to current home or business owners, whereas new construction can include developers. For some measures, the City of La Mesa is also a participant.

Figure A2. Potential Stakeholders Impacted by a Photovoltaic System Ordinance



Key questions asked for each identified Participant includes:

- Are there any upfront costs required for purchase/installation?
- Are there any ongoing maintenance costs and, if so, at what frequency are they incurred (e.g. annually, biannually)?
- Is the activity reducing consumption (electricity, natural gas, water, fuel, etc.)?
- What rebates and incentives are available?
- What rate schedules apply to participant groups?

The type of transaction involved is also considered; is the Participant purchasing the system outright or leasing it (e.g. through a Power Purchase Agreement)?

A1.3 Non-Participant Perspective

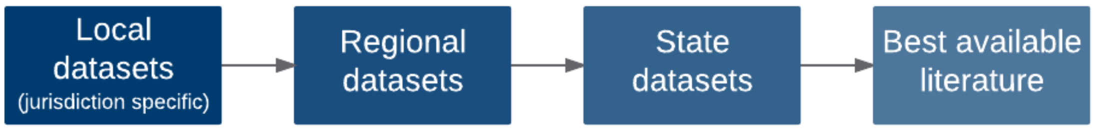
Non-participants are those who fund rebates and incentives (through taxes, fees, etc.) that participants use to offset costs, and are difficult to identify unless documenting the rebates and incentives available to participants.

Data needed to estimate the impact on non-participants is the same as that for any rebates or incentives identified for participants (shown as cost reductions for participants and costs for non-participants).

A.2 Data Collection and Normalization

Data collection followed the hierarchy outlined in Figure A3. Data specific to the City of La Mesa is used whenever possible for benefit and cost values, as well as for key assumptions. In instances where data specific to the City of La Mesa is unavailable or incomplete (little historic activity), regional or state data is applied. In the absence of sufficient regional or state data, estimates provided in current literature are used.

Figure A3. Data Collection Hierarchy for Climate Action Plan Benefit-Cost Analyses



All collected data values were normalized to 2010 dollars (2010$) using the Consumer Price Index (CPI). Normalization reduces interannual impacts of outside influences (inflation, deflation, etc.) on dollar values. Failing to normalize the data can skew results of the analysis. All dollar values were normalized before being integrated into CEA and BCA calculations using the following equation:

Equation 1. Normaliztion of Data Values Using Consumer Price Index

$$X_0 = X_t * \frac{CPI_0}{CPI_t}$$

Where,

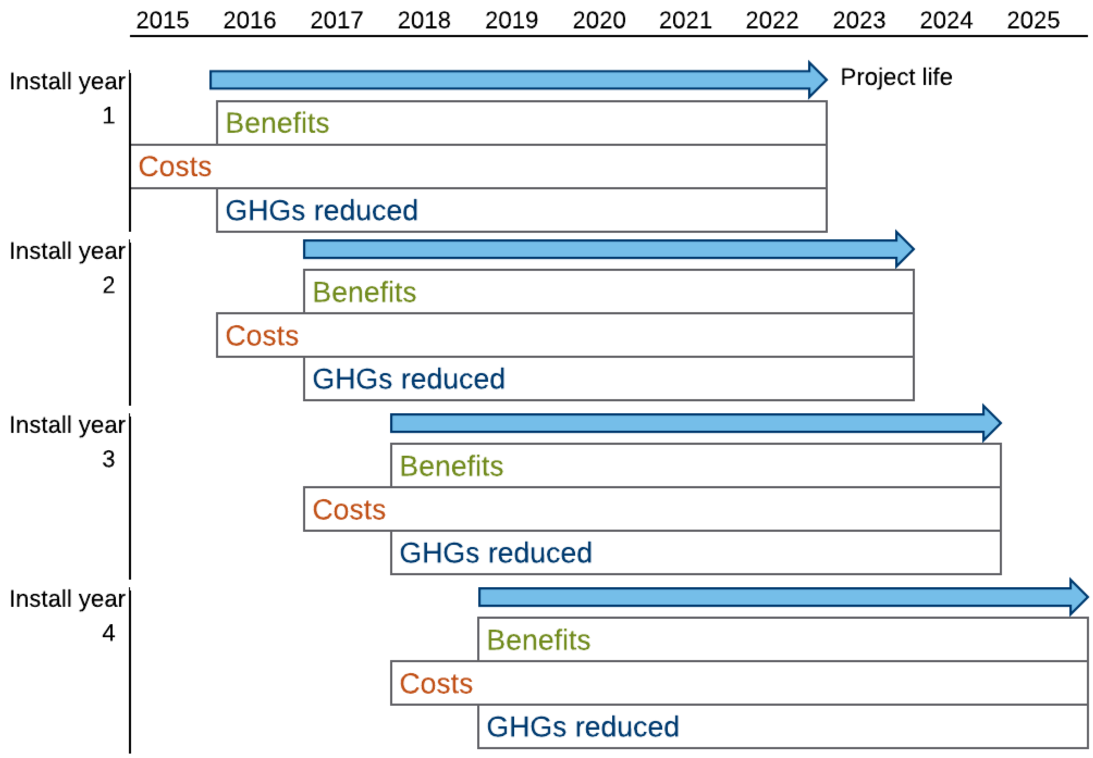
X_0	= normalized dollar value in base year
X_t	= nominal dollar value in year t
CPI_0	= Consumer price index in base year
CPI_t	= Consumer price index in year t

When the dollar year is not specified for a data value(s) in a report or literature used, the year of publication is applied for normalization.

A.3 Layout Benefits and Costs over Lifetime

For each measure, the benefit and cost streams are laid out over the entire lifetime associated with that particular activity for the particular perspective(s) being analyzed. In the example in Figure A4, 2015 is considered the first install year and the useful life is seven years (2011-2022). The year 2016 is considered the second install year and benefits/costs go out through 2023 (seven-year life). This example does not differentiate between perspectives, but the same process is applied to each by adding or removing the appropriate benefits and costs for that perspective and measure. Additionally, each installation year will have corresponding GHGs that are reduced annually. Annual GHG reductions for a particular install year will not vary by perspective.

Figure A4. Example of Benefits and Costs Laid Out over Useful Lives for Multiple Install Years



A.4 Calculate Present Value Benefits and Costs

Once all benefits and costs have been laid out over the action's useful life, the discount rate is applied to both the benefit and cost streams for each installation year to calculate their respective present values (Equation 2and Equation 3).

Equation 2. Present Value Benefits Calculation

$$PV_{benefits} = \sum_{0}^{t=i} \frac{B_t}{(1+r)^t}$$

Equation 3. Present Value Costs Calculation

$$PV_{costs} = \sum_{0}^{t=i} \frac{C_t}{(1+r)^t}$$

Where,

$PV_{benefits}$	= present value of benefits stream
B_t	= benefits in year *t*
PV_{costs}	= present value of costs stream
C_t	= costs in year *t*
r	= discount rate
i	= useful life of measure/action

A4.1 Anticipated Present Value Benefits and Costs in Target Year

Present value benefits and costs calculations estimate the total of each over all useful lives. However, a CAP BCA is meant to show results with respect to a particular target year. To achieve this, the present value benefits and costs are apportioned to the GHGs reduced over each install year's useful life and then multiplied by the GHGs reduced in the target year for that install year (Equation 7 and Equation 8). Results are totaled for all install years to calculate the total anticipated benefit and cost in the target year for a given measure.

Equation 4. Anticipated Present Value Benefits in Target Year Calculation

$$Anticipated\ PV_{benefits}\ in\ target\ year = \frac{PV_{benefits}}{\sum_{0}^{t=i} GHGs_t} * GHGs_{t=target\ year}$$

Equation 5. Anticipated Present Value Costs in Target Year Calculation

$$Anticipated\ PV_{costs}\ in\ target\ year = \frac{PV_{costs}}{\sum_{0}^{t=i} GHGs_t} * GHGs_{t=target\ year}$$

Where,

$PV_{benefits}$ = present value of benefits stream
PV_{costs} = present value of costs stream
$GHGs_t$ = greenhouse gases reduced in year t
i = useful life of measure/action

A.5 Calculate Net Present Value (NPV)

Net present value (NPV) is calculated as the difference between the present value benefits and the present value costs for each Install Year (Equation 6).

Equation 6. Net Present Value Calculation

$$NPV = PV_{benefits} - PV_{costs}$$

Where,

NPV = net present value
$PV_{benefits}$ = present value of benefits stream
PV_{costs} = present value of costs stream

A5.1 Anticipated Net Present Value in Target Year

Similar to the present value benefits and costs, NPV must be apportioned across all GHGs to find the anticipated NPV in the Target Year. This can be done using Equation 4 and substituting *NPV* in for $PV_{benefits}$ or more simply by subtracting the anticipated present value costs from the anticipated value benefits (Equation 7).

Equation 7. Anticipated Net Present Value in Target Year Calculation

$$Anticipated\ NPV\ in\ target\ year = Anticipated\ PV_{benefits}\ in\ target\ year - Anticipated\ PV_{costs}\ in\ target\ year$$

A.6 Calculate Dollar per Metric Ton of CO_2e

The dollar per metric ton is calculated by dividing the NPV for each install year by the GHGs reduced over the entire useful life for that install year (Equation 8).

Equation 8. Dollar per Metric Ton of CO_2e Calculation

$$Dollar\ per\ metric\ ton\ CO_2e = \frac{NPV}{\sum_0^{t=i} GHGs_t}$$

Where,

NPV	= net present value
$GHGs_t$	= greenhouse gases reduced in year *t*
i	= useful life of measure/action

A6.1 Weighted Average Dollar per Metric Ton of CO_2e

Since GHG reductions in the target year are not necessarily the same for each install year[15], weighted average values must be calculated to accurately reflect the dollar per metric ton of CO_2e of a particular measure in the target year. The weighted average can be found using Equation 9.

Equation 9. Weighted Average Dollar per Metric Ton of CO_2e Calculation

$$Weighted\ average\ \$/MT\ CO_2e = \frac{\sum_{j=1}^{j=k}(\$/MT_j * GHGs_{target\ year;j})}{\sum_{j=1}^{j=k} GHGs_{target\ year;j}}$$

Where,

$\$/MT_j$	= dollar per metric ton of install year *j*
$GHGs_{Target\ Year;j}$	= greenhouse gases reduced in target year by actions in install year j
j	= install year
k	= number of install years

A.7 Calculate Benefit-Cost Ratio

The benefit-cost ratio (BCR) is calculated by dividing the present value benefits by the present value costs for a given install year (Equation 10).

Equation 10. Benefit-Cost Ratio Calculation

$$BCR = \frac{PV_{benefits}}{PV_{costs}}$$

Where,

BCR	= benefit-cost ratio
$PV_{benefits}$	= present value of benefits stream
PV_{costs}	= present value of costs stream

[15] E.g. reductions form a photovoltaic system installed in 2015 will offset less GHGs in 2020 than a system of the same size installed in 2019 when a system degradation rate is applied.

A7.1 Weighted Average Benefit-Cost Ratio

Since GHG reductions in the target year are not necessarily the same for each install year[16], weighted average values must be calculated to accurately reflect the benefit-cost ratio of a particular measure in the target year. The weighted average can be found using Equation 11.

Equation 11. Weighted Average Benefit-Cost Ratio Calculation

$$Weighted\ average\ BCR = \frac{\sum_{j=1}^{j=k}(BCR_j * GHGs_{target\ year;j})}{\sum_{j=1}^{j=k} GHGs_{target\ year;j}}$$

Where,

BCR_j	= benefit-cost ratio of install year *j*
$GHGs_{target\ year;j}$	= greenhouse gases reduced in target year by actions in install year *j*
j	= install year
k	= number of install years

A.8 Calculate Discounted Payback Period

The payback period requires a look at the cumulative flow of discounted benefits and discounted costs for a given install year (Equation 12). The number of years with a negative cumulative discounted cash flow, *n*, starts in year one and goes up to the year before cumulative discounted benefits are greater than cumulative discounted costs. The cash flow for any given year is the sum of the benefits and costs in that year (both discounted in this case).

Equation 12. Discounted Payback Period Calculation

$$DPP = n + \frac{CF_{t=n}}{CF_{t+1}}$$

Where,

DPP	= discounted payback period
n	= number of years with a negative cumulative discounted cash flow
$CF_{t=n}$	= discounted cash flow in year *t*, where *t* = *n*
CF_{t+1}	= discounted cash flow in year *t* + 1

A8.1 Weighted Average Discounted Payback Period

Since GHG reductions in the target year are not necessarily the same for each install year[16], weighted average values must be calculated to accurately reflect the discounted payback period of a particular measure in the target year. The weighted average can be found using Equation 13.

Equation 13. Weighted Average Discounted Payback Period Calculation

$$Weighted\ average\ DPP = \frac{\sum_{j=1}^{j=k}(DPP_j * GHGs_{target\ year;j})}{\sum_{j=1}^{j=k} GHGs_{target\ year;j}}$$

[16] E.g. reductions form a photovoltaic system installed in 2015 will offset less GHGs in 2020 than a system of the same size installed in 2019 when a system degradation rate is applied.

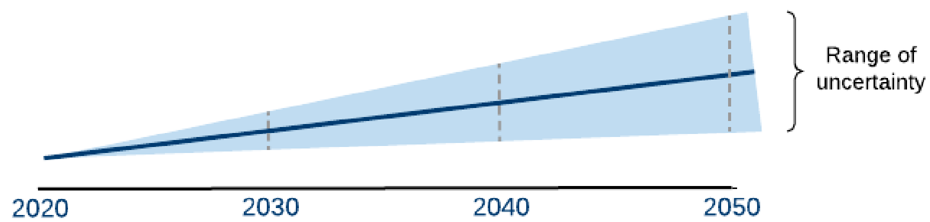
Where,

DPP_j	= discounted payback period of install year j
$GHGs_{target\ year;j}$	= greenhouse gases reduced in target year by actions in install year j
j	= install year
k	= number of install years

A.9 Conduct Sensitivity Analyses

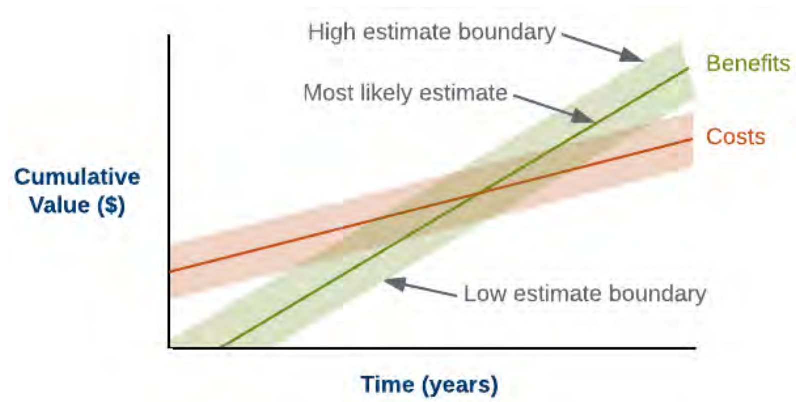
Since the analysis involves future projections, it acknowledges some level of uncertainty, which increases the further out into the future the projection goes (Figure A5).

Figure A5. Increasing Uncertainty with Future Projections



Uncertainty can be addressed through sensitivity analyses, which develop a range in outcomes when various inputs and assumptions are modified (Figure A6). A sensitivity analysis was conducted using a range of discount rates – three percent, five percent, and seven percent. Aside from varying the discount rate, all inputs were held constant and the same calculations detailed in the previous sections were performed to calculate results. All values are discounted back to the same year, regardless of an individual measure or action start year to ensure that all results are compatible and comparable.

Figure A6. Conceptual Diagram of Benefit and Cost Ranges Using a Sensitivity Analysis



Appendix B. MEASURE BY MEASURE RESULTS

The following sections include an extended set of CEA and BCA tabular results for each measure in target year 2020 along with data inputs and assumptions used in the analyses. All results are in present value dollars using a five percent discount rate and normalized to 2010 dollars (2010$). See Appendix C for sensitivity analysis results for all measures using a range of discount rates.

GHG reductions for the 2020 CAP target year are based on calculations in the City of La Mesa Draft CAP Appendix B (Reduction Quantification Methodology). For measures with 2035 GHG reduction targets only, this analysis assumes those measure start in 2018 and an incremental level of activity is achieved each year 2018-2035 necessary to 2035 target reductions identified in the CAP.

B.1 Measure E-1: Building Retrofit Program

This report analyzed the benefits and costs of reducing 36.4 million kWh/yr and 360,500 therms/yr between 2010 and 2020 through residential and commercial energy efficiency building retrofits. Actions taken to achieve this goal are estimated to reduce 4,200 MT CO_2e in 2020.

Participant benefits and costs included in this analysis are only considered for residential and commercial building energy efficiency retrofits (2,964 MT CO_2e/yr by 2020). The CAP also includes estimated GHG reductions achieved by the Grossmont Hospital co-generation facility project (1,236 MT CO_2e in 2020); benefits and costs were not analyzed for this project, which went online in 2016. Additionally, costs incurred in the participant perspective include energy audit costs for all individuals required to complete an audit, not just those who follow-up with an energy efficiency retrofit. This analysis assumes that 12% of those individuals who complete an audit will engage in energy efficiency retrofit activity. As a result, the benefit cost-ratio for an individual homeowner or business will be higher than that reported for the participant in this report.

Administrator costs are staffing costs for the City of La Mesa to implement this CAP measure. Non-participant costs include funding subsidies (rebates, incentives, and upfront loan disbursements to participants). Non-participants receive benefits in the form of loan payments from participants. While this benefit is not a direct payment to non-participants, it reduces the need for increased taxes or fees to support the loan program. The social cost of carbon is used for externalities. Emissions reductions were estimated according to calculations in the CAP Appendix B; GHG reductions shown in report tables are *rounded* estimates provided in the CAP, not necessarily the specific estimates identified in CAP Appendix B calculations.

An extended set of CEA and BCA tabular results are provided in Table B1. General data inputs and assumptions are documented in Table B2.

Table B1. Summary Results for Measure E-1 in 2020

E-1: Building Retrofit Program					
	Administrator	**Participant**	**Non-Participant**	**Measure**	**Society**
Present Value Benefits	-	$664,628	$528,525	$1,193,153	$1,265,978
Present Value Costs	($2,766)	($1,138,930)	($901,689)	($2,043,385)	($2,043,385)
Net Present Value	($2,766)	($474,302)	($373,164)	($850,232)	($777,407)
GHGs (MT CO_2e)	**4,200**				
\$/MT CO_2e	($1)	($160)	($126)	($287)	($262)
BCR	-	0.58	-	0.58	0.62
Discounted Payback Period	-	-	-	-	-

*All dollar values are in 2010$ Energy Policy Initiatives Center, USD 2018

Table B2. Data Inputs and Assumptions for Measure E-1

E-1: Building Retrofit Program			
Description	**Input[1]**	**Perspective[2]**	**Source**
Costs			
CAP implementation costs	*Varies by year*	A	Provided by City staff (see CAP Implementation Cost Report)
Energy audit - residential ($/home)	*($318)*	P	SDG&E 2016. San Diego Gas & Electric Home Upgrade FAQ
Energy audit - commercial ($/sq.ft.)	*($0.30)*	P	PNNL 2011. A guide to energy audits
Retrofit - residential ($/home)	*($6,561)*	P	DNV KEMA 2014. Impact Evaluation of the California Comprehensive Residential Retrofits
Retrofit - commercial ($/sq.ft.)	*($21)*	P	Benson et al. 2011 Retrofitting Commercial Real Estate: Current Trends and Challenges in Increasing Building Energy Efficiency
Rebates and incentives - residential ($/home)	*$2,163*	P, NP	DNV KEMA 2014. Impact Evaluation of the California Comprehensive Residential Retrofits
Rebates and incentives - commercial ($/sq.ft.)	*$1.12*	P, NP	US DOE 2013. Tax Deductions for Commercial Buildings
ARRA loan - residential ($/home)	*$3,750*	P, NP	DNV KEMA 2014. Impact Evaluation of the California Comprehensive Residential Retrofits
Lost utility deductions - commercial	*Varies by year*	P	USDT IRS. 2017a. Business Expenses
Benefits			
Electricity bill savings - residential ($/kWh)	*Mid-demand case*	P	CEC 2016. California Energy Demand Updated Forecast, 2017-2027
Electricity bill savings - commercial ($/kWh)	*Mid-demand case*	P	CEC 2016. California Energy Demand Updated Forecast, 2017-2027
Natural gas bill savings - residential ($/therm)	*Varies by year*	P	SDG&E historical tariffs
Natural gas bill savings - commercial ($/therm)	*Varies by year*	P	SDG&E historical tariffs
Externalities included			
Social cost of carbon ($/MT CO_2e)	*3% discount rate scenario*	S	US EPA 2016. Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis
Other inputs and assumptions			
Number of retrofits - residential (homes)	*Varies by year*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Number of retrofits - commercial (sq.ft.)	*Varies by year*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B; US EIA 2012 Commercial Buildings Energy Consumption Survey Data
Electricity savings (kWh/yr)	*Varies by year*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Natural gas savings (therms/yr)	*Varies by year*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Share of SDG&E program energy efficiency savings-residential	*78%*	-	SANDAG 2013. Series 13 Regional Growth Forecast
Share of SDG&E program energy efficiency savings-commercial	*22%*	-	SANDAG 2013. Series 13 Regional Growth Forecast
ARRA loan term	*10 years*	-	ACEEE 2014. Residential Energy Efficiency Financing: Insights and lessons learned from the Better Buildings Neighborhood Program
ARRA loan interest rate	*3.8%*	-	ACEEE 2014. Residential Energy Efficiency Financing: Insights and lessons learned from the Better Buildings Neighborhood Program
Percent of audits that lead to retrofit - residential	*12%*	-	
Effective commercial tax rate	*22%*	-	US DT OTA 2016. Average Effective Federal Corporate Tax Rates
Greenhouse gases reduced annually (MT CO_2e)	*Varies by year*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Useful life	*20 years*	-	DNV KEMA 2014. Impact Evaluation of the California Comprehensive Residential Retrofits

[1]All dollar values are in 2010$

[2]A: Administrator, P: Participant, NP: Non-participant, S: Societal

Energy Policy Initiatives Center, USD 2018

B.2 Measure E-2: Shade Tree Program

This report analyzed the benefits and costs of planting 250 new shade trees between 2010 and 2020. Actions taken to achieve this goal are estimated to reduce less than one MT CO_2e in 2020.

Planting is assumed to have started in 2015 with 50 trees planted annually up to 2020. Participants reduce energy demand as shade trees modify interior conditions of residential units (e.g., reduce a home's interior temperature during the summer, decreasing the energy demand for cooling).

Administrator costs are staffing costs for the City of La Mesa to implement this CAP measure. No non-participant costs are considered; rebates or incentives are currently not available in La Mesa for shade tree planting. The social cost of carbon is used for externalities in conjunction with reductions in criteria pollutants and storm water treatment associated with trees in urban environments. Emissions reductions were estimated according to calculations in the CAP Appendix B; GHG reductions shown in report tables are *rounded* estimates provided in the CAP, not necessarily the specific estimates identified in CAP Appendix B calculations.

An extended set of CEA and BCA tabular results are provided in Table B3. General data inputs and assumptions are documented in Table B4.

Table B3. Summary Results for Measure E-2 in 2020

E-2: Shade Tree Program	Administrator	Participant	Non-Participant	Measure	Society
Present Value Benefits	-	$1,296	-	$1,296	$2,161
Present Value Costs	($3,567)	($2,117)	-	($5,684)	($5,684)
Net Present Value	($3,567)	($820)	-	($4,387)	($3,522)
GHGs (MT CO_2e)			**<1**		
$/MT CO_2e	($1,783)	($410)	-	($2,194)	($1,761)
BCR	-	0.61	-	0.23	0.38
Discounted Payback Period	-	-	-	-	-

*All dollar values are in 2010$ — Energy Policy Initiatives Center, USD 2018

Table B4. Data Inputs and Assumptions for Measure E-2

E-2: Shade Tree Program			
Description	**Input[1]**	**Perspective[2]**	**Source**
Costs			
CAP implementation costs	*Varies by year*	A	Provided by City staff (see CAP Implementation Cost Report)
Purchase and planting ($/tree)	*($86)*		McPherson et al. 2000. Tree Guidelines for Coastal Southern California Communities
Annual maintenance ($/tree)	*($63)*	P	Provided through discussion with City staff
Water bill increase ($/tree)	*Varies by year*	P	Helix Water District historic and current water
Benefits			
Electricity bill savings - residential ($/kWh)	*Mid-demand case*	P	CEC 2016. California Energy Demand Updated Forecast, 2017-2027
Externalities included			
Social cost of carbon ($/MT CO_2e)	*3% discount rate scenario*	S	US EPA 2016. Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis
Value of avoided criteria pollutants ($/tree)	*Varies by year*	S	McPherson et al. 2000. Tree Guidelines for Coastal Southern California Communities; McPherson et al. 2006 Coastal Plain Community
Rain interception benefits per gallon ($/gal)	*$0.01*	S	McPherson et al. 2000. Tree Guidelines for Coastal Southern California Communities
Other inputs and assumptions			
Number of trees planted annually	*50*	-	City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Electricity savings (kWh/tree/year)	*Varies by year*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Water demand (gal/tree/yr)	*Varies by year*	-	City of San Diego 2015. Draft Urban Forestry Management Plan
Frequency of maintenance (pruning)	*7 years*	-	Provided through discussion with City staff
Greenhouse gases reduced annually (MT CO_2e)	*Varies by year*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Useful life	*30 years*	-	USDA Forest Service 2008. CUFR Tree Carbon Calculator

[1]All dollar values are in 2010$

[2]A: Administrator, P: Participant, NP: Non-participant, S: Societal

Energy Policy Initiatives Center, USD 2018

B.3 Measure E-3: Municipal Energy Efficiency Goal

This report analyzed the benefits and costs of implementing energy efficiency improvements identified in the City of La Mesa Energy Roadmap, reducing 124,000 kWh/yr and 1,275 therms/yr by 2020 at municipal facilities. Actions taken to achieve this goal are estimated to reduce 30 MT CO_2e in 2020.

The City of La Mesa Energy Roadmap identifies energy efficiency retrofit activity for five municipal facilities to markedly reduce City energy consumption. The City Hall retrofit includes installing vending misers on vending machines and a full recommissioning of cooling/heating equipment. The Public Works retrofit includes replacing lighting equipment in the fleet maintenance building and installing occupancy controls on indoor lighting. The Municipal Pool retrofit considers the installation of controls on filtration pumps, and upgrading deck and submersed lighting. The Sunset Gym retrofit includes upgrading outdoor lighting and increasing fresh air circulation to air conditioner rooms. The fifth retrofit involves replacement of four backup generators in Fire and Safety municipal buildings. Participant costs are associated with installing these retrofits and benefits consider the corresponding energy savings received.

Administrator costs are staffing costs for the City of La Mesa to implement this CAP measure. Non-participant costs include funding subsidies (rebates and incentives to participants). The social cost of carbon is used for externalities. Emissions reductions were estimated according to calculations in the CAP Appendix B; GHG reductions shown in report tables are *rounded* estimates provided in the CAP, not necessarily the specific estimates identified in CAP Appendix B calculations.

An extended set of CEA and BCA tabular results are provided in Table B5. General data inputs and assumptions are documented Table B6.

Table B5. Summary Results for Measure E-3 in 2023

E-3: Municipal Energy Efficiency Goal					
	Administrator	**Participant**	**Non-Participant**	**Measure**	**Society**
Present Value Benefits	-	$9,644	-	$9,644	$10,348
Present Value Costs	($1,881)	($2,214)	($531)	($4,626)	($4,626)
Net Present Value	($1,881)	$7,430	($531)	$5,017	$5,722
GHGs (MT CO_2e)	**30**				
$/MT CO_2e	($59)	$232	($17)	$157	$179
BCR	-	4.36	-	2.08	2.24
Discounted Payback Period	-	4.1	-	8.3	7.7

*All dollar values are in 2010$ Energy Policy Initiatives Center, USD 2018

Table B6. Data Inputs and Assumptions for Measure E-3

E-3: Municipal Energy Efficiency Goal			
Description	**Input**[1]	**Perspective**[2]	**Source**
Costs			
CAP implementation costs	*Varies by year*	A	Provided by City staff (see CAP Implementation Cost Report)
City Hall retrofit	*($48,799)*	P	City of La Mesa 2013. City of La Mesa Energy Roadmap Appendix C
Public Works retrofit	*($3,790)*	P	City of La Mesa 2013. City of La Mesa Energy Roadmap Appendix C
Municipal pools retrofit	*($5,065)*	P	City of La Mesa 2013. City of La Mesa Energy Roadmap Appendix C
Sunset Gym retrofit	*($1,357)*	P	City of La Mesa 2013. City of La Mesa Energy Roadmap Appendix C
Backup generators retrofit	*($22,102)*	P	City of La Mesa 2013. City of La Mesa Energy Roadmap Appendix C
City Hall retrofit rebates	*$7,886*	P, NP	City of La Mesa 2013. City of La Mesa Energy Roadmap Appendix C
Public Works retrofit rebates	*$2,230*	P, NP	City of La Mesa 2013. City of La Mesa Energy Roadmap Appendix C
Municipal pools retrofit rebates	*$995*	P, NP	City of La Mesa 2013. City of La Mesa Energy Roadmap Appendix C
Sunset Gym retrofit rebates	*$194*	P, NP	City of La Mesa 2013. City of La Mesa Energy Roadmap Appendix C
Backup generators retrofit rebates	*$4,386*	P, NP	City of La Mesa 2013. City of La Mesa Energy Roadmap Appendix C
Benefits			
Electricity bill savings - municipal ($/kWh)	*Mid-demand case*	P	CEC 2016. California Energy Demand Updated Forecast, 2017-2027
Natural gas bill savings - municipal ($/therm)	*Varies by year*	P	SDG&E historical tariffs
Externalities included			
Social cost of carbon ($/MT CO_2e)	*3% discount rate scenario*	S	US EPA 2016. Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis
Other inputs and assumptions			
Municipal energy efficiency retrofit year	*2018*	-	*Assumes all retrofits identified in the La Mesa Energy Roadmap completed in this year
Electricity reduced annually (kWh)	*124,000*	-	City of La Mesa 2013. City of La Mesa Energy Roadmap Appendix C
Natural gas reduced annually (therms)	*1,275*	-	City of La Mesa 2013. City of La Mesa Energy Roadmap Appendix C
Greenhouse gases reduced annually (MT CO_2e)	*Varies by year*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Useful life	*20 years*	-	DNV KEMA 2014. Impact Evaluation of the California Comprehensive Residential Retrofits Program

[1]All dollar values are in 2010$

[2]A: Administrator, P: Participant, NP: Non-participant, S: Societal

Energy Policy Initiatives Center, USD 2018

B.4 Measure E-4: Public Lighting

This report analyzed the benefits and costs of retrofitting all City-owned traffic lights and street lights with energy-efficient technology. Actions taken to achieve this goal are estimated to reduce 170 MT CO_2e in 2020.

The activity necessary to achieve this goal was completed by 2011; this analysis assumes all retrofits occur in 2010, with 2011 being the first year of savings. The City of La Mesa provided cost data for the 1,083 street lights retrofitted during this time period. As a result, the City has experienced utility bill reductions associated with reduced electricity demand.

Administrator costs are staffing costs for the City of La Mesa to implement this CAP measure. No non-participant costs are considered; rebate or incentive data were not provided by the City of La Mesa for past lighting retrofits. The social cost of carbon is used for externalities. Emissions reductions were estimated according to calculations in the CAP Appendix B; GHG reductions shown in report tables are *rounded* estimates provided in the CAP, not necessarily the specific estimates identified in CAP Appendix B calculations.

An extended set of CEA and BCA tabular results are provided in Table B7. General data inputs and assumptions are documented in Table B8.

Table B7. Summary Results for Measure E-4 in 2023

E-4: Public Lighting					
	Administrator	**Participant**	**Non-Participant**	**Measure**	**Society**
Present Value Benefits	-	\$46,192	-	\$46,192	\$51,240
Present Value Costs	(\$2,211)	(\$25,142)	-	(\$27,352)	(\$27,352)
Net Present Value	(\$2,211)	\$21,050	-	\$18,839	\$23,887
GHGs (MT CO_2e)			**170**		
\$/MT CO_2e	(\$13)	\$125	-	\$112	\$142
BCR	-	1.84	-	1.69	1.87
Discounted Payback Period	-	8.5	-	8.5	7.7

*All dollar values are in 2010$ — Energy Policy Initiatives Center, USD 2018

Table B8. Data Inputs and Assumptions for Measure E-4

E-4: Public Lighting			
Description	**Input**[1]	**Perspective**[2]	**Source**
Costs			
CAP implementation costs	*Varies by year*	A	Provided by City staff (see CAP Implementation Cost Report)
Street light retrofit ($/light)	*($348)*	P	Provided by City Staff
Benefits			
Electricity bill savings - municipal ($/kWh)	*Mid-demand case*	P	SDG&E historic LS-2 rates; CEC 2016. California Energy Demand Updated Forecast, 2017-2027
Externalities included			
Social cost of carbon ($/MT CO_2e)	*3% discount rate scenario*	S	US EPA 2016. Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis
Other inputs and assumptions			
Number of streetlight retrofits	*1083*	-	Provided by City Staff
Year of retrofits	*2010*	-	Provided by City Staff
Electricity reduced annually (kWh/light)	*762*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Greenhouse gases reduced annually (MT CO_2e)	*Varies by year*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Useful life	*15 years*	-	TRB 2012. NCHRP Report 713 Estimating Life Expectancies of Highway Assets

T-6: Municipal Fleet Transition

Energy Policy Initiatives Center, USD 2018

[2]A: Administrator, P: Participant, NP: Non-participant, S: Societal

B.5 Measure E-5: Solar Photovoltaic Program

This report analyzed the benefits and costs of installing 6.1 MW of solar photovoltaic (PV) capacity between 2010 and 2020 resulting in the generation of 11 million kWh/yr. Actions taken to achieve this goal are estimated to reduce 2,240 MT CO_2e in 2020.

Historic residential and commercial solar PV installation data are applied between 2010 and 2016. Forecasted annual installations 2017-2020 are assumed to be residential only in accordance with GHG reduction calculations in CAP Appendix B. At the measure perspective solar PV is considered to have a net cost per ton reduced for installations (2010-2020) necessary to achieve the 2020 GHG reduction target. While solar PV systems are considered cost-effective for participants for all install years, the cost-effectiveness at the measure level has markedly increased between 2010 and 2016. Installations after 2015 are estimated to have a net benefit per metric ton reduced across all perspectives.

Administrator costs are staffing costs for the City of La Mesa to implement this CAP measure. Non-participant costs include funding subsidies (rebates and incentives to participants). The social cost of carbon is used for externalities. Emissions reductions were estimated according to calculations in the CAP Appendix B; GHG reductions shown in report tables are *rounded* estimates provided in the CAP, not necessarily the specific estimates identified in CAP Appendix B calculations.

An extended set of CEA and BCA tabular results are provided in Table B9. General data inputs and assumptions are documented in Table B10.

Table B9. Summary Results for Measure E-5 in 2023

E-5: Solar Photovoltaic Program					
	Administrator	**Participant**	**Non-Participant**	**Measure**	**Society**
Present Value Benefits	-	$997,836	-	$997,836	$1,046,538
Present Value Costs	($1,603)	($671,358)	($405,396)	($1,078,356)	($1,078,356)
Net Present Value	($1,603)	$326,479	($405,396)	($80,520)	($31,818)
GHGs (MT CO_2e)			**2,240**		
$/MT CO_2e	($1)	$146	($181)	($36)	($14)
BCR	-	1.49	-	0.93	0.97
Discounted Payback Period	-	12.8	-	-	-

*All dollar values are in 2010$ Energy Policy Initiatives Center, USD 2018

Table B10. Data Inputs and Assumptions for Measure E-5

E-5: Solar Photovoltaic Program			
Description	**Input**[1]	**Perspective**[2]	**Source**
Costs			
CAP implementation costs	*Varies by year*	A	Provided by City staff (see CAP Implementation Cost Report)
Purchase and installation - residential ($/kW)	*Varies by year*	P	Millstein et al. 2016. Tracking the Sun IX - The Installed Price of Residential and Non-Residential Photovoltaic Systems in the United States
Purchase and installation - commercial ($/kW)	*Varies by year*	P	Millstein et al. 2016. Tracking the Sun IX - The Installed Price of Residential and Non-Residential Photovoltaic Systems in the United States
Operations and maintenance - residential ($/kW)	*($19)*	P	NREL 2015. Best Practices in PV System Operations and Maintenance
Operations and maintenance - commercial ($/kW)	*($17)*	P	NREL 2015. Best Practices in PV System Operations and Maintenance
Inverter replacement - residential ($/kW)	*($164)*	P	NREL 2015. Best Practices in PV System Operations and Maintenance; NREL 2017. U.S. Solar Photovoltaic System Cost Benchmark
Inverter replacement - commercial ($/kW)	*($136)*	P	NREL 2015. Best Practices in PV System Operations and Maintenance; NREL 2017. U.S. Solar Photovoltaic System Cost Benchmark
Average rebate per system ($/kW)	*Varies by year*	P, NP	Millstein et al. 2016. Tracking the Sun IX - The Installed Price of Residential and Non-Residential Photovoltaic Systems in the United States
Average rebate per system ($/kW)	*Varies by year*	P, NP	Millstein et al. 2016. Tracking the Sun IX - The Installed Price of Residential and Non-Residential Photovoltaic Systems in the United States
Federal Solar Investment Tax Credit (ITC)	*30% (after rebates)*	P, NP	SEIA. 2016. The Solar Investment Tax Credit (ITC). Solar Energy Industries Association
Tax Deductions (MACRS, bonus depreciation) - commercial	*Varies by year*	P, NP	SEIA 2017. 5 year cost recovery period for solar energy property; USDT IRS 2017a. Business Expenses; USDT IRS 2017b. Instructions for Form 1120 U.S. Corporation Income Tax Return
Lost utility deductions - commercial	*Varies by year*	P	USDT IRS 2017a. Business Expenses
Benefits			
Electricity bill savings - residential ($/kWh)	*Mid-demand case*	P	CEC 2016. California Energy Demand Updated Forecast, 2017-2027
Electricity bill savings - commercial ($/kWh)	*Mid-demand case*	P	CEC 2016. California Energy Demand Updated Forecast, 2017-2027
Externalities included			
Social cost of carbon ($/MT CO_2e)	*3% discount rate scenario*	S	US EPA 2016. Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis
Other inputs and assumptions			
Number of systems installed annually - residential (2010-2014)	*62*	-	Estimated from historic data and City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Number of systems installed annually - residential (2015-2019)	*60*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Number of systems installed annually - commercial (2010-2014)	*1*	-	Estimated from historic data and City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
System size - residential (kW)	*10.65*	-	Millstein et al. 2016. Tracking the Sun IX - The Installed Price of Residential and Non-Residential Photovoltaic Systems in the United States
System size - commercial (kW)	*256*	-	Millstein et al. 2016. Tracking the Sun IX - The Installed Price of Residential and Non-Residential Photovoltaic Systems in the United States
Inverter replacement frequency	*10 years*	-	NREL 2015. Best Practices in PV System Operations and Maintenance; NREL 2017. U.S. Solar Photovoltaic System Cost Benchmark
Effective commercial tax rate	*22%*	-	US DT OTA 2016. Average Effective Federal Corporate Tax Rates
Greenhouse gases reduced annually (MT CO_2e)	*Varies by year*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Useful life	*25 years*	-	Kneifel et al. 2016. Energy and Economic Implications of Solar Photovoltaic Performance Degradation

[1]All dollar values are in 2010$

Energy Policy Initiatives Center, USD 2018

[2]A: Administrator, P: Participant, NP: Non-participant, S: Societal

B.6 Measure E-6: Solar Hot Water Program

This report analyzed the benefits and costs of installing solar hot water heaters in residential and commercial buildings since 2010 to achieve an annual savings of 5,100 therms by 2020. Actions taken to achieve this goal are estimated to reduce 30 MT CO_2e in 2020.

Historic residential and commercial solar hot water heater data are applied between 2010 and 2016. Forecasted annual installations 2017-2020 are assumed to be residential only in accordance with GHG reduction calculations in CAP Appendix B. Benefits and costs associated with residential and commercial installations can vary greatly; historic data indicates commercial installations are generally more cost-efficient relative to residential systems when considering lifetime benefits and costs. Results shown here aggregate the impacts for commercial and residential systems.

Administrator costs are staffing costs for the City of La Mesa to implement this CAP measure. Non-participant costs include funding subsidies (rebates and incentives to participants). The social cost of carbon is used for externalities. Emissions reductions were estimated according to calculations in the CAP Appendix B; GHG reductions shown in report tables are *rounded* estimates provided in the CAP, not necessarily the specific estimates identified in CAP Appendix B calculations.

An extended set of CEA and BCA tabular results are provided in Table B11. General data inputs and assumptions are documented in Table B12.

Table B11. Summary Results for Measure E-6 in 2023

E-6: Solar Hot Water Program					
	Administrator	**Participant**	**Non-Participant**	**Measure**	**Society**
Present Value Benefits	-	$2,233	-	$2,233	$2,910
Present Value Costs	($1,628)	($3,306)	($3,267)	($8,201)	($8,201)
Net Present Value	($1,628)	($1,073)	($3,267)	($5,968)	($5,291)
GHGs (MT CO_2e)	**30**				
$/MT CO_2e	($59)	($39)	($118)	($215)	($191)
BCR	-	0.68	-	0.27	0.35
Discounted Payback Period	-	-	-	-	-

*All dollar values are in 2010$ Energy Policy Initiatives Center, USD 2018

Table B12. Data Inputs and Assumptions for Measure E-6

E-6: Solar Hot Water Program			
Description	**Input**[1]	**Perspective**[2]	**Source**
Costs			
CAP implementation costs	*Varies by year*	A	Provided by City staff (see CAP Implementation Cost Report)
Purchase and installation - residential, single-family ($/home)	*($6,070)*	P	CEC (n.d.). California Solar Initiative (CSI) Solar Thermal Program data
Purchase and installation - historic ($/system)	*Varies by year and type*	P	CEC (n.d.). California Solar Initiative (CSI) Solar Thermal Program data
Maintenance ($/system)	*($1,013)*	P	NREL 2011. Break-even Cost for Residential Solar Water Heating in the United States: Key Drivers and Sensitivities
Rebates/Incentives - residential, single-family ($/home)	*$2,484*	P, NP	CEC (n.d.). California Solar Initiative (CSI) Solar Thermal Program data
Rebates/Incentives - historic ($/system)	*Varies by year and type*	P, NP	CEC (n.d.). California Solar Initiative (CSI) Solar Thermal Program data
Federal Investment Tax Credit	*30% (after rebates)*	P, NP	SEIA. 2016. The Solar Investment Tax Credit (ITC). Solar Energy Industries Association
Benefits			
Natural gas bill savings - residential ($/therm)	*Varies by year*	P	SDG&E historical tariffs
Natural gas bill savings - commercial ($/therm)	*Varies by year*	P	SDG&E historical tariffs
Externalities included			
Social cost of carbon ($/MT CO_2e)	*3% discount rate scenario*	S	US EPA 2016. Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis
Other inputs and assumptions			
Number of water heaters installed annually - historic	*Varies by year*	-	CEC (n.d.). California Solar Initiative (CSI) Solar Thermal Program data
Number of water heaters installed annually - forecast	*1*	-	City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B; Communication with AECOM; CEC (n.d.). California Solar Initiative (CSI) Solar Thermal Program data
Natural gas reduced annually - historic (therms/system)	*Varies by year*	-	CEC (n.d.). California Solar Initiative (CSI) Solar Thermal Program data
Natural gas reduced annually - forecast (therms/system)	*93*	-	City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B; Communication with AECOM; CEC (n.d.). California Solar Initiative (CSI) Solar Thermal Program data
Maintenance frequency	*10 years*	-	NREL 2011. Break-even Cost for Residential Solar Water Heating in the United States: Key Drivers and Sensitivities
Greenhouse gases reduced annually (MT CO_2e/system)	*Varies by size*	-	City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B; Communication with AECOM; CEC (n.d.). California Solar Initiative (CSI) Solar Thermal Program data
Useful life	*20 years*	-	EnergyStar.gov

[1]All dollar values are in 2010$

[2]A: Administrator, P: Participant, NP: Non-participant, S: Societal

Energy Policy Initiatives Center, USD 2018

B.7 Measure E-8: Zero Net Energy Construction

This report analyzed the incremental benefits and costs of a zero net energy construction requirement for new residential units. This measure indicates the requirement will start in 2020. To analyze potential impacts of this measure in 2020, this report assumes the requirement begins in 2018 and that an incremental level of activity is achieved each year to reach the same 2035 GHG reduction target identified in the CAP. Zero net energy requirements for commercial construction would not start until 2030, well beyond the time frame in this analysis, and were not included in the CEA or BCA. Actions taken to achieve this goal are estimated to reduce 806 MT CO_2e in 2020.

The participant considered in this analysis could be either a homeowner or a developer. Participant costs include the incremental cost of constructing a home beyond state standards to achieve the zero net energy requirement. This includes energy efficiency design and installation of on-site solar. Utility bill reductions (electric and natural gas) as a result of this activity are considered the benefits to the participant (homeowner).

Administrator costs are staffing costs for the City of La Mesa to implement this CAP measure. Non-participant costs include funding subsidies (rebates and incentives to participants). The social cost of carbon is used for externalities. Emissions reductions were estimated according to calculations in the CAP Appendix B; GHG reductions shown in report tables are *rounded* estimates provided in the CAP, not necessarily the specific estimates identified in CAP Appendix B calculations.

An extended set of CEA and BCA tabular results are provided in Table B13. General data inputs and assumptions are documented in Table B14.

Table B13. Summary Results for Measure E-8 in 2023

E-8: Zero Net Energy Construction					
	Administrator	**Participant**	**Non-Participant**	**Measure**	**Society**
Present Value Benefits	-	$198,991	-	$198,991	$217,367
Present Value Costs	($756)	($313,925)	($55,257)	($369,938)	($369,938)
Net Present Value	($756)	($114,935)	($55,257)	($170,947)	($152,571)
GHGs (MT CO_2e)			**806***		
$/MT CO_2e	($1)	($143)	($69)	($212)	($189)
BCR	-	0.63	-	0.54	0.59
Discounted Payback Period	-	-	-	-	-

*Assumes activity begins early to achieve 2030 target — Energy Policy Initiatives Center, USD 2018

*All dollar values are in 2010$

Table B14. Data Inputs and Assumptions for Measure E-8

E-8: Zero Net Energy Construction			
Description	**Input**[1]	**Perspective**[2]	**Source**
Costs			
CAP implementation costs	*Varies by year*	A	Provided by City staff (see CAP Implementation Cost Report)
Incremental cost of residential energy efficiency upgrades ($/home)	*($22,127)*	P	ACEEE 2008. Summer Study on Energy Efficiency in Buildings
Residential rebates ($/home)	*$3,312*	P, NP	ACEEE 2008. Summer Study on Energy Efficiency in Buildings
Benefits			
Residential electricity bill savings	*Mid-Demand case*	P	CEC 2016. California Energy Demand Updated Forecast, 2017-2027
Residential natural gas bill savings	*Varies by year*	P	SDG&E historical tariffs
Externalities included			
Social cost of carbon ($/MT CO_2e)	*3% discount rate scenario*	S	US EPA 2016. Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis
Other inputs and assumptions			
Number of new residential homes	*Varies by year*		SANDAG 2013. Series 13 Regional Growth Forecast
Residential electricity reductions (kWh)	*Varies by year*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Residential natural gas reductions (therms)	*Varies by year*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Greenhouse gases reduced annually (MT CO_2e)	*Varies by year*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Useful life	*20 years*	-	DNV KEMA 2014. Impact Evaluation of the California Comprehensive Residential Retrofits Program

[1]All dollar values are in 2010$

Energy Policy Initiatives Center, USD 2018

[2]A: Administrator, P: Participant, NP: Non-participant, S: Societal

B.8 Measure T-1: Bicycle and Pedestrian Infrastructure Development

This report analyzed the benefits and costs of installing 3 miles of new Class II bike lanes by 2020. Actions taken to achieve this goal are estimated to reduce 50 MT CO_2e in 2020.

Participants in this measure include both the City of La Mesa and commuters within La Mesa. The City is responsible for the installation and maintenance of bike lines (participant costs), while commuters who switch from driving a vehicle to riding a bicycle experience reductions in fuel consumption (participant benefits).

Administrator costs are staffing costs for the City of La Mesa to implement this CAP measure. No non-participant costs are considered; rebates and incentives are not available to encourage commuters to switch their mode of transportation from vehicle to bicycle. The social cost of carbon is used for externalities in conjunction with the avoided cost associated with criteria pollutants. Emissions reductions were estimated according to calculations in the CAP Appendix B; GHG reductions shown in report tables are *rounded* estimates provided in the CAP, not necessarily the specific estimates identified in CAP Appendix B calculations.

An extended set of CEA and BCA tabular results are provided in Table B15. General data inputs and assumptions are documented in Table B16.

Table B15. Summary Results for Measure T-1 in 2023

T-1: Bicycle and Pedestrian Infrastructure Development					
	Administrator	**Participant**	**Non-Participant**	**Measure**	**Society**
Present Value Benefits	-	$14,359	-	$14,359	$16,854
Present Value Costs	($4,742)	($13,286)	-	($18,028)	($18,028)
Net Present Value	($4,742)	$1,073	-	($3,669)	($1,174)
GHGs (MT CO_2e)			**50**		
$/MT CO_2e	($95)	$21	-	($73)	($23)
BCR	-	1.08	-	0.80	0.93
Discounted Payback Period	-	17.8	-	-	-

*All dollar values are in 2010$ Energy Policy Initiatives Center, USD 2018

Table B16. Data Inputs and Assumptions for Measure T-1

T-1: Bicycle and Pedestrian Infrastructure Development			
Description	**Input**[1]	**Perspective**[2]	**Source**
Costs			
CAP implementation costs	*Varies by year*	A	Provided by City staff (see CAP Implementation Cost Report)
Class II bike lane installation ($/mi)	*($35,141)*	P	City of La Mesa 2012. Bicycle Facilities and Alternative Transportation Plan
Class II bike lane maintenance ($/mi)	*($1,872)*	P	City of San Diego 2013. Bicycle Master Plan
Benefits			
Fuel savings - gasoline ($/gal; regular grade)	*Varies by year*	P	US EIA 2017a. Los Angeles Gasoline and Diesel Retail Prices; US EIA 2017b. Petroleum and Other Liquids Prices
Fuel savings - diesel ($/gal; grade No.2)	*Varies by year*	P	US EIA 2017a. Los Angeles Gasoline and Diesel Retail Prices; US EIA 2017b. Petroleum and Other Liquids Prices
Externalities included			
Social cost of carbon ($/MT CO_2e)	*3% discount rate scenario*	S	US EPA 2016. Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis
Value of avoided criteria pollutants - gasoline ($/mi)	*Varies by year*	S	CARB. EMFAC2014 Web Database; CARB 2015. EMFAC2014 Volume III - Technical Documentation; SANDAG 2015. San Diego Forward: The Regional Plan
Value of avoided criteria pollutants - diesel ($/mi)	*Varies by year*	S	CARB. EMFAC2014 Web Database; CARB 2015. EMFAC2014 Volume III - Technical Documentation; SANDAG 2015. San Diego Forward: The Regional Plan
Other inputs and assumptions			
Class II bike lanes installed annually (mi/yr)	*0.64*	-	City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Gasoline reduced annually (gal/mi bike lane)	*1,537*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Diesel reduced annually (gal/mi bike lane)	*211*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Vehicle miles traveled reduced annually (VMT/mi bike lane)	*30,276*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Greenhouse gases reduced annually (MT CO_2e)	*Varies by year*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Useful life	*20 years*		CARB 1995. Emission Reduction Calculation Methodologies

[1]All dollar values are in 2010$

[2]A: Administrator, P: Participant, NP: Non-participant, S: Societal

Energy Policy Initiatives Center, USD 2018

B.9 Measure T-3: Transportation Demand Management Program

This report analyzed the benefits and costs of promoting SANDAG's iCommute program to assist in achieving a 6% reduction in per capita vehicle miles traveled compared to 2010 levels by 2035. Actions taken to achieve this goal are estimated to reduce 2,000 MT CO_2e in 2020.

Participation in carshares, vanpools, and carpools are considered in this analysis. Participation rates in each program were estimated by applying City of La Mesa specific data to SANDAG participation estimates in the San Diego Forward: The Regional Plan Appendix C. Current incentives available through the iCommute program were applied as cost-reductions for participants, yielding a positive cost stream (negative cost) for participants. In addition, participants experience reduced fuel savings.

Administrator costs are staffing costs for the City of La Mesa to implement this CAP measure. Non-participant costs include funding subsidies (rebates and incentives to participants). The social cost of carbon is used for externalities in conjunction with the avoided cost associated with criteria pollutants. Emissions reductions were estimated according to calculations in the CAP Appendix B; GHG reductions shown in report tables are *rounded* estimates provided in the CAP, not necessarily the specific estimates identified in CAP Appendix B calculations.

An extended set of CEA and BCA tabular results are provided in Table B17. General data inputs and assumptions are documented in Table B18.

Table B17. Summary Results for Measure T-3 in 2023

T-3: Transportation Demand Management Program					
	Administrator	**Participant**	**Non-Participant**	**Measure**	**Society**
Present Value Benefits	-	$406,238	-	$406,238	$531,097
Present Value Costs	($41,952)	$52,039	($52,039)	($41,952)	($41,952)
Net Present Value	($41,952)	$458,277	($52,039)	$364,286	$489,145
GHGs (MT CO_2e)			**2,000**		
$/MT CO_2e	($21)	$229	($26)	$182	$245
BCR	-	-	-	9.68	12.66
Discounted Payback Period	-	-	-	1.2	1.1

*All dollar values are in 2010$

Energy Policy Initiatives Center, USD 2018

Table B18. Data Inputs and Assumptions for Measure T-3

T-3: Transportation Demand Management Program			
Description	**Input[1]**	**Perspective[2]**	**Source**
Costs			
CAP implementation costs	*Varies by year*	A	Provided by City staff (see CAP Implementation Cost Report)
Vanpool incentive ($/vanpool/yr)	*$4,800*	P, NP	SANDAG 2015. San Diego Forward: The Regional Plan Appendix C: Sustainable Communities Strategy Documentation and Related Information
Carpool incentive ($/carpooler/yr)	*$90*	P, NP	SANDAG 2015. San Diego Forward: The Regional Plan Appendix C: Sustainable Communities Strategy Documentation and Related Information
Benefits			
Fuel savings - gasoline ($/gal; regular grade)	*Varies by year*	P	US EIA 2017a. Los Angeles Gasoline and Diesel Retail Prices; US EIA 2017b. Petroleum and Other Liquids Prices
Fuel savings - diesel ($/gal; grade No.2)	*Varies by year*	P	US EIA 2017a. Los Angeles Gasoline and Diesel Retail Prices; US EIA 2017b. Petroleum and Other Liquids Prices
Externalities included			
Social cost of carbon ($/MT CO_2e)	*3% discount rate scenario*	S	US EPA 2016. Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis
Value of avoided criteria pollutants - gasoline ($/mi)	*Varies by year*	S	CARB. EMFAC2014 Web Database; CARB 2015. EMFAC2014 Volume III - Technical Documentation; SANDAG 2015. San Diego Forward: The Regional Plan
Value of avoided criteria pollutants - diesel ($/mi)	*Varies by year*	S	CARB. EMFAC2014 Web Database; CARB 2015. EMFAC2014 Volume III - Technical Documentation; SANDAG 2015. San Diego Forward: The Regional Plan
Other inputs and assumptions			
Number of commuters in La Mesa	*Varies by year*	-	SANDAG 2013. Series 13 Regional Growth Forecast
Number of commuters in carshare program by 2020	*15%*	-	SANDAG 2015. San Diego Forward: The Regional Plan Appendix C: Sustainable Communities Strategy Documentation and Related Information
La Mesa share of new vanpools and carpools	*2%*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Number of new annual vanpools	*7*	-	SANDAG 2015. San Diego Forward: The Regional Plan Appendix C: Sustainable Communities Strategy Documentation and Related Information
Number of new annual carpools	*19*	-	SANDAG 2015. San Diego Forward: The Regional Plan Appendix C: Sustainable Communities Strategy Documentation and Related Information
Retention rate of carpools to second year	*90%*	-	SANDAG 2015. San Diego Forward: The Regional Plan Appendix C: Sustainable Communities Strategy Documentation and Related Information
Carpool ridership (carpooolers/car)	*2.1*	-	SANDAG 2015. San Diego Forward: The Regional Plan Appendix C: Sustainable Communities Strategy Documentation and Related Information
LDA fuel economy - gasoline (mpg)	*Varies by year*	-	CARB. EMFAC2014 Web Database
LDA fuel economy - diesel (mpg)	*Varies by year*	-	CARB. EMFAC2014 Web Database
Share of VMT reductions - gasoline	*99%*	-	City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Share of VMT reductions - diesel	*1%*	-	City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Greenhouse gases reduced annually (MT CO_2e)	*Varies by year*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Useful life	*NA*	-	*assumes reductions are accounted for same year as activity

[1]All dollar values are in 2010$ — Energy Policy Initiatives Center, USD 2018

[2]A: Administrator, P: Participant, NP: Non-participant, S: Societal

B.10 Measure T-4: Mixed-Use and Transit-Oriented Development

This report analyzed the benefits and costs of encouraging mixed-use and transit-oriented development to assist in achieving a 6% reduction in per capita vehicle miles traveled compared to 2010 levels by 2035. Actions taken to achieve this goal are estimated to reduce 1,890 MT CO_2e in 2020.

This analysis conservatively estimates that activity defined in this measure would encourage commuters to switch from using a single-occupancy vehicle to mass transit. This results in fuel savings for participants (benefit) countered by the purchase of a monthly regional transportation mass transit pass. The number of commuters was estimated using the 2010 per capita daily vehicle miles traveled (DVMT) and the estimated VMT reduced in CAP Appendix B. No incremental development costs are considered with this measure as current literature estimates cost reductions for this type of development over more sprawl-type development. Through communications with City of La Mesa staff, it was determined that this measure would emphasize filling existing capacity on current mass transit routes (no incremental costs for the mass-transit provider).

Administrator costs are staffing costs for the City of La Mesa to implement this CAP measure. No non-participant costs are considered; rebates and incentives are not available to encourage commuters to switch their mode of transportation from vehicle to mass transit as it relates to land use development. The social cost of carbon is used for externalities in conjunction with the avoided cost associated with criteria pollutants. Emissions reductions were estimated according to calculations in the CAP Appendix B; GHG reductions shown in report tables are *rounded* estimates provided in the CAP, not necessarily the specific estimates identified in CAP Appendix B calculations.

An extended set of CEA and BCA tabular results are provided in Table B19. General data inputs and assumptions are documented in Table B20.

Table B19. Summary Results for Measure T-4 in 2023

T-4: Mixed-Used and Transit-Oriented Development					
	Administrator	Participant	Non-Participant	Measure	Society
Present Value Benefits	-	$417,841	-	$417,841	$543,266
Present Value Costs	($81,683)	($375,310)	-	($456,993)	($456,993)
Net Present Value	($81,683)	$42,531	-	($39,152)	$86,273
GHGs (MT CO_2e)	**1,890**				
$/MT CO_2e	($43)	$22	-	($21)	$46
BCR	-	1.11	-	0.91	1.19
Discounted Payback Period	-	<1	-	-	<1

*All dollar values are in 2010$

Energy Policy Initiatives Center, USD 2018

Table B20. Data Inputs and Assumptions for Measure T-4

T-4: Mixed-Use and Transit-Oriented Development			
Description	**Input**[1]	**Perspective**[2]	**Source**
Costs			
CAP implementation costs	*Varies by year*	A	Provided by City staff (see CAP Implementation Cost Report)
Regional transportation pass ($/rider/yr)	*($773)*	P	MTS 2017. Fares and Passes - Pass Prices
Benefits			
Fuel savings - gasoline ($/gal; regular grade)	*Varies by year*	P	US EIA 2017a. Los Angeles Gasoline and Diesel Retail Prices; US EIA 2017b. Petroleum and Other Liquids Prices
Fuel savings - diesel ($/gal; grade No.2)	*Varies by year*	P	US EIA 2017a. Los Angeles Gasoline and Diesel Retail Prices; US EIA 2017b. Petroleum and Other Liquids Prices
Externalities included			
Social cost of carbon ($/MT CO_2e)	*3% discount rate scenario*	S	US EPA 2016. Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis
Value of avoided criteria pollutants - gasoline ($/mi)	*Varies by year*	S	CARB. EMFAC2014 Web Database; CARB 2015. EMFAC2014 Volume III - Technical Documentation; SANDAG 2015. San Diego Forward: The Regional Plan
Value of avoided criteria pollutants - diesel ($/mi)	*Varies by year*	S	CARB. EMFAC2014 Web Database; CARB 2015. EMFAC2014 Volume III - Technical Documentation; SANDAG 2015. San Diego Forward: The Regional Plan
Other inputs and assumptions			
LDA fuel economy - gasoline (mpg)	*Varies by year*	-	CARB. EMFAC2014 Web Database
LDA fuel economy - diesel (mpg)	*Varies by year*	-	CARB. EMFAC2014 Web Database
Share of VMT reductions - gasoline	*99%*	-	City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Share of VMT reductions - diesel	*1%*	-	City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Greenhouse gases reduced annually (MT CO_2e)	*Varies by year*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Useful life	*NA*	-	*assumes reductions are accounted for same year as activity

[1]All dollar values are in 2010$ — Energy Policy Initiatives Center, USD 2018

[2]A: Administrator, P: Participant, NP: Non-participant, S: Societal

B.11 Measure T-5: Alternative Refueling Infrastructure Development

This report analyzed the benefits and costs of installing electric vehicle (EV) charging infrastructure to assist in achieving a 6% reduction in per capita vehicle miles traveled compared to 2010 levels by 2035. Actions taken to achieve this goal are estimated to reduce 150 MT CO_2e in 2020.

The number of chargers necessary to achieve the VMT reductions identified in CAP Appendix B, were estimated using EV charging and eVMT forecasts provided in SANDAG's San Diego Forward: The Regional Plan Appendix C. It is assumed that all installations are publicly available Level 2 EVCS chargers.[17] Participant costs include the cost of purchase and installation in addition to the utility costs associated with electricity consumption. Participant benefits are accrued by commuters who utilize the charging infrastructure and experience a benefit associated with reduced fuel demand.

Administrator costs are staffing costs for the City of La Mesa to implement this CAP measure. Non-participant costs include funding subsidies (rebates and incentives to participants). The social cost of carbon is used for externalities in conjunction with the avoided cost associated with criteria pollutants. Emissions reductions were estimated according to calculations in the CAP Appendix B; GHG reductions shown in report tables are *rounded* estimates provided in the CAP, not necessarily the specific estimates identified in CAP Appendix B calculations.

An extended set of CEA and BCA tabular results are provided in Table B21. General data inputs and assumptions are documented in Table B22.

Table B21. Summary Results for Measure T-5 in 2020

T-5: Alternative Refueling Infrastructure Development					
	Administrator	**Participant**	**Non-Participant**	**Measure**	**Society**
Present Value Benefits	-	\$28,400	-	\$28,400	\$33,832
Present Value Costs	(\$12,132)	(\$31,674)	(\$4,276)	(\$48,081)	(\$48,081)
Net Present Value	(\$12,132)	(\$3,274)	(\$4,276)	(\$19,681)	(\$14,249)
GHGs (MT CO_2e)			**150**		
\$/MT CO_2e	(\$80)	(\$22)	(\$28)	(\$129)	(\$94)
BCR	-	0.90	-	0.59	0.70
Discounted Payback Period	-	-	-	-	-

*All dollar values are in 2010$ — Energy Policy Initiatives Center, USD 2018

[17] The CAP and corresponding GHG reduction calculations do not specify the extent to which chargers are installed in residential units or commercial parking spaces. Installation costs included here generally apply to installations in commercial and public spaces.

Table B22. Data Inputs and Assumptions for Measure T-5

T-5: Alternative Refueling Infrastructure Development			
Description	**Input[1]**	**Perspective[2]**	**Source**
Costs			
CAP implementation costs	*Varies by year*	A	Provided by City staff (see CAP Implementation Cost Report)
Level 2 EVCS charger purchase ($/charger)	*($3,174)*	P	US DOE 2015. Costs Associated with Non-residential Electric Vehicle Supply Equipment
Level 2 EVCS charger installation ($/charger)	*($3,680)*	P	US DOE 2015. Costs Associated with Non-residential Electric Vehicle Supply Equipment
Level 1 EVCS charger rebate ($/charger)	*$1,879*	P, NP	SANDAG 2015. San Diego Forward: The Regional Plan Appendix C: Sustainable Communities Strategy Documentation and Related Information
Electricity bill increase ($/kWh)	*Mid-demand case*	P	CEC 2016. California Energy Demand Updated Forecast, 2017-2027
Benefits			
Fuel savings - gasoline ($/gal; regular grade)	*Varies by year*	P	US EIA 2017a. Los Angeles Gasoline and Diesel Retail Prices; US EIA 2017b. Petroleum and Other Liquids Prices
Fuel savings - diesel ($/gal; grade No.2)	*Varies by year*	P	US EIA 2017a. Los Angeles Gasoline and Diesel Retail Prices; US EIA 2017b. Petroleum and Other Liquids Prices
Externalities included			
Social cost of carbon ($/MT CO_2e)	*3% discount rate scenario*	S	US EPA 2016. Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis
Value of avoided criteria pollutants - gasoline ($/mi)	*Varies by year*	S	CARB. EMFAC2014 Web Database; CARB 2015. EMFAC2014 Volume III - Technical Documentation; SANDAG 2015. San Diego Forward: The Regional Plan
Value of avoided criteria pollutants - diesel ($/mi)	*Varies by year*	S	CARB. EMFAC2014 Web Database; CARB 2015. EMFAC2014 Volume III - Technical Documentation; SANDAG 2015. San Diego Forward: The Regional Plan
Other inputs and assumptions			
Annual number of chargers installed (2018-2019)	*14*	-	Estimated from SANDAG 2015. San Diego Forward: The Regional Plan Appendix C: Sustainable Communities Strategy Documentation and Related Information
EV electricity demand (kWh/mi)	*0.32*	-	US DOE 2017. Alternative Fuels Data Center: Hybrid and Plug-In Electric Vehicle Emissions Data Sources and Assumptions
LDA fuel economy - gasoline (mpg)	*Varies by year*	-	CARB. EMFAC2014 Web Database
LDA fuel economy - diesel (mpg)	*Varies by year*	-	CARB. EMFAC2014 Web Database
Share of VMT reductions - gasoline	*99%*	-	City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Share of VMT reductions - diesel	*1%*	-	City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Greenhouse gases reduced annually (MT CO_2e)	*Varies by year*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Useful life	*10 years*	-	US DOE 2015. Costs Associated with Non-residential Electric Vehicle Supply Equipment

[1]All dollar values are in 2010$

Energy Policy Initiatives Center, USD 2018

[2]A: Administrator, P: Participant, NP: Non-participant, S: Societal

B.12 Measure T-6: Municipal Fleet Transition

This report analyzed the benefits and costs of transitioning two municipal fleet vehicles – a passenger vehicle and light-duty truck – to hybrid alternatives by 2020. Actions taken to achieve this goal are estimated to save 560 gallons of gasoline annually and reduce 10 MT CO_2e in 2020.

Included in this measure are the replacement of a 1998 Ford Taurus and 1996 Ford Explorer with hybrid options by 2020. This analysis assumes both are replaced in 2018 using a Toyota Camry and Toyota Highlander as the replacement. The cost to the City as it relates to this CAP measure is the incremental purchase price of a hybrid Camry/Highlander over a non-hybrid Camry/Highlander with comparable features.[18] Fair market value estimates were collected from Kelley Blue Book. Benefits to the City include fuel reductions.

Administrator costs are staffing costs for the City of La Mesa to implement this CAP measure. No non-participant costs are considered; potential rebate or incentive data were not provided by the City of La Mesa for switching out municipal vehicles with hybrid alternatives. The social cost of carbon is used for externalities. Emissions reductions were estimated according to calculations in the CAP Appendix B; GHG reductions shown in report tables are *rounded* estimates provided in the CAP, not necessarily the specific estimates identified in CAP Appendix B calculations.

An extended set of CEA and BCA tabular results are provided in Table B23. General data inputs and assumptions are documented in Table B24.

Table B23. Summary Results for Measure T-6 in 2023

T-6: Municipal Fleet Transition	Administrator	Participant	Non-Participant	Measure	Society
Present Value Benefits	-	$751	-	$751	$874
Present Value Costs	($4,158)	($315)	-	($4,473)	($4,473)
Net Present Value	($4,158)	$436	-	($3,722)	($3,599)
GHGs (MT CO_2e)			**10**		
$/MT CO_2e	($800)	$84	-	($716)	($692)
BCR	-	2.38	-	0.17	0.20
Discounted Payback Period	-	6.35	-	-	-

*All dollar values are in 2010$ Energy Policy Initiatives Center, USD 2018

[18] It is assumed the City of La Mesa would normally need to replace vehicles in the municipal fleet. The incremental purchase cost of a hybrid over a non-hybrid is used, since the CAP measure only indicates what type of vehicle would need to be purchased at time of replacement.

Table B24. Data Inputs and Assumptions for Measure T-6

T-6: Municipal Fleet Transition			
Description	**Input[1]**	**Perspective[2]**	**Source**
Costs			
CAP implementation costs	*Varies by year*	A	Provided by City staff (see CAP Implementation Cost Report)
Passenger vehicle replacement price (incremental cost above non-hybrid)	*($4,775)*	P	Kelley Blue Book website (Toyota Camry hybrid and non-hybrid)
Light-duty truck replacement price (incremental cost above non-hybrid)	*($2,204)*	P	Kelley Blue Book website (Toyota Highlander hybrid and non-hybrid)
Benefits			
Fuel savings - gasoline ($/gal; regular grade)	*Varies by year*	P	US EIA 2017a. Los Angeles Gasoline and Diesel Retail Prices; US EIA 2017b. Petroleum and Other Liquids Prices
Externalities included			
Social cost of carbon ($/MT CO_2e)	*3% discount rate scenario*	S	US EPA 2016. Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis
Other inputs and assumptions			
Vehicle replacement year	*2018*	-	*1998 Ford Taurus (1) and 1996 Ford Explorer (1) replaced with hybrid alternatives
Gasoline reduced annually (gal)	*559*	-	City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Greenhouse gases reduced annually (MT CO_2e)	*5*	-	City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Useful life	*15 years*	-	BERLA 2017. Average Lifespan for U.S. Vehicles

[1]All dollar values are in 2010$

Energy Policy Initiatives Center, USD 2018

[2]A: Administrator, P: Participant, NP: Non-participant, S: Societal

B.13 Measure W-1: Urban Water Management Plan Programs

This report analyzed the benefits and costs of reducing water consumption through residential water conservation retrofits between 2010 and 2020. Actions taken to achieve this goal are estimated to reduce 450 MT CO_2e in 2020.

This analysis focuses on residential indoor water conservation retrofit activity including the installation of low-flow toilets and faucets, and high-efficiency clothes washers and dishwashers. Helix Water District provided data on historic rebate applications 2010-2016, which were applied to calculations where applicable. Participants experience costs associated with water conservation retrofits and receive benefits in the form of water bill reductions.

Administrator costs are staffing costs for the City of La Mesa to implement this CAP measure. Non-participant costs include funding subsidies (rebates and incentives to participants). The social cost of carbon is used for externalities. Emissions reductions were estimated according to calculations in the CAP Appendix B; GHG reductions shown in report tables are *rounded* estimates provided in the CAP, not necessarily the specific estimates identified in CAP Appendix B calculations.

An extended set of CEA and BCA tabular results are provided in Table B25. General data inputs and assumptions are documented in Table B26.

Table B25. Summary Results for Measure W-1 in 2023

W-1: Urban Water Management Plan Programs					
	Administrator	**Participant**	**Non-Participant**	**Measure**	**Society**
Present Value Benefits	-	$597,559	-	$597,559	$609,004
Present Value Costs	($3,499)	($309,044)	($93,601)	($406,145)	($406,145)
Net Present Value	($3,499)	$288,515	($93,601)	$191,415	$202,859
GHGs (MT CO_2e)	**450**				
$/MT CO_2e	($8)	$644	($209)	$427	$453
BCR	-	1.93	-	1.47	1.50
Discounted Payback Period	-	5.84	-	6.29	6.18

*All dollar values are in 2010$ Energy Policy Initiatives Center, USD 2018

Table B26. Data Inputs and Assumptions for Measure W-1

W-1: Urban Water Management Plan Programs			
Description	**Input[1]**	**Perspective[2]**	**Source**
Costs			
CAP implementation costs	*Varies by year*	A	Provided by City staff (see CAP Implementation Cost Report)
Retrofit ($/home)	*($577)*	P	Pacific Institute 2016. The Cost of Alternative Water Supply and Efficiency Options in California
Rebates and incentives ($/home)	*$134*	P, NP	SoCal WaterSmart 2017. Rebate schedule
Benefits			
Water bill savings ($/gal)	*Varies by year*	P	Helix Water District historic and current water
Externalities included			
Social cost of carbon ($/MT CO_2e)	*3% discount rate scenario*	S	US EPA 2016. Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis
Other inputs and assumptions			
Million gallons saved annually per residential retrofit (MG)	*0.02*	-	Communication with Helix Water District (historic water conservation retrofit rebate applications)
Annual water savings (MG)	*Varies by year*	-	City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Greenhouse gases reduced annually (MT CO2e/MG)	*3*	-	City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Useful life	*10 years*	-	Communication with Helix Water District (historic water conservation retrofit rebate applications)

[1]All dollar values are in 2010$ — Energy Policy Initiatives Center, USD 2018

[2]A: Administrator, P: Participant, NP: Non-participant, S: Societal

B.14 Measure SW-3: 75% Waste Diversion Strategy

This report analyzed the benefits and costs of increasing solid waste diversion to 75% by 2035. This measure indicates the requirement will start in 2020. To analyze potential impacts of this measure in 2020, this report assumes the requirement begins in 2018 and that an incremental level of activity is achieved each year to achieve the same GHG reductions identified in measures SW-1 Food Scrap and Yard Waste Diversion and SW-2 Construction and Demolition Waste Diversion Program in 2020. Measures SW-1 and SW-2 have limited supporting data for analysis; measure SW-3 75% Waste Diversion Strategy is used as a proxy for both. Actions taken to achieve this goal are estimated to reduce 5,350 MT CO_2e in 2020.

Participants are primarily waste haulers and costs include cost of waste diversion (e.g., transportation) and processing. These costs could be passed on to residents and businesses. Benefits received include the potential sale of any processed material diverted from the landfill.

Administrator costs are staffing costs for the City of La Mesa to implement this CAP measure. No non-participant costs are considered; there are no anticipated rebates or incentives for increased solid waste diversion. The social cost of carbon is used for externalities. Emissions reductions were estimated according to calculations in the CAP Appendix B; GHG reductions shown in report tables are *rounded* estimates provided in the CAP, not necessarily the specific estimates identified in CAP Appendix B calculations.

An extended set of CEA and BCA tabular results are provided in Table B27. General data inputs and assumptions are documented in Table B28.

Table B27. Summary Results for Measure SW-3 in 2023

SW-3: 75% Waste Diversion Strategy					
	Administrator	**Participant**	**Non-Participant**	**Measure**	**Society**
Present Value Benefits	-	$503,013	-	$503,013	$656,840
Present Value Costs	($15,644)	($797,148)	-	($812,792)	($812,792)
Net Present Value	($15,644)	($294,135)	-	($309,779)	($155,952)
GHGs (MT CO_2e)	**5,350***				
$/MT CO_2e	($3)	($55)	-	($58)	($29)
BCR	-	0.63	-	0.62	0.81
Discounted Payback Period	-	-	-	-	-

*Assumes activity begins early to achieve 2030 target — Energy Policy Initiatives Center, USD 2018

*All dollar values are in 2010$

Table B28. Data Inputs and Assumptions for Measure SW-3

SW-3: 75% Waste Diversion Strategy			
Description	**Input[1]**	**Perspective[2]**	**Source**
Costs			
CAP implementation costs	*Varies by year*	A	Provided by City staff (see CAP Implementation Cost Report)
Cost of diverted waste collection ($/ton)	*($132)*		EPA 2008.
Cost of processing diverted waste ($/ton)	*($43)*		Kessler Consulting 2009. Pinellas County Florida: MRFing Our Way to Diversion: Capturing the Commercial Waste Stream. Materials Recovery Feasibility Study
Benefits			
Reduced disposal costs ($/ton)	*$75*		Repa 2005. NSWMA's 2005 Tip Fee Survey
Revenue form sale of processed waste material ($/ton)	*$36*		ACRC. Keeping Recycling Cool
Externalities included			
Social cost of carbon ($/MT CO_2e)	*3% discount rate scenario*	S	US EPA 2016. Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis
Other inputs and assumptions			
Current diversion rate	*54%*	-	
Tons of waste generated	*Varies by year*	-	City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B; Communication with AECOM
Tons of waste diverted	*Varies by year*	-	City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B; Communication with AECOM
Greenhouse gases reduced annually (MT CO2e/yr)	*Varies by year*	-	City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B; Communication
Useful life	*NA*	-	*assumes reductions are accounted for same year as activity

[1]All dollar values are in 2010$

[2]A: Administrator, P: Participant, NP: Non-participant, S: Societal

Energy Policy Initiatives Center, USD 2018

B.15 Measure G-1: Urban Forest Management

This report analyzed the benefits and costs of planting 500 net new trees between 2015 and 2020. Actions taken to achieve this goal are estimated to reduce 50 MT CO_2e in 2020.

Participant costs include the capital associated with purchasing, planting, and maintaining trees. Additional participant costs include repairs to infrastructure from tree-related damage and potential liability issues associated with trees (e.g. falling branches). There are no direct, monetary participant benefits identified.

Administrator costs are staffing costs for the City of La Mesa to implement this CAP measure. No non-participant costs are considered; there are no identified rebates or incentives for the City to plant trees. The social cost of carbon is used for externalities in conjunction with reductions in criteria pollutants and storm water treatment associated with trees in urban environments. Emissions reductions were estimated according to calculations in the CAP Appendix B; GHG reductions shown in report tables are *rounded* estimates provided in the CAP, not necessarily the specific estimates identified in CAP Appendix B calculations.

An extended set of CEA and BCA tabular results are provided in Table B29. General data inputs and assumptions are documented in Table B30.

Table B29. Summary Results for Measure G-1 in 2023

G-1: Urban Forest Management					
	Administrator	**Participant**	**Non-Participant**	**Measure**	**Society**
Present Value Benefits	-	-	-	-	$2,001
Present Value Costs	($1,053)	($4,684)	-	($5,738)	($5,738)
Net Present Value	($1,053)	($4,684)	-	($5,738)	($3,737)
GHGs (MT CO_2e)			**50**		
$/MT CO_2e	($21)	($94)	-	($115)	($75)
BCR	-	-	-	-	0.35
Discounted Payback Period	-	-	-	-	-

*All dollar values are in 2010$ — Energy Policy Initiatives Center, USD 2018

Table B30. Data Inputs and Assumptions for Measure G-1

G-1: Urban Forest Management			
Description	**Input[1]**	**Perspective[2]**	**Source**
Costs			
CAP implementation costs	*Varies by year*	A	Provided by City staff (see CAP Implementation Cost Report)
Purchase and planting ($/tree)	*($197)*	P	Provided by City staff
Annual maintenance ($/tree)	*($63)*	P	Provided by City staff
Water bill increase ($/tree)	*Varies by age*	P	Helix Water District historic and current water
Average annual infrastructure damage cost ($/tree)	*Varies by age*	P	McPherson et al. 2000. Tree Guidelines for Coastal Southern California Communities
Average annual liability and legal cost ($/tree)	*Varies by age*	P	McPherson et al. 2000. Tree Guidelines for Coastal Southern California Communities
Benefits			
NA			
Externalities included			
Social cost of carbon ($/MT CO_2e)	*3% discount rate scenario*	S	US EPA 2016. Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis
Value of avoided criteria pollutants ($/tree)	*Varies by year*	S	McPherson et al. 2000. Tree Guidelines for Coastal Southern California Communities; McPherson et al. 2006 Coastal Plain Community
Rain interception benefits per gallon ($/gal)	*$0.01*	S	McPherson et al. 2000. Tree Guidelines for Coastal Southern California Communities
Other inputs and assumptions			
Number of trees planted annually	*100*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Water demand (gal/tree/yr)	*Varies by year*	-	City of San Diego 2015. Draft Urban Forestry Management Plan
Frequency of maintenance (pruning)	*7 years*		Provided by City staff
Greenhouse gases sequestered annually (MT CO_2e/tree)	*Varies by age of tree*	-	City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B; USDA Forest Service 2008. CUFR Tree Carbon Calculator
Useful life	*30 years*	-	USDA Forest Service 2008. CUFR Tree Carbon Calculator

[1]All dollar values are in 2010$

[2]A: Administrator, P: Participant, NP: Non-participant, S: Societal

Energy Policy Initiatives Center, USD 2018

B.16 Measure G-2: Expanded Urban Forestry Program

This report analyzed the benefits and costs of increasing tree canopy within the City of La Mesa by 1,400 acres by 2035. This measure indicates activity will start in 2020. To analyze potential impacts of this measure in 2020, this report assumes the activity begins in 2018 and that an incremental level of activity is achieved each year to achieve the same GHG reductions identified for target year 2035. Actions taken to achieve this goal are estimated to reduce 745 MT CO_2e in 2020.

Participant costs include the capital associated with purchasing, planting, and maintaining trees. Data for the City of Los Angeles was used to estimate the number of trees required to achieve 100% cover over a single acre. Additional participant costs include repairs to infrastructure from tree-related damage and potential liability issues associated with trees (e.g. falling branches). There are no direct, monetary participant benefits identified.

Administrator costs are staffing costs for the City of La Mesa to implement this CAP measure. No non-participant costs are considered; there are no identified rebates or incentives for the City to plant trees. The social cost of carbon is used for externalities in conjunction with reductions in criteria pollutants and storm water treatment associated with trees in urban environments. Emissions reductions were estimated according to calculations in the CAP Appendix B; GHG reductions shown in report tables are *rounded* estimates provided in the CAP, not necessarily the specific estimates identified in CAP Appendix B calculations.

An extended set of CEA and BCA tabular results are provided in Table B31. General data inputs and assumptions are documented in Table B32.

Table B31. Summary Results for Measure G-2 in 2020

G-2: Expanded Urban Forestry Program					
	Administrator	**Participant**	**Non-Participant**	**Measure**	**Society**
Present Value Benefits	-	-	-	-	$14,439
Present Value Costs	($323)	($120,483)	-	($120,807)	($120,807)
Net Present Value	($323)	($120,483)	-	($120,807)	($106,368)
GHGs (MT CO_2e)			**745***		
$/MT CO_2e	($0)	($162)	-	($162)	($143)
BCR	-	-	-	-	0.12
Discounted Payback Period	-	-	-	-	-

*Assumes activity begins early to achieve 2030 target — Energy Policy Initiatives Center, USD 2018

*All dollar values are in 2010$

Table B32. Data Inputs and Assumptions for Measure G-2

G-2: Expanded Urban Forestry Program			
Description	**Input**[1]	**Perspective**[2]	**Source**
Costs			
CAP implementation costs	*Varies by year*	A	Provided by City staff (see CAP Implementation Cost Report)
Purchase and planting ($/tree)	*($197)*	P	Provided by City staff
Annual maintenance ($/tree)	*($63)*	P	Provided by City staff
Water bill increase ($/tree)	*Varies by age*	P	Helix Water District historic and current water
Average annual infrastructure damage cost ($/tree)	*Varies by age*	P	McPherson et al. 2000. Tree Guidelines for Coastal Southern California Communities
Average annual liability and legal cost ($/tree)	*Varies by age*	P	McPherson et al. 2000. Tree Guidelines for Coastal Southern California Communities
Benefits			
NA			
Externalities included			
Social cost of carbon ($/MT CO_2e)	*3% discount rate scenario*	S	US EPA 2016. Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis
Value of avoided criteria pollutants ($/tree)	*Varies by year*	S	McPherson et al. 2000. Tree Guidelines for Coastal Southern California Communities; McPherson et al. 2006 Coastal Plain Community
Rain interception benefits per gallon ($/gal)	*$0.01*	S	McPherson et al. 2000. Tree Guidelines for Coastal Southern California Communities
Other inputs and assumptions			
Number of acres planted annually	*82*	-	Estimated from City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B
Number of tree per acre	*168*	-	USDA Forest Service 2010. Assessing Urban Forest Effects and Values: Los Angeles' Urban Forest
Water demand (gal/tree/yr)	*Varies by year*	-	City of San Diego 2015. Draft Urban Forestry Management Plan
Frequency of maintenance (pruning)	*7 years*	-	Provided by City staff
Greenhouse gases sequestered annually (MT CO_2e/tree)	*Varies by age of tree*	-	City of La Mesa. Oct. 2017 Public Review Draft Climate Action Plan Appendix B; USDA Forest Service 2008. CUFR Tree Carbon Calculator
Useful life	*30 years*	-	USDA Forest Service 2008. CUFR Tree Carbon Calculator

[1]All dollar values are in 2010$

[2]A: Administrator, P: Participant, NP: Non-participant, S: Societal

Energy Policy Initiatives Center, USD 2018

Appendix C. SENSITIVITY ANALYSIS RESULTS

A sensitivity analysis was conducted to understand how the dollar per metric ton of carbon dioxide equivalent ($/MT CO_2e) responds to changes in a key input – the discount rate. Individual measure results shown here are for target year 2020 using a three, five, and seven percent discount rate.

C.1 Measure E-1: Building Retrofit Program

Table C1 displays sensitivity analysis results ($/MT CO_2e) for Measure E-1 in 2020 using a three, five and seven percent discount rate.

Table C1. Sensitivity Analysis for Measure E-1 in 2020 ($/MT CO_2e)

E-1: Building Retrofit Program					
Discount Rate	Administrator	Participant	Non-Participant	Measure	Society
3%	($1)	($147)	($116)	($264)	($232)
5%	($1)	($160)	($126)	($287)	($262)
7%	($1)	($165)	($132)	($297)	($278)

*All dollar values are in 2010$ Energy Policy Initiatives Center, USD 2018

C.2 Measure E-2: Shade Tree Program

Table C2 displays sensitivity analysis results ($/MT CO_2e) for Measure E-2 in 2020 using a three, five and seven percent discount rate.

Table C2. Sensitivity Analysis for Measure E-2 in 2020 ($/MT CO_2e)

E-2: Shade Tree Program					
Discount Rate	Administrator	Participant	Non-Participant	Measure	Society
3%	($2,091)	($490)	-	($2,581)	($1,884)
5%	($1,783)	($410)	-	($2,194)	($1,761)
7%	($1,526)	($350)	-	($1,875)	($1,598)

*All dollar values are in 2010$ Energy Policy Initiatives Center, USD 2018

C.3 Measure E-3: Municipal Energy Efficiency Goal

Table C3 displays sensitivity analysis results ($/MT CO_2e) for Measure E-3 in 2020 using a three, five and seven percent discount rate.

Table C3. Sensitivity Analysis for Measure E-3 in 2020 ($/MT CO_2e)

E-3: Municipal Energy Efficiency Goal					
Discount Rate	Administrator	Participant	Non-Participant	Measure	Society
3%	($70)	$339	($19)	$250	$281
5%	($59)	$232	($17)	$157	$179
7%	($50)	$161	($14)	$97	$113

*All dollar values are in 2010$ Energy Policy Initiatives Center, USD 2018

C.4 Measure E-4: Public Lighting

Table C4 displays sensitivity analysis results ($/MT CO_2e) for Measure E-4 in 2020 using a three, five and seven percent discount rate.

Table C4. Sensitivity Analysis for Measure E-4 in 2020 ($/MT CO_2e)

E-4: Public Lighting					
Discount Rate	Administrator	Participant	Non-Participant	Measure	Society
3%	($16)	$170	-	$154	$189
5%	($13)	$125	-	$112	$142
7%	($11)	$89	-	$78	$104

*All dollar values are in 2010$ Energy Policy Initiatives Center, USD 2018

C.5 Measure E-5: Solar Photovoltaic Program

Table C5 displays sensitivity analysis results ($/MT CO_2e) for Measure E-5 in 2020 using a three, five and seven percent discount rate.

Table C5. Sensitivity Analysis for Measure E-5 in 2020 ($/MT CO_2e)

E-5: Solar Photovoltaic Program					
Discount Rate	Administrator	Participant	Non-Participant	Measure	Society
3%	($1)	$258	($192)	$65	$95
5%	($1)	$146	($181)	($36)	($14)
7%	($1)	$72	($172)	($101)	($84)

*All dollar values are in 2010$ Energy Policy Initiatives Center, USD 2018

C.6 Measure E-6: Solar Hot Water Program

Table C6 displays sensitivity analysis results ($/MT CO_2e) for Measure E-6 in 2020 using a three, five and seven percent discount rate.

Table C6. Sensitivity Analysis for Measure E-6 in 2020 ($/MT CO_2e)

E-6: Solar Hot Water Program					
Discount Rate	Administrator	Participant	Non-Participant	Measure	Society
3%	($69)	($27)	($129)	($224)	($192)
5%	($59)	($39)	($118)	($215)	($191)
7%	($50)	($46)	($108)	($205)	($186)

*All dollar values are in 2010$ Energy Policy Initiatives Center, USD 2018

C.7 Measure E-8: Zero Net Energy Construction

Table C7 displays sensitivity analysis results ($/MT CO_2e) for Measure E-8 in 2020 using a three, five and seven percent discount rate.

Table C7. Sensitivity Analysis for Measure E-8 in 2020 ($/MT CO_2e)

E-8: Zero Net Energy Construction					
Discount Rate	Administrator	Participant	Non-Participant	Measure	Society
3%	($1)	($120)	($81)	($202)	($170)
5%	($1)	($143)	($69)	($212)	($189)
7%	($1)	($150)	($58)	($209)	($192)

*All dollar values are in 2010$ Energy Policy Initiatives Center, USD 2018

C.8 Measure T-1: Bicycle and Pedestrian Infrastructure Development

Table C8 displays sensitivity analysis results ($/MT CO_2e) for Measure T-1 in 2020 using a three, five and seven percent discount rate.

Table C8. Sensitivity Analysis for Measure T-1 in 2020 ($/MT CO_2e)

T-1: Bicycle and Pedestrian Infrastructure Development					
Discount Rate	Administrator	Participant	Non-Participant	Measure	Society
3%	($111)	$68	-	($43)	$24
5%	($95)	$21	-	($73)	($23)
7%	($81)	($7)	-	($88)	($50)

*All dollar values are in 2010$ Energy Policy Initiatives Center, USD 2018

C.9 Measure T-3: Transportation Demand Management Program

Table C9 displays sensitivity analysis results ($/MT CO_2e) for Measure T-3 in 2020 using a three, five and seven percent discount rate.

Table C9. Sensitivity Analysis for Measure T-3 in 2020 ($/MT CO_2e)

T-3: Transportation Demand Management Program					
Discount Rate	Administrator	Participant	Non-Participant	Measure	Society
3%	($25)	$276	($31)	$220	$295
5%	($21)	$229	($26)	$182	$245
7%	($18)	$191	($22)	$151	$204

*All dollar values are in 2010$ Energy Policy Initiatives Center, USD 2018

C.10 Measure T-4: Mixed-Use and Transit-Oriented Development

Table C10 displays sensitivity analysis results ($/MT CO_2e) for Measure T-4 in 2020 using a three, five and seven percent discount rate.

Table C10. Sensitivity Analysis for Measure T-4 in 2020 ($/MT CO_2e)

T-4: Mixed-Used and Transit-Oriented Development					
Discount Rate	Administrator	Participant	Non-Participant	Measure	Society
3%	($51)	$27	-	($24)	$55
5%	($43)	$22	-	($21)	$46
7%	($37)	$19	-	($18)	$38

*All dollar values are in 2010$ Energy Policy Initiatives Center, USD 2018

C.11 Measure T-5: Alternative Refueling Infrastructure Development

Table C11 displays sensitivity analysis results ($/MT CO_2e) for Measure T-5 in 2020 using a three, five and seven percent discount rate.

Table C11. Sensitivity Analysis for Measure T-5 in 2020 ($/MT CO_2e)

T-5: Alternative Refueling Infrastructure Development					
Discount Rate	Administrator	Participant	Non-Participant	Measure	Society
3%	($93)	($20)	($33)	($146)	($100)
5%	($80)	($22)	($28)	($129)	($94)
7%	($68)	($22)	($24)	($114)	($86)

*All dollar values are in 2010$ Energy Policy Initiatives Center, USD 2018

C.12 Measure T-6: Municipal Fleet Transition

Table C12 displays sensitivity analysis results ($/MT CO_2e) for Measure T-6 in 2020 using a three, five and seven percent discount rate.

Table C12. Sensitivity Analysis for Measure T-6 in 2020 ($/MT CO_2e)

T-6: Municipal Fleet Transition					
Discount Rate	Administrator	Participant	Non-Participant	Measure	Society
3%	($947)	$124	-	($823)	($791)
5%	($800)	$84	-	($716)	($692)
7%	($677)	$56	-	($621)	($603)

*All dollar values are in 2010$ Energy Policy Initiatives Center, USD 2018

C.13 Measure W-1: Urban Water Management Plan Programs

Table C13 displays sensitivity analysis results ($/MT CO_2e) for Measure W-1 in 2020 using a three, five and seven percent discount rate.

Table C13. Sensitivity Analysis for Measure W-1 in 2020 ($/MT CO_2e)

W-1: Urban Water Management Plan Programs					
Discount Rate	Administrator	Participant	Non-Participant	Measure	Society
3%	($9)	$863	($226)	$628	$659
5%	($8)	$644	($209)	$427	$453
7%	($7)	$475	($194)	$275	$296

*All dollar values are in 2010$ Energy Policy Initiatives Center, USD 2018

C.14 Measure SW-3: 75% Waste Diversion Strategy

Table C14 displays sensitivity analysis results ($/MT CO_2e) for Measure SW-3 in 2020 using a three, five and seven percent discount rate.

Table C14. Sensitivity Analysis for Measure SW-3 in 2020 ($/MT CO_2e)

SW-3: 75% Waste Diversion Strategy					
Discount Rate	Administrator	Participant	Non-Participant	Measure	Society
3%	($3)	($66)	-	($69)	($35)
5%	($3)	($55)	-	($58)	($29)
7%	($3)	($46)	-	($49)	($25)

*All dollar values are in 2010$ Energy Policy Initiatives Center, USD 2018

C.15 Measure G-1: Urban Forest Management

Table C15 displays sensitivity analysis results ($/MT CO_2e) for Measure G-1 in 2020 using a three, five and seven percent discount rate.

Table C15. Sensitivity Analysis for Measure G-1 in 2020 ($/MT CO_2e)

G-1: Urban Forest Management					
Discount Rate	Administrator	Participant	Non-Participant	Measure	Society
3%	($25)	($125)	-	($149)	($86)
5%	($21)	($94)	-	($115)	($75)
7%	($18)	($73)	-	($91)	($65)

*All dollar values are in 2010$ Energy Policy Initiatives Center, USD 2018

C.16 Measure G-2: Expanded Urban Forestry Program

Table C16 displays sensitivity analysis results ($/MT CO_2e) for Measure G-2 in 2020 using a three, five and seven percent discount rate.

Table C16. Sensitivity Analysis for Measure G-2 in 2020 ($/MT CO_2e)

G-2: Expanded Urban Forestry Program					
Discount Rate	Administrator	Participant	Non-Participant	Measure	Society
3%	($1)	($191)	-	($191)	($161)
5%	($0)	($162)	-	($162)	($143)
7%	($0)	($138)	-	($138)	($125)

*All dollar values are in 2010$ Energy Policy Initiatives Center, USD 2018

— See attached CAP Implementation Cost Report —

CLIMATE ACTION PLAN IMPLEMENTATION COST REPORT

(Appendix D to Cost-Effectiveness and Benefit-Cost Analyses)

A Preliminary Estimate of City of La Mesa Staffing Costs

February 2018

Prepared for the City of La Mesa

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.

Prepared in partnership with the San Diego Association of Governments (SANDAG) and the Energy Roadmap Program. This Program is partially funded by California utility customers and administered by San Diego Gas & Electric Company under the auspices of the California Public Utilities Commission.

Table of Contents

EXECUTIVE SUMMARY

This report summarizes the findings of the City of La Mesa (La Mesa) draft Climate Action Plan (CAP) Implementation Cost Analysis conducted by the Energy Policy Initiatives Center (EPIC) at the University of San Diego. The analysis estimates staffing costs for the activities that would need to be conducted to achieve the GHG emission reduction targets included in the CAP. The goals of this analysis are to:

- develop a preliminary estimate of the total staffing cost to La Mesa to implement GHG reduction measures included in the November 2017 draft version of the CAP over the first five years;
- determine the estimated incremental costs associated with new programs that would not have occurred without the CAP; and,
- determine the estimated staffing impact to implement CAP measures.

While the analysis for this report evaluated costs for the first 5 years, CAP measures could have associated costs beyond the time frame presented here. Data was collected in two parts – for year one and an aggregate total for years two through five. Staffing cost estimates in this report represent those anticipated to be incurred by La Mesa to implement CAP measures. The measures set forth in the CAP can be broken into two broad cost categories. The first category includes the cost of actions to implement measures, including costs to develop and enact ordinances, conduct education and outreach, and install capital improvements. The second category comprises costs associated with CAP administration, including costs to assess the performance of CAP measures annually, complete regular GHG inventory updates, coordinate implementation and performance tracking activities among departments, and prepare a CAP update every five years. Staffing costs associated with both categories are included here.

How cost effectively CAP measures can reduce greenhouse gases and the costs borne by La Mesa residents and businesses are not considered in this report, but will be addressed in a companion Climate Action Plan Cost Effectiveness and Benefit Cost Analyses Report. The results of that analysis will help the public and decision makers compare the relative cost effectiveness of CAP measures to reduce emissions by presenting the net cost of reducing a metric ton of GHG emissions. This allows for a comparison across all measures to determine the most cost-effective strategies. The Climate Action Plan Cost Effectiveness and Benefit Cost Analyses Report also will estimate the financial impacts to homes and business that participate in or comply with CAP measures. These results are presented in a range of metrics, including payback period, benefit-cost ratio, return on investment, and internal rate of return that will also allow for comparison across all CAP measures. This analysis also will take into account the costs incurred by La Mesa to implement and coordinate CAP measures.

Staffing cost results are presented as totals and then the incremental costs associated with new programs that would not have occurred without the CAP. Staffing impacts are shown in full-time equivalent (FTE) and are presented both as the total staffing level needed to conduct the anticipated tasks and as the incremental staffing needs.

Key Findings

The following key findings summarize the results of the analysis conducted for this report.

Total Staffing Costs Would be $2.7 Million over the First Five-Year Period

Estimated staffing costs to implement CAP measures over the first five years would be $2.7 million, about $1 million in year one and $1.7 million in years two through five, about $417,000 annually during the final four years of the analysis period. (Table 3).

Table 3 Staffing Cost to Implement the CAP

	Year 1	Years 2-5	Total	% of Total
Total Cost	$1,031,000	$1,669,000	$2,701,000	100%
Existing Programs	$221,000	$314,000	$535,000	20%
New Programs	$810,000	$1,355,000	$2,165,000	80%

Most Staffing Costs are Associated with New Programs

Of the 24 measures in the CAP, 19 include new activities that would be implemented only as a result of the CAP. About 80% of total staffing costs to implement the CAP ($2.2 million) are associated with new measures that would not have been implemented without the CAP (Table 3 above). This amount represents the incremental staffing cost to implement CAP measures.

While most staffing costs are associated with new programs, the CAP integrates existing programs. Seven CAP measures include existing activities that would have been implemented regardless of CAP adoption, including Public Lighting (E-4), Urban Forest Master Plan (GI-1), Construction and Demolition Waste Diversion Program (SW-2), Bicycle and Pedestrian Infrastructure Development (T-1), Bicycle Safety Outreach Program (T-2), Mixed-Use and Transit-Oriented Development (T-4), and Water Sensitive Landscape Design and Irrigation (W-2). These programs represent an estimated total staffing cost of $535,000 for first five years of CAP implementation, about 20% of total staffing costs (Table 3 above).

Additional Staffing Capacity May be Needed to Implement CAP Measures

A total of about 6 FTE would be needed to implement the CAP over the first five years. Of this total, just over 1 FTE are associated with existing programs and 5 FTE with new programs (Table 4 below). While overall staffing capacity may be sufficient to accommodate additional CAP implementation activities over the first five years, two positions are significantly affected in the first year. The Associate Planner position in the Community Development Department would require a total of 2.6 FTE over the first five years of CAP implementation – 1.8 FTE in year one an additional 0.8 FTE over the final four years. The Associate Engineer position in the Public Works Department would require a total of 1.9 FTE -- 0.9 in year one and an additional 1 FTE over the final four years. Additional staffing or other resources may be needed in year one to supplement these two positions.

Table 4 Staffing Impact (FTE) to Implement CAP Measures

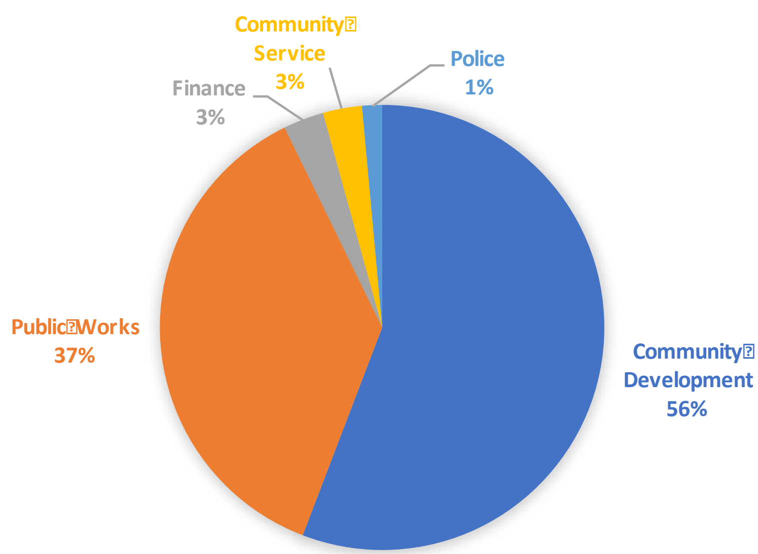
	Year 1	Years 2-5*	Total
Total Staffing	3.7	6.2	N/A
Incremental Staffing	3.7	2.5	6.2
Existing Programs	0.8	0.4	1.2
New Programs	2.9	2.1	5.0

*Values represent the total FTE needed over the four year period.

Most Costs are in the Community Development and Public Works Departments

The Community Development Department would represent 56% of total staffing costs to implement CAP measures over the first five years, followed by Public Works with 37%. These two Departments would account for over 90% of all staffing costs (Figure 8).

Figure 8 Total Personnel Expenses by Department (Years 1-5)



Within these two departments, two positions would represent about 70% of total personnel costs associated with CAP implementation. The Associate Planner position in the Community Development Department would have the highest estimated total staffing costs over the first five years of CAP implementation with nearly $1.2 million (44% of total costs). Of the total for this position, about $490,000 would occur in year one and $706,000 over the final four years, or an average of about $176,000 annually over this period. The Associate Engineer position in the Public Works Department would have the second highest staffing cost with $667,000 (25% of total costs). About $220,000 of these costs would occur in the first year and $447,000 in years two through five.

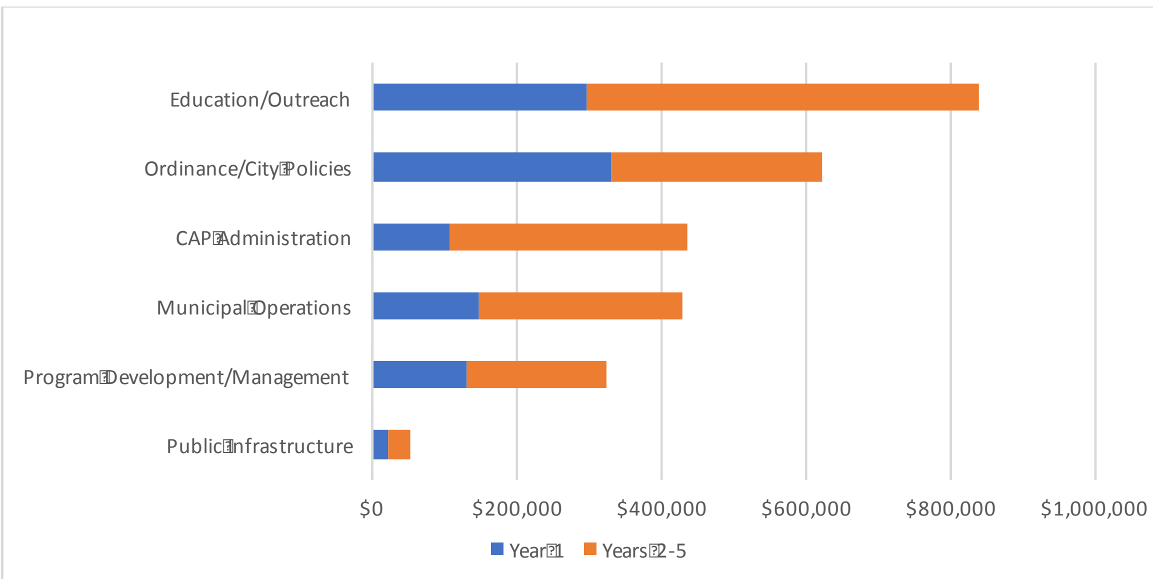
Two CAP Measures Account for One Quarter of Total Staffing Costs

Two measures in the Transportation Strategy would represent about 25% of total estimated staffing costs: Mixed-Use and Transit-Oriented Development (T-4) would have the highest estimated staffing cost with about $360,000 (13% of total costs), followed by Alternative Refueling Infrastructure Development (T-5) with 286,000 (11%). Costs for these two measures are roughly equal in the first year and the next four years of CAP implementation.

Activities Related to Education and Outreach Have the Highest Staffing Costs

Education and outreach activities would have the highest staffing cost at $839,000 over the five-year period, about 30% of total costs (Figure 9). Activities to develop or change La Mesa's ordinances or other city policies would account for about $621,000, or 23% of total costs. CAP Administration, including inventory updates, monitoring, and CAP updates, would require $436,000 (16%). These three categories of CAP implementation activities would account for about 70% of total staffing costs.

Figure 9 Total CAP Implementation Costs by Activity Type



Next Steps and Recommendations

Understanding the incremental staffing impacts is an important step in determining the cost of implementing the CAP; however, several additional steps could complement this analysis to provide a more comprehensive cost estimate.

- **Distinguish between Existing Staff Capacity and Needed Capacity** – The incremental cost and effort totals provided here are the total estimated necessary to implement the Actions identified in the draft CAP. Results do not distinguish between work that could be completed by existing staffing capacity and what additional staffing capacity would be needed. An important next step would to determine how much (if any) of the estimated work load for CAP implementation and administration could be done by existing staff and how much (if any) additional capacity (new positions or supplemental resources) would be needed to implement CAP measures.

- **Consider a CAP Administrator Role or Position** - Given the coordination and collaboration necessary to implement many of the CAP Actions, La Mesa may want to consider developing a CAP administrator role as a stand-alone position or as part of the job description of a current position.

- **Refine Estimate for Non-Staffing Costs** – Additional analysis would be needed to develop a more comprehensive estimate for consulting services, supplies and materials, and capital expenditures to implement CAP measures. Staff estimates that about $100,000 in supplies and materials would be necessary to implement the CAP in the first five years. It also estimated that costs to conduct a feasibility study for Community Choice Aggregation could cost between $150,000 and $250,000, depending on how the analysis was conducted. Another important aspect of assessing the cost to the City are the incremental capital costs associated with CAP implementation. City of La Mesa could evaluate these costs to determine future budget impacts.

- **Identify Funding Sources and Needs of New Programs** – Once all incremental costs are identified, understanding which programs are currently funded or have identified funding sources and which programs are unfunded or do not have identified funding sources could help to link the CAP cost analysis to La Mesa's budgeting process. Identifying current funding sources and the amount of additional funds that might be needed for new programs can help to develop a comprehensive view of CAP implementation costs.

1 INTRODUCTION

This report summarizes the findings of the City of La Mesa (La Mesa) Climate Action Plan (CAP) Implementation Cost Analysis conducted by the Energy Policy Initiatives Center (EPIC) at the University of San Diego. The analysis estimates costs for the activities that would need to be conducted to achieve the GHG emission reduction targets included in the CAP. The goals of this analysis are to:

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- determine the estimated staffing impact to implement CAP measures.

While the analysis for this report evaluated costs for the first 5 years, CAP measures could have associated costs beyond the time frame presented here. Data was collected in two parts – for year one and an aggregate total for years two through five. Staffing cost estimates in this report represent those anticipated to be incurred by La Mesa to implement CAP measures. The measures set forth in the CAP can be broken into two broad cost categories. The first category includes the cost of actions to implement measures, including costs to develop and enact ordinances, conduct education and outreach, and install capital improvements. The second category comprises costs associated with CAP administration, including costs to assess the performance of CAP measures annually, complete regular GHG inventory updates, coordinate implementation and performance tracking activities among departments, and prepare a CAP update every five years. Staffing costs associated with both categories are included here.

How cost effectively CAP measures can reduce greenhouse gases and the costs borne by La Mesa residents and businesses are not considered in this report, but will be addressed in a companion Climate Action Plan Cost Effectiveness and Benefit Cost Analyses Report. The results of that analysis will help the public and decision makers compare the relative cost effectiveness of CAP measures to reduce emissions by presenting the net cost of reducing a metric ton of GHG emissions. This allows for a comparison across all measures to determine the most cost-effective strategies. The Climate Action Plan Cost Effectiveness and Benefit Cost Analyses Report also will estimate the financial impacts to homes and business that participate in or comply with CAP measures. These results will be presented in a range of metrics, including payback period, benefit-cost ratio, return on investment, and internal rate of return that will also allow for comparison across all CAP measures. This analysis also will take into account the costs incurred by La Mesa to implement and coordinate CAP measures.

Staffing cost results are presented as totals and then the incremental costs associated with new programs that would not have occurred without the CAP. Staffing impacts are shown in full-time equivalent (FTE) and are presented both as the total staffing level needed to conduct the anticipated tasks and as the incremental staffing needs.

1.1 Organization of Report

Section 2 of the report provides an overview of the CAP implementation cost analysis. The costs evaluated for this analysis are described in Section 3, including a brief discussion of other costs like consultants, supplies and materials, and other analysis required for certain CAP measures. The results for the estimated staffing costs required to implement CAP measures are presented in Section 4. The staffing impacts – presented in full-time equivalents (FTE) – are summarized in Section 5. A discussion of the limitations of this analysis is included in Section 6 and a brief conclusion and summary of possible next steps is provided in Section 7.

2 CAP IMPLEMENTATION COST ANALYSIS OVERVIEW

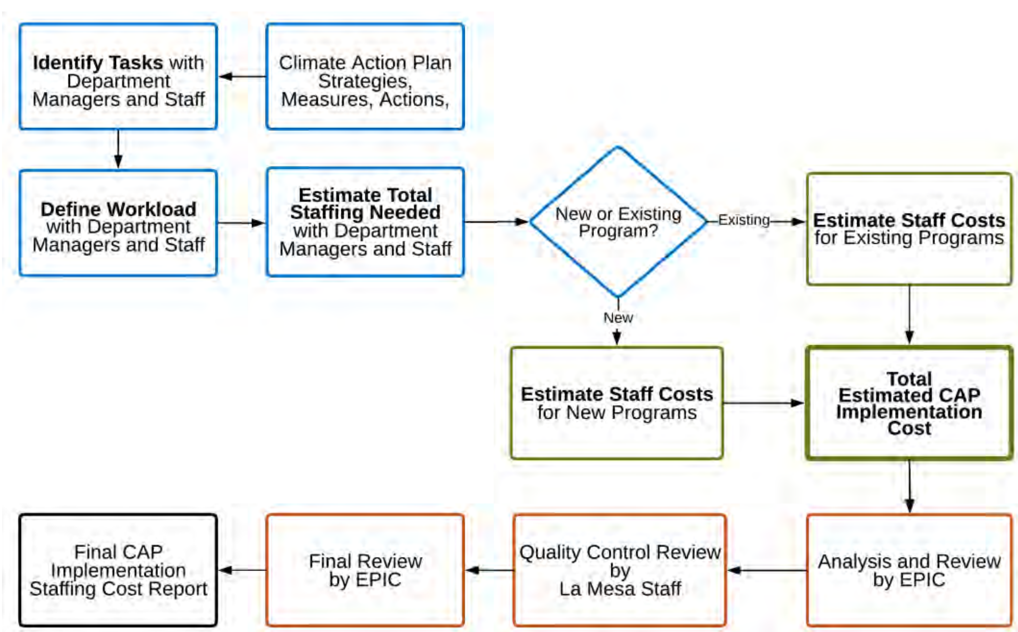
This report estimates staffing costs anticipated during the first five years of CAP implementation. The staffing costs presented are estimates based on input and discussions with La Mesa staff that would be involved in its implementation. The costs are based on the best available information and will help each of these departments develop budgets moving forward. To account for changes in CAP implementation activities, cost, and staffing impacts, the estimates included can be updated in the future in concert with regular CAP monitoring and updating efforts. This would provide sufficient time to better understand how implementation activities may actually occur and it would allow for synchronization with the La Mesa's budget process.

The following sections summarize the process used to estimate CAP Implementation Costs and the overall framework used to identify and evaluate costs.

2.1 Process to Estimate CAP Implementation Costs

The general steps in the process to estimate CAP implementations costs were to: (1) determine the tasks required to implement CAP actions; (2) define workload associated with these tasks; (3) determine whether existing staffing levels and other resources are sufficient; and (4) determine the level of additional staffing and other resources that might be required above and beyond existing resources. Figure 10 illustrates the general process used to identify resource gaps (blue boxes), estimate the cost of those resources (green boxes), compile results, conduct a review, and update appropriate La Mesa staff (orange boxes).

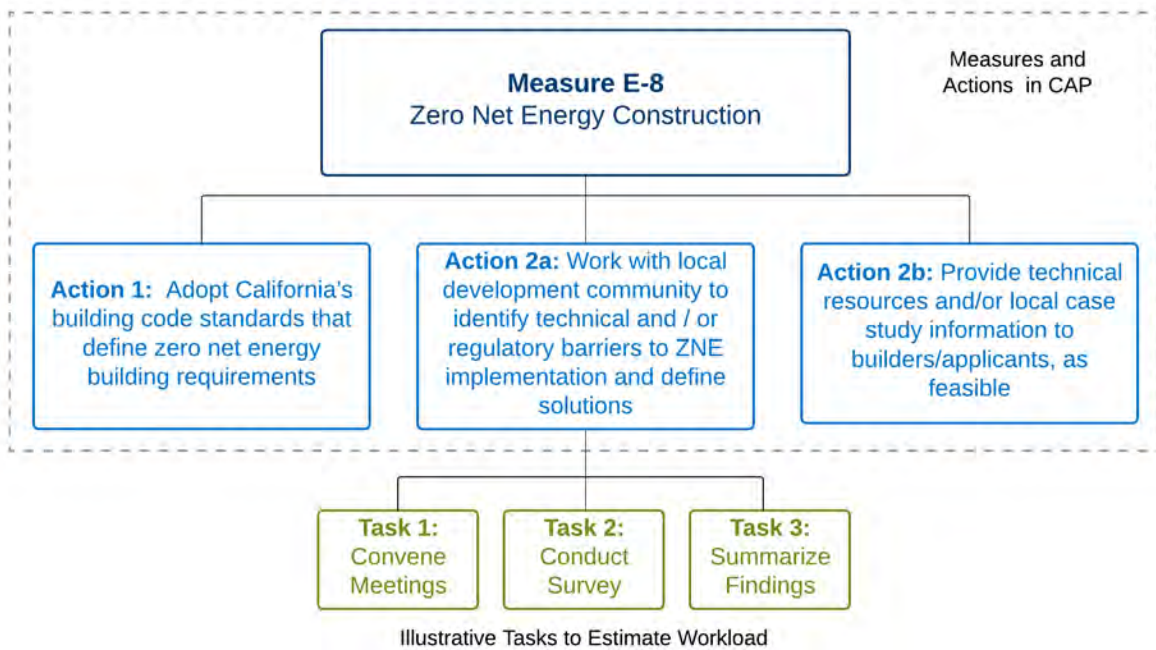
Figure 10 Process to Develop CAP Implementation Staffing Cost Estimate



2.1.1 Identify Climate Action Plan Tasks

The first step was for La Mesa staff to identify tasks to represent the expected workload. The CAP comprises measures that include specific programs, policy actions, and associated tasks that will be implemented to reduce GHG emissions. To better understand the potential workload and more accurately estimate associated costs, La Mesa staff identified preliminary tasks for each action. Figure 11 illustrates the relationship between the CAP measures, actions, and examples of implementation tasks.

Figure 11 Hierarchy of Measures, Actions, and Example Tasks



2.1.2 Establish Preliminary Cost Estimates

Once the tasks were identified, La Mesa staff developed estimates for staffing cost to conduct the tasks necessary to implement CAP actions. To facilitate and standardize the collection of implementation cost data provided by La Mesa staff, EPIC created a data collection template. La Mesa staff and EPIC conducted meetings with department managers and staff representatives to further discuss cost estimates and cost data collection.

The cost estimates presented in this study reflect the staffing costs to implement the draft CAP released in November 2017. The cost estimates are based on assumptions about the work effort needed to implement the draft CAP actions. If the final CAP includes new or altered measures, implementation costs would be different from those reported here and would need to be adjusted.

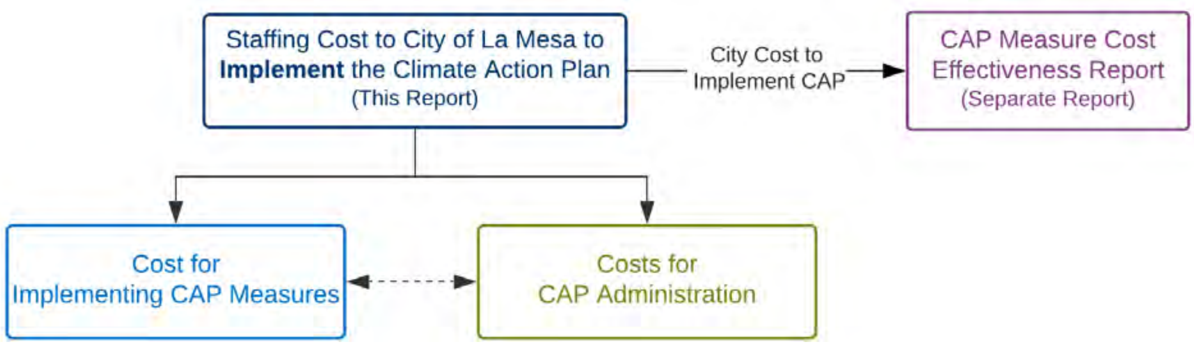
2.1.3 Quality Control and Update to Departments

Quality control and data validation occurred at several stages. Primary validation occurred after total estimated costs were collected. EPIC and La Mesa staff then performed an internal quality control check, updated key managers, and reviewed costs with department managers and staff. Based on this initial review, some costs components were updated to create consistency across all departments and to create a complete data set. La Mesa staff also conducted a detailed consistency check to ensure internal cost reporting consistency. EPIC conducted a final review of all costs prior to inclusion in this report.

3 COSTS EVALUATED

The analysis for this report estimates the staffing cost to implement CAP measures and actions. Because there is limited information about the specific tasks that would be required to implement the CAP actions, the estimates presented here are based on assumptions about the work to be performed. While the City should anticipate a range of potential incremental costs to implement the CAP, this report focuses mainly on staffing costs. Two broad types of staffing costs are considered: those incurred to implementing programs and activities related to CAP measures (e.g., education and outreach, ordinance development, conducting retrofits on city facilities), and those related to overall CAP administration. Figure 12 demonstrates the two main components of the staffing cost estimate included in this report.

Figure 12 City of La Mesa Climate Action Plan (CAP) Implementation Costs



How cost effectively CAP measures can reduce greenhouse gases and the costs borne by La Mesa residents and businesses are not considered in this report, but will be addressed in the Climate Action Plan Cost Effectiveness and Benefit Cost Analyses Report. The results of that analysis will help the public and decision makers compare the relative cost effectiveness of CAP measures to reduce emissions by presenting the net cost of reducing a metric ton of GHG emissions. This allows for a comparison across all measures to determine the most cost-effective strategies. The Climate Action Plan Cost Effectiveness and Benefit Cost Analyses Report also estimates the financial impacts to homes and business that participate in or comply with CAP measures. These results are presented in a range of metrics, including payback period, benefit-cost ratio, return on investment, and internal rate of return that also allow for comparison across all CAP measures. This analysis also considers the costs incurred by La Mesa to implement and coordinate CAP measures.

3.1 Personnel

The staffing costs and impact (FTE) presented in this report are estimates of the time needed to implement the activities associated with CAP actions, some of which are existing programs and some are new activities to La Mesa. The staffing cost results represent total staff costs and do not make any assumptions about whether the effort is performed by existing staff or would require additional staff. Further analysis would be required to determine this.

Several key assumptions were used in determining personnel costs. Hourly rates from the current fiscal year are used for all cost estimated across the five-year period. Also, to convert hours to full-time equivalents (FTE), 2,080 hours is considered full-time. In order to determine costs for certain

Environmental Services programs, we have used the fully burdened rate for administrative analyst II position. This position is currently vacant, but would need to be filled in order to implement any new environmental services programs.

3.2 Consultants

This analysis focused on staffing costs and did not include any specific analysis of potential consultant costs. Many resources exist in the San Diego region to support all aspects of the climate planning cycle. The City could rely on technical assistance and guidance from SANDAG's Energy Roadmap Program, which provides energy efficiency support and is in the process of creating a regional framework for climate action planning and plans to support specific climate action planning efforts.[19] Other organizations, including the San Diego Regional Climate Collaborative, Center for Sustainable Energy, and SDG&E provide services and have materials that could be used to support CAP implementation.

There are CAP Measures for which further analysis is required to determine potential need for consulting services. For example, the City could consider whether consultant services are required to develop an Urban Forest Master Plan (a long-term action) and a feasibility study for a Community Choice Aggregation program. Such studies typically cost in the range of about $150,000 to $250,000. Also, there has been discussion of sharing the services of an Urban Forester and Ombudsman with other neighboring jurisdictions in the region.

3.3 Other Costs

No specific data was collected to estimate the level of other costs, including materials, supplies, printing, etc. Staff estimates that an amount of about $100,000 could be reasonable for the first five-year implementation period. This amount was not allocated to departments or CAP Measures, but is provided here as a preliminary estimate. Also, no capital or other equipment costs are included in this analysis.

[19] This project and the associated work was funded by the SANDAG Energy Roadmap Program's Climate Planning Services.

4 RESULTS – STAFFING COSTS

This section presents the results of the La Mesa CAP Implementation Cost Analysis and answers the question: **What are the staffing costs to La Mesa to implement the CAP over the first five years?** It presents an overall summary of staffing costs for new and existing programs for year one and years two through five and summarizes results by La Mesa department, staff position, CAP measure, and CAP activity type. Detailed results are provided for totals and the incremental portion associated with new programs.

Table 5 summarizes the estimated staffing costs related to CAP implementation. The total staffing costs to implement CAP actions for the first five years is estimated to be $2.7 million. Of this total, $535,000 (20%) is for staffing costs related to existing programs that would have been implemented regardless of CAP adoption. About $2.2 million (80%) is associated with the staffing needs for new programs that would not have been implemented without the CAP. This amount would represent the incremental staffing cost to implement CAP actions. About 37% of these costs ($810,000) would be incurred in the first year and reflects the start-up nature of CAP activities.

Table 5 Personnel Cost and Effort to Implement the CAP

	Year 1	Years 2-5	Total	% of Total
Total Cost	$1,031,000	$1,669,000	$2,701,000	100%
Existing Programs	$221,000	$314,000	$535,000	20%
New Programs	$810,000	$1,355,000	$2,165,000	80%

4.1 Staffing Costs by Department

The La Mesa Implementation Cost analysis estimated incremental costs for each affected department to illustrate how CAP staffing costs and workload would be distributed across the La Mesa organizational structure.

4.1.1 Total Staffing Costs by Department

The highest percentage of total estimated incremental costs for CAP implementation are in the Community Development Department, which represents about 56% of total costs, followed by Public Works, with about 37% (Figure 6). These two departments represent about 93% of all staffing costs. Measure T-4 to promote Mixed-Use and Transit-oriented Development represents about 25% of the total staffing costs for the Community Development Department. The Shade Tree Program (E-2) represents about 17% of the total staffing costs for Public Works Department, followed by Municipal Fleet Transition and Bicycle and Infrastructure Development (T-1), each of which represent 11% of total costs.

Figure 13 Total Staff Cost by Department (Years 1-5)

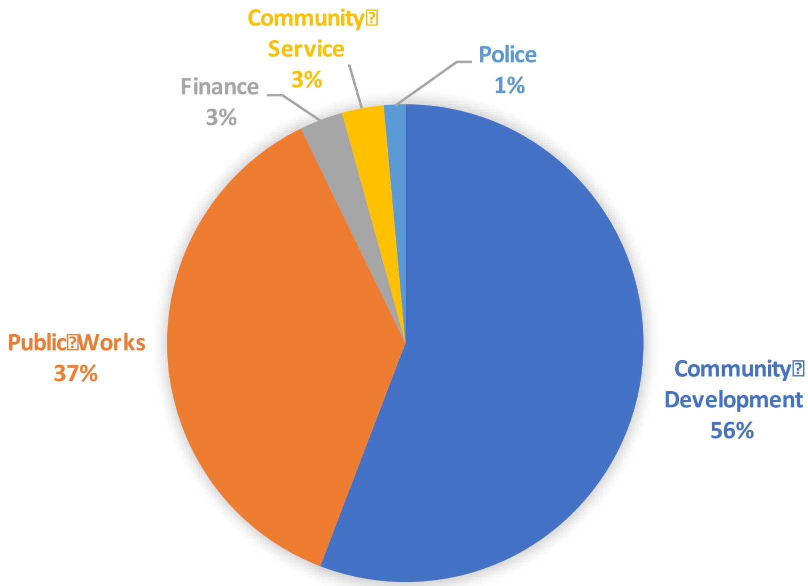
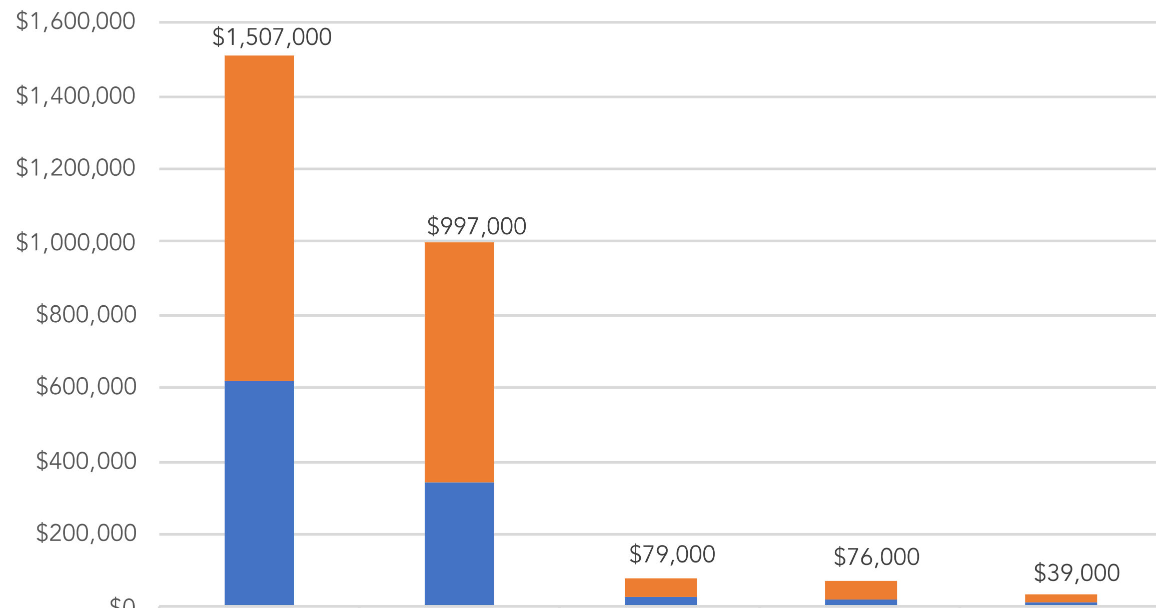


Figure 14 shows the total staffing cost results presented highest to lowest and by year one and years two through five.

Figure 14 Total Personnel Cost to Implement the CAP by Department

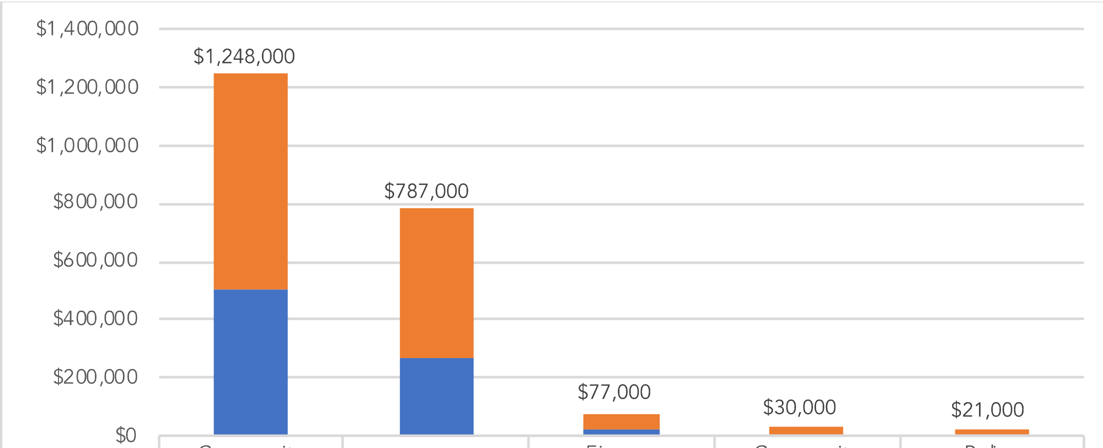


	Community Development	Public Works	Finance	Community Service	Police
Years 2-5	$884,000	$656,000	$50,000	$51,000	$27,000
Year 1	$623,000	$341,000	$29,000	$25,000	$11,000
Total	$1,507,000	$997,000	$79,000	$76,000	$39,000

4.1.2 Incremental Staffing Costs by Department

Figure 15 presents total staffing cost by department over the first five years of CAP implementation. Community Development and Public Works also represent about 94% of incremental staffing costs. Community Development has an incremental staffing cost of about $1.2 million, about 58% of incremental costs over the first five years of CAP implementation. Three measures represent about 45% of the incremental staffing costs for Community Development: Alternative Refueling Infrastructure Development (T-5) with 16%, Building Retrofit Program (E-1) with 16%, and CAP Implementation and Monitoring (I-2) with 13%. Incremental staffing costs for Public Works is about $787,000 over the same period, representing 36% of incremental costs. Similarly, three measures represent about 50% of the incremental staffing costs for Public Works: Shade Tree Program (E-2) with 22%, Municipal Fleet Transition (T-6) with 14%, and Municipal Energy Efficiency Goal (E-3) with 13%.

Figure 15 Incremental Personnel Cost to Implement the CAP by Department (Years 1-5)



	Community Development	Public Works	Finance Department	Community Service	Police Department
Years 2-5	$748,000	$518,000	$50,000	$25,000	$12,000
Year 1	$500,000	$268,000	$26,000	$5,000	$8,000
Total	$1,248,000	$787,000	$77,000	$30,000	$21,000

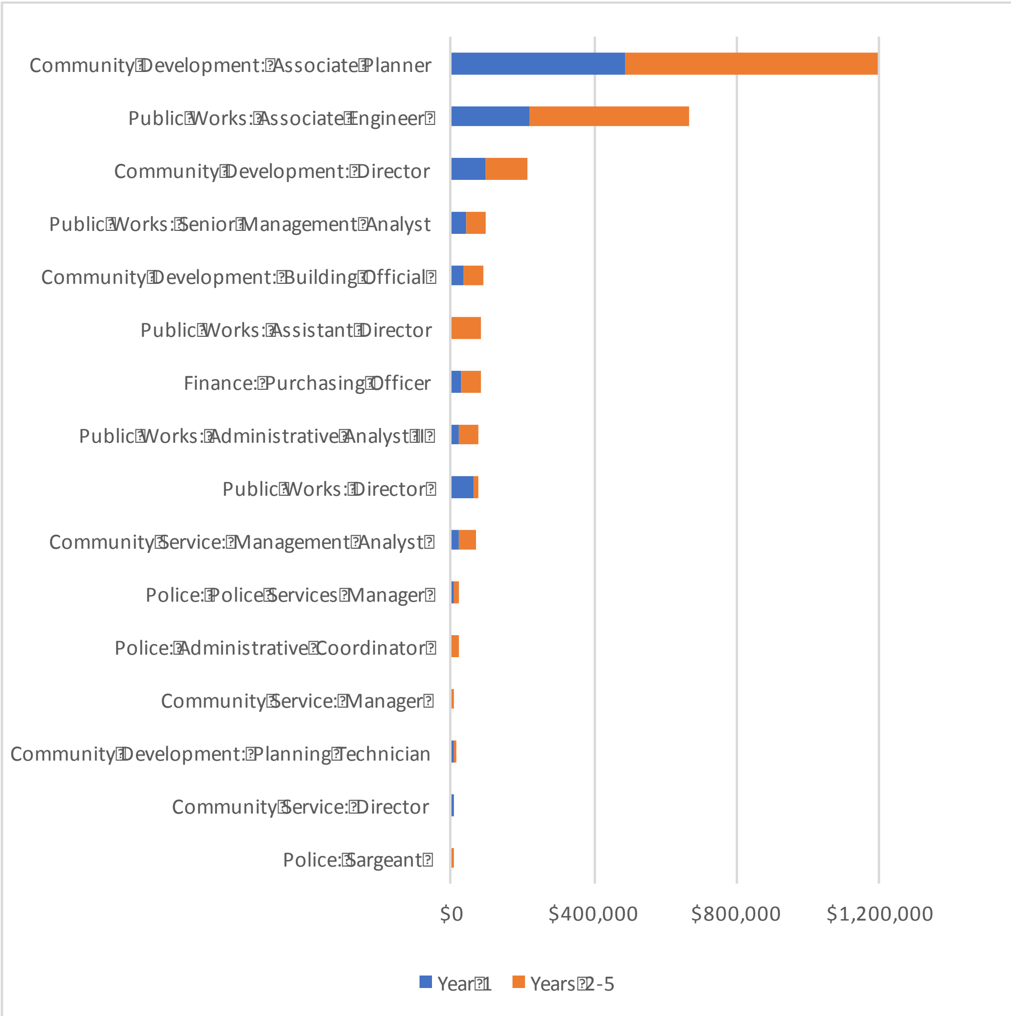
4.2 Staffing Costs by Staff Position

This section summarizes results by staff position to provide a more granular perspective that allows for personnel planning associated with CAP implementation. It provides further detail for total costs and the incremental portion associated with new programs.

4.2.1 Total Staffing Costs by Position

The Associate Planner position in the Community Development Department would have the highest estimated total staffing costs over the first five years of CAP implementation with nearly $1.2 million (44% of total costs). Of the total for this position, about $490,000 would occur in year one and $706,000 over the final 4 years, or an average of about $176,000 annually over this period. The Associate Engineer position in the Public Works Department would have the second highest staffing cost with $667,000 (25% of total costs). About $220,000 of these costs would occur in the first year and $447,000 in years two through five. These two positions account for about 70% of total personnel costs associated with CAP implementation. Figure 16 shows the estimated cost by staff position for each La Mesa department.

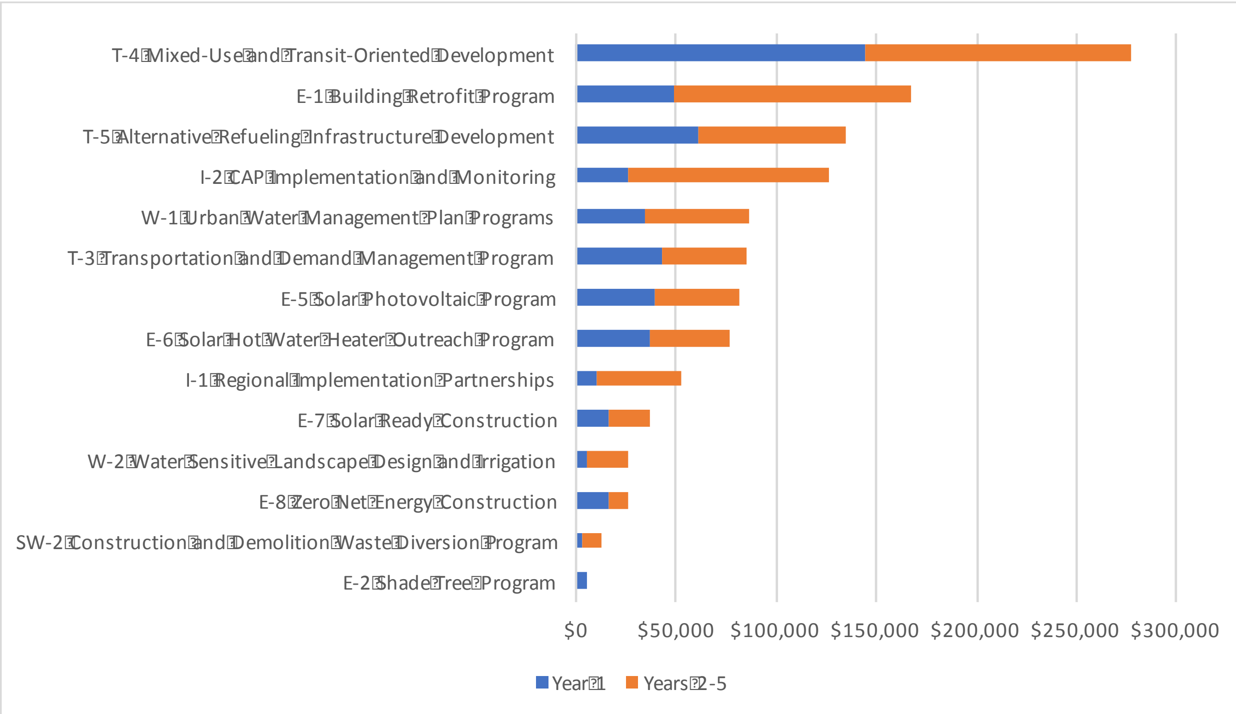
Figure 16 Total Staff Cost by Position



4.2.1.1 Total Cost for the Associate Planner Position by CAP Measure

Work associated with four CAP measures would account for about 60% of the total staffing cost for the Associate Planner position in the Community Development Department: Mixed-Use and Transit-Oriented Development (T-4) with about $277,000 or 23% of total costs for this position, Building Retrofit Program (E-1) with about $167,000 or 14%, Alternative Refueling Infrastructure Development (T-5) with about $134,000 or 11%, and CAP Implementation and Monitoring (I-2) with about $126,000 or 11% (Figure 17).

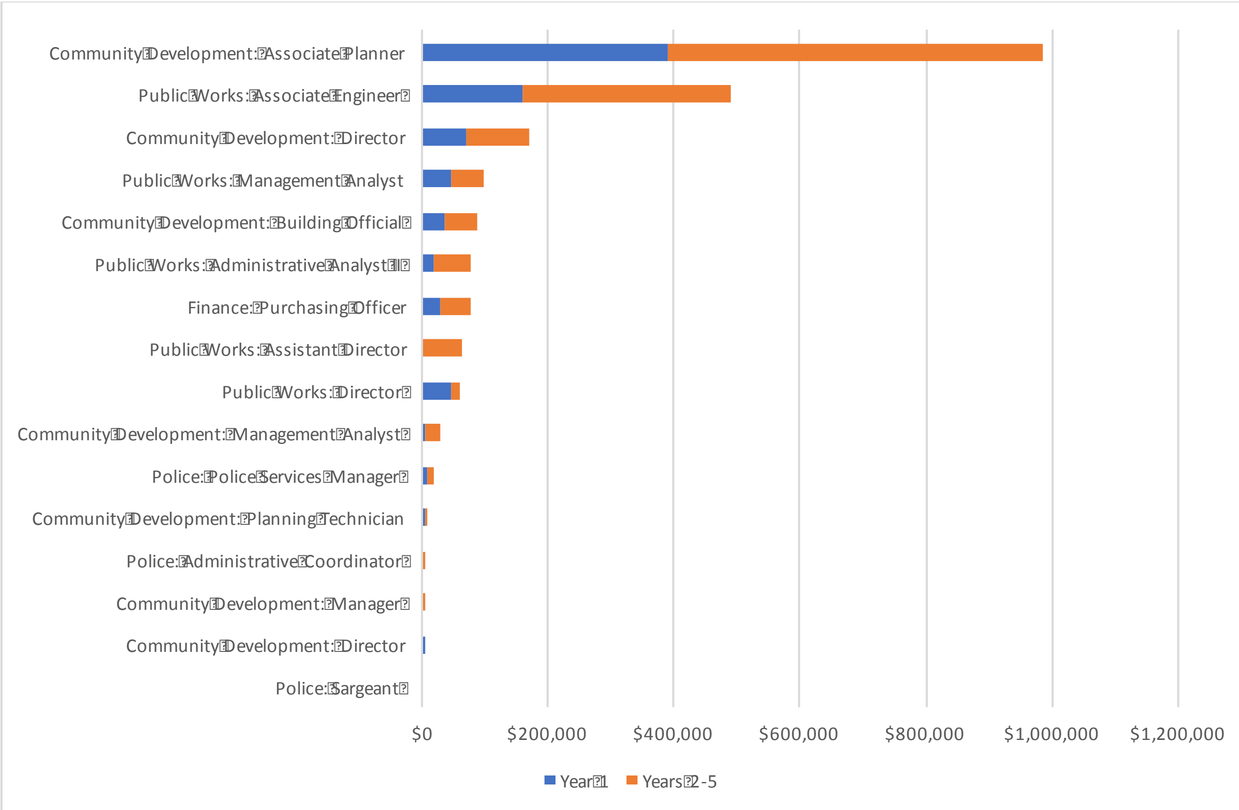
Figure 17 Total Cost for the Associate Planner Position by CAP Measure



4.2.2 Incremental Staffing Cost by Position

The Associate Planner position in the Community Development Department and the Associate Engineer position in the Public Works Department also would have the highest estimated incremental staffing cost associated with CAP implementation. The Associate Planner position would have new costs of nearly $985,000 million over five years - $390,000 in year one and $596,000 over the next four years, an average of about $150,000 annually during that period. Total estimated incremental staffing costs for this Associate Planner represent about 80% of the total CAP implementation costs for this position. The Associate Engineer position in the Public Works Department would have the next highest estimated incremental cost total of about $490,000 in the first five years of CAP, with $160,000 in the first year and $330,000 during the final four years, an average of about $82,000 during that period. Figure 18 summarizes the incremental staffing costs by position. Similar to total staffing costs, the incremental staffing costs associated with these two positions represent about 70% of new costs that would not have occurred without the CAP.

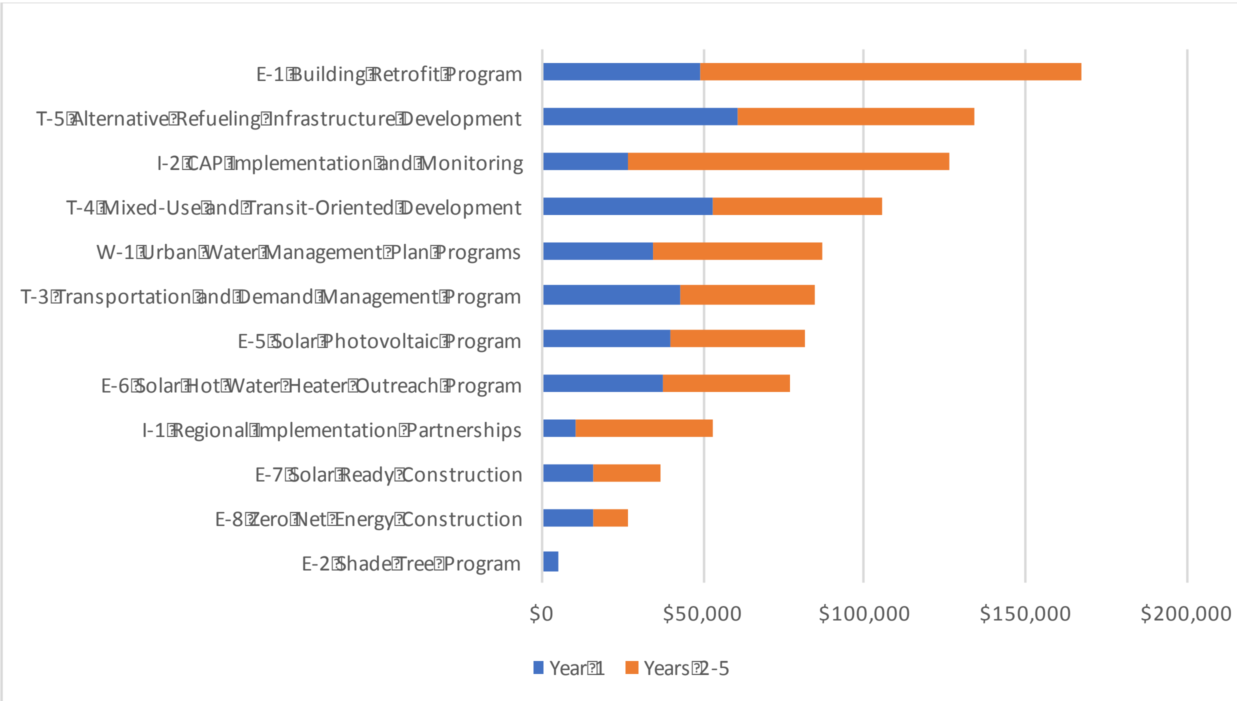
Figure 18 Incremental Staff Cost by Staff Position



4.2.2.1 Incremental Cost for the Associate Planner Position by CAP Measure

Figure 19 shows the CAP measures with the highest incremental staffing costs for the anticipated work of the Associate Planner Position in the Community Development Department. Work to complete the tasks for the Building Retrofits Program (E-1) has the highest incremental staffing costs and represents about 17% of the incremental costs associated with this position. The next three measures with the highest incremental staffing cost would be Alternative Refueling Infrastructure Development (T-5) (14%), CAP Implementation and Monitoring (I-2) (13%), Mixed-Use and Transit-Oriented Development (T-4) (11%). The top four measures represent about 55% of total incremental costs for the Associate Planner position.

Figure 19 Incremental Cost for the Community Development Associate Planner Position by CAP Measure



4.3 Staffing Costs by CAP Measure

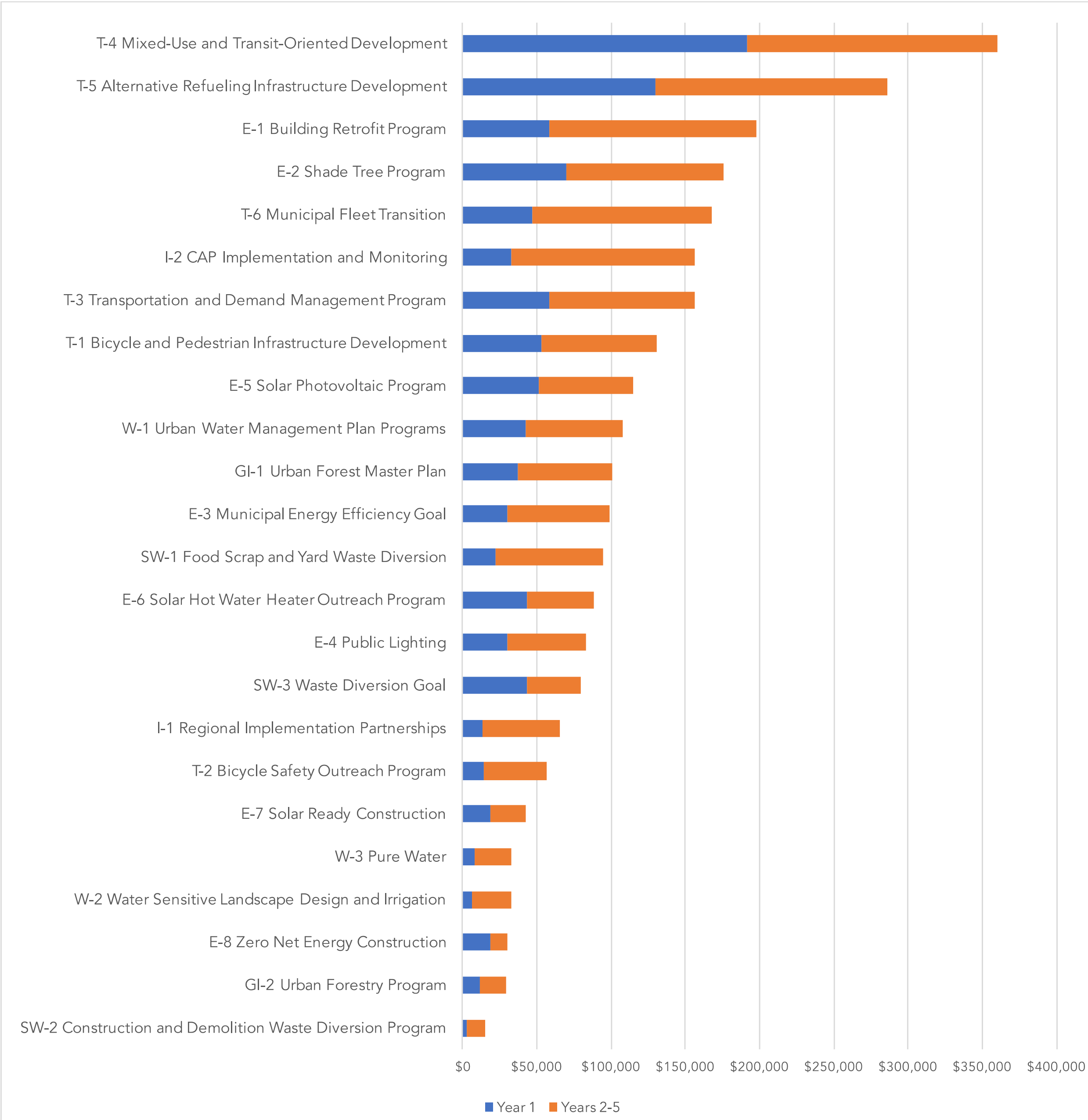
The CAP implementation cost analysis also determined the total cost and staffing impact for each CAP measure. The sections below provide further detail for total costs and the incremental portion associated with new programs.

4.3.1 Total Staffing Costs by CAP Measure

Figure 20 presents the estimated total staffing costs to implement each CAP Measure in year one and years two through five. Two measures in the Transportation Strategy represent about 25% of total estimated staffing costs: Mixed-Use and Transit-Oriented Development (T-4) has the highest estimated staffing cost with about $360,000 (13% of total costs), followed by Alternative Refueling Infrastructure Development (T-5) with 286,000 (11%). Costs for these two measures are roughly equal in the first year and the next four years of CAP implementation.

The next two measures with the highest staffing costs are both from the Energy Strategy and represent about 14% of total costs: Building Retrofit Program (E-1) with $197,000 (7%) and Shade Tree Program (E-2) with about $175,000 (7%).

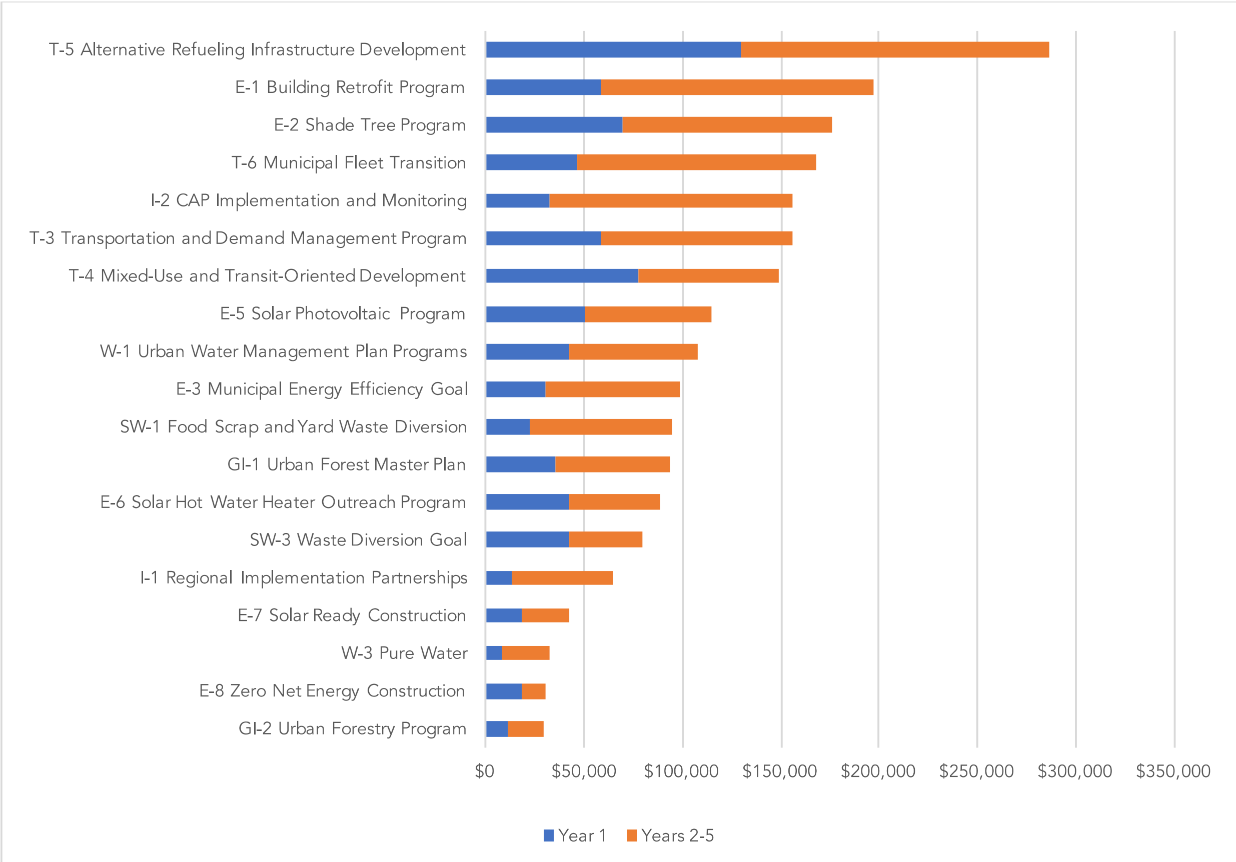
Figure 20 Total Staff Costs by CAP Measure



4.3.2 Incremental Staffing Costs by CAP Measure

Figure 21 summarizes the incremental staffing costs associated with new programs that would not be implemented without the CAP. Three measures account for about one third of incremental staffing costs: Alternative Refueling Infrastructure Development (T-5) with $286,000 (13% of incremental costs), Building Retrofit Program (E-1) with $197,000 (9%), and Shade Tree Program (E-2) with $175,000 (8%).

Figure 21 Incremental Personnel Cost by CAP Measure



4.4 Staffing Costs by Activity Type

Estimated staffing costs can be broken down by type of CAP activity. Since many CAP Measures cross departments, grouping them by activity type provides an organizational structure that could increase efficiencies when implementing the draft CAP. Also, this breakdown of activities also can frame discussion of the need for and role of a position to coordinate CAP implementation, cross-departmental efforts, and reporting.

4.4.1 Activity Types

Activities and tasks associated with CAP action can be grouped together by function or type to better understand how activities cut across positions or CAP Measures and to increase efficiency. CAP measures and actions were categorized into the following activity types.

- CAP Administration
- Education and Outreach
- Municipal Operations
- Ordinances/City Policies
- Program Development/Management
- Public Infrastructure

4.4.1.1 CAP Administration

Draft CAP Measure I-1 Regional Implementation Partnerships and I-2 CAP Implementation and Monitoring include tasks and activities that are traditionally seen as related to the overall administration of the CAP, including regional collaboration, monitoring and reporting, and updating the CAP. The following Measures and Actions are of activities in the CAP Administration category

- I-1 Action 1a – Collaborate with other Local Governments and SANDAG
- I-1 Action 2a – Partner with other Local Governments to Implement Programs
- I-2 Action 1a – Prepare Annual CAP Implementation Report
- I-2 Action 2a – Prepare Emissions Inventory Update Every 2 Years
- I-2 Action 3a – Monitor CAP Measure Progress
- I-2 Action 4a – Amend CAP Every 5 Years

In addition, there are other Actions in the draft CAP that are not direct administration of the CAP but include activities that are similar in nature and were considered administrative in nature for purposes of categorizing costs and efforts. The following Actions provide examples.

- E-1 Action 5a – Develop partnership and plan with SDG&E and PACE Providers
- E-3 Action 4a – Leverage San Diego Regional Climate Collaborative and SANDAG Energy Working Group for Sharing Local Successes
- E-4 Action 3a – Use Energy Roadmap Program and Partner with SDG&E for Rebates or On-bill Financing
- SW-2 Action 2a - Participate in Regional Waste Diversion Discussions
- T-4 Action 4a - Work with SANDAG to Enhance Local Transit Service Options
- T-5 Action 6a - Partner with SANDAG, SDAPCD, and Other Area Jurisdictions to Explore Cost-Effective Ways to Increase Alternative Vehicle Charging
- T-5 Action 7a - Participate in Regional Discussions with SANDAG and SDG&E on Technical Aspects of Alternative Refueling Strategies

4.4.1.2 Education and Outreach

Many CAP Measures and Actions call for education and public outreach. Also, any CAP Actions that would develop and enact an ordinance, also would require significant public outreach and education efforts. Many educational and outreach efforts could be grouped for efficiency and could be implemented simultaneously, including website development, document production, and social media campaigns.

Examples of Actions in the draft CAP that call for education and outreach include the following:

- E-1 Action 1a - Targeted Public Outreach for Residential Energy Efficiency
- E-2 Action 1a – Collect and Share Informational Materials on City's Sustainability Webpage
- E-5 Action 3a – Develop Outreach Campaign to Increase Solar PV Installations
- E-6 Action 2a – Conduct Internal Training on Solar Incentives/Rebates
- GI-1 Action 3a - Partner with Community to Promote Tree planting on Private Property
- SW-1 Action 2a - Update Sustain La Mesa webpage to Link to Waste Hauler Information Regarding Organic Waste
- T-3 Action 1a - Add link to iCommute on Sustain La Mesa webpage
- W-2 Action 1a - Finalize Graywater Education Program and Host Workshops

4.4.1.3 Municipal Operations

Several Measures address municipal operations. The following Actions are examples of those included in this category.

- E-3 Action 1a - Implement Energy Roadmap Recommendations
- E-3 Action 2a - Revisit municipal efficiency goal on regular cycle (e.g., every 5 years) and consider remaining retrofit opportunities when revising municipal goal
- GI-1 Action 1a - Continue to Implement Tree Policy Manual for City Departments
- T-6 Action 1a - Develop Municipal Fleet Low-carbon Target
- W-1 Action 3a - Benchmark, Track, and Review Municipal Water Use

4.4.1.4 Ordinances/City Policies

Several CAP Actions call for consideration of ordinances, policies, or plans. Examples of these include the following.

- E-2 Action 1a – Update City's Tree Planting Standards
- E-6 Action 1a – Identify and Remove Regulatory Barriers to Solar Hot Waters
- E-8 Action 1a – Adopt California's Zero Net Energy Building Code Standards
- GI-1-2 – Continue to Implement City's Design Standards for Parking Lot Shade Trees
- T-5-2 - Require Installation of Public-use EV Charging Units in Certain Projects

4.4.1.5 Program Development/Management

Certain measures require new programs to be developed and managed as part of CAP implementation, including the following examples.

- E-2 Action 6a - Develop Shade Tree Give-Away Program
- SW-1 Action 4a - Explore Opportunities to Develop a Voluntary Commercial Food Scrap Collection Pilot Program
- T-3 Action 3a - Develop City Employee Commuter Program

4.4.1.6 Public Infrastructure

The CAP also calls for measures for which La Mesa will implement public infrastructure projects, including the following examples.

- T-1 Action 4a - Improve Existing Bike Lanes with Enhanced Signage or Striping
- T-1 Action 5a - Install Sharrows on Bike Routes

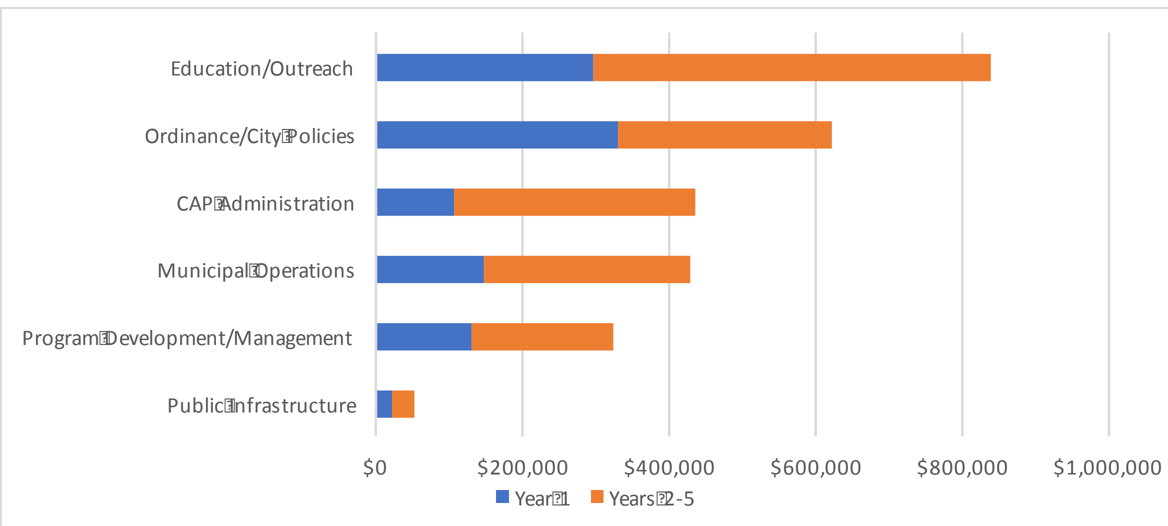
4.4.2 Total Staffing Cost by CAP Activity Type

Education and outreach activities would have the highest staffing cost at $839,000 over the five-year period, about 30% of total costs (Table 6 and Figure 22). Activities to develop or change La Mesa's ordinances or other City policies would account for about $621,000, or 23% of total costs. CAP Administration, including inventory updates, monitoring, and CAP updates, would require $436,000 (16%) over the first five years of CAP implementation.

Table 6 Total Cost and Staffing Impact by CAP Activity Type

CAP Activity Type	Year 1	Years 2-5	Total	% of Total
CAP Administration	$105,000	$330,000	$436,000	16%
Education/Outreach	$296,000	$542,000	$839,000	31%
Municipal Operations	$146,000	$280,000	$427,000	16%
Ordinance/City Policies	$330,000	$291,000	$621,000	23%
Program Development/Management	$131,000	$191,000	$323,000	12%
Public Infrastructure	$21,000	$31,000	$53,000	2%
Total	$1,031,000	$1,669,000	$2,701,000	100%
% of Total	38%	62%	100%	

Figure 22 Total Staff Cost by CAP Activity Type



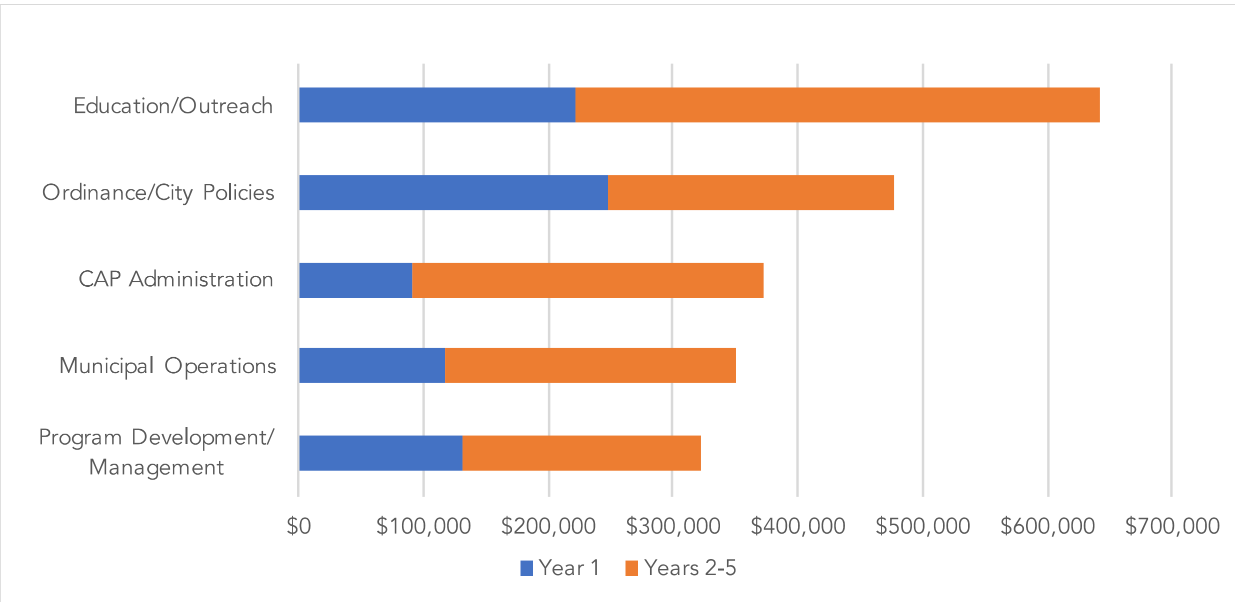
4.4.3 Incremental Staffing Cost by CAP Activity Type

Table 7 and Figure 23 summarize the incremental staffing costs to implement new CAP activities by CAP Activity Type. Education and outreach activities would account for the highest portion of incremental staffing costs at $641,000 – about one-third of all incremental staffing costs to implement CAP measures for the first 5 years. Ordinance and city policy development would require $477,000 (22%), followed by CAP administration with $373,000 or about 17%.

Table 7 Incremental Staff Cost by Activity Type

CAP Activity Type	Year 1	Years 2-5	Total	% of Total
CAP Administration	$91,000	$281,000	$373,000	17%
Education/Outreach	$221,000	$419,000	$641,000	30%
Municipal Operations	$117,000	$233,000	$350,000	16%
Ordinance/City Policies	$248,000	$229,000	$477,000	22%
Program Development/Management	$131,000	$191,000	$323,000	15%
Total	$810,000	$1,355,000	$2,165,000	100%
% of Total	37%	63%	100%	

Figure 23 Incremental Staff Cost by Activity Type



5 RESULTS – STAFFING IMPACTS (FTE)

The section presents the results of the La Mesa CAP Implementation Cost analysis and answers the question: **What are the staffing impacts to La Mesa to implement the CAP over the first five years?** It presents an overall summary of staffing impacts in FTE for new and existing programs for year one and years two through five and summarizes results by La Mesa department, staff position, CAP measure, and CAP activity type. Detailed results are provided for totals and the incremental portion associated with new programs.

5.1 Overall Staffing Impacts

The total estimated staffing needed to implement CAP activities in the first five years is 6.2 FTE - 3.7 FTE would be needed in year one and an additional 2.5 FTE would be needed during years two through five, an average of about 0.6 FTE annually over this period. About 80% of staffing needs (5 FTE) are associated with new programs that would not have been implemented without CAP adoption, with 3 FTE required in year one and an additional 2 FTE over the remaining four years, or an average of about 0.5 FTE each year during that period. Table 8 summarizes these results. While results distinguish the staffing impact for existing versus new programs, no distinction is made between existing and new staff positions.

Table 8 Summary of Staffing Impacts (FTE) to Implement CAP Measures

	Year 1	Years 2-5*	Total
Total Staffing	3.7	6.2	N/A
Incremental Staffing	3.7	2.5	6.2
Existing Programs	0.8	0.4	1.2
New Programs	2.9	2.1	5.0

*Values represent the total FTE needed over the four year period.

The following sections present staffing impact (FTE) in more detail. Results are shown by year, by program status (i.e., existing or new), and both in terms of total staffing – the cumulative total of staff required to complete the work in a given year – and the incremental staffing needed, which includes FTE required for year one and the additional FTE needed during years 2-5 to reach the total staffing requirement of 6.2 FTE in years 2-5.

5.2 Staffing Impacts by Department

Similar to the distribution of staffing costs, Community Development Department has the highest staffing impact with a total of 3 FTE – 2.1 FTE in year one and an additional 0.9 FTE in years two through five. Public Works Department has the second highest staffing need with a total of 2.7 FTE – 1.3 FTE in years one and an additional 1.3 FTE in years two through five Figure 24 summarizes these results. The blue portion of the bar represents the FTE requirements in year one. The orange portion represents the additional FTE needed to reach the cumulative staffing total (number at the end of the bar).

Figure 24 Total Staff Impact (FTE) by Department with Additional Impact for Years 2-5

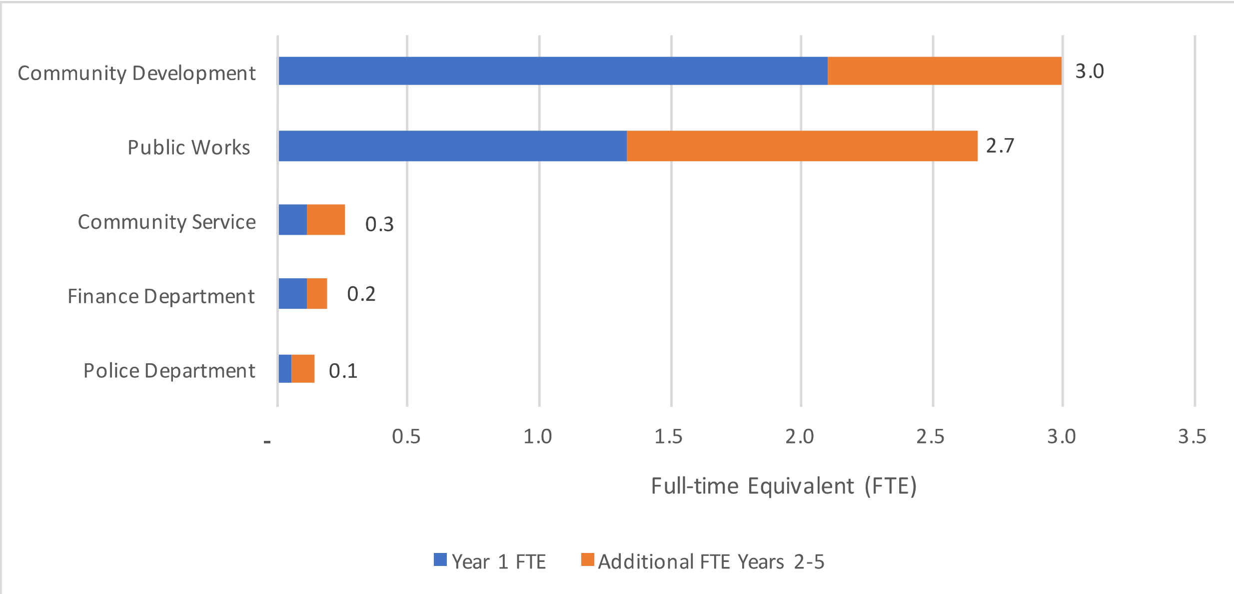


Table 9 shows total staffing requirements by program status for both timeframes. Values for years two through five represent the cumulative staffing levels needed to complete the work anticipated during that time period.

Table 9 Total Staff Impact (FTE) by Department

	Year 1			Years 2-5		
Department/Division	Existing Programs	New Programs	Total Year 1	Existing Programs	New Programs	Total Years 2-5
Community Development	0.4	1.7	2.1	0.5	2.5	3.0
Community Service	0.1	0.0	0.1	0.1	0.1	0.3
Finance	0.0	0.1	0.1	-	0.2	0.2
Police	0.0	0.0	0.0	0.1	0.1	0.1
Public Works	0.3	1.1	1.3	0.6	2.1	2.7
Total	0.8	2.9	3.7	1.2	5.0	6.2

5.3 Staffing Impacts by Position

The Associate Planner in the Community Development Department would require the most effort with 2.6 FTE – 1.8 FTE in year one an additional 0.8 FTE over the final four years. This position is the only one that would require a level of effort greater than 1 FTE in the first year of CAP implementation. The Associate Engineer position in the Public Works Department would require a total of 1.9 FTE – 0.9 FTE in year one and an additional 1 FTE in years two through five. These two positions could need supplemental capacity or resources in year one to complete the estimate workload associated with CAP activities. Figure 25 summarizes these results.

Figure 25 Total Staffing Impact (FTE) for Select Positions

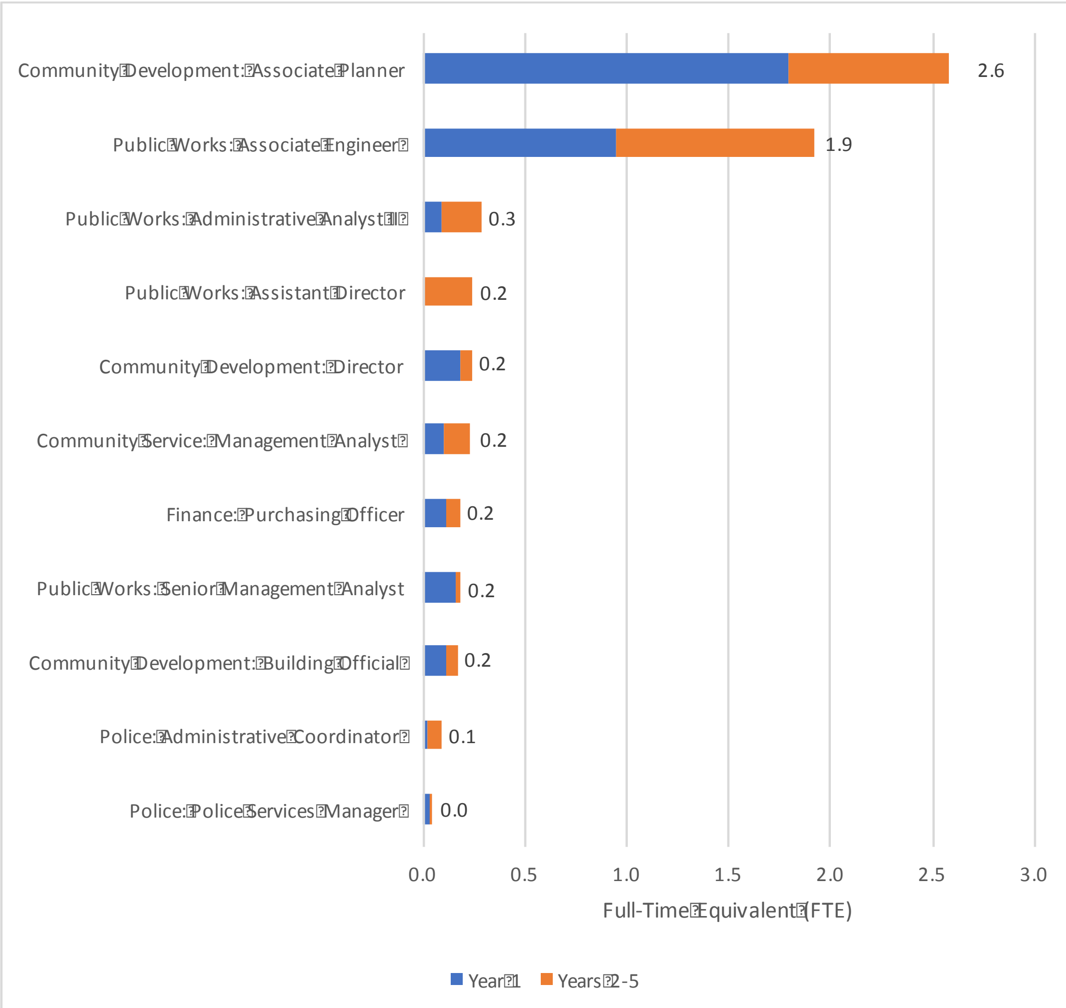


Table 10 shows total staffing requirements by program status for both timeframes. Values for years two through five represent the cumulative staffing levels needed to complete the work anticipated during that time period. Consistent with the overall breakdown of costs between existing and new programs, about 80% of the staffing impact for the Associate Planner in the Community Development Department are associated with new programs in year one and about 84% in years two through five. For the Associated Engineer in the Public Works Department, new programs represent about 75% of effort over the five-year period.

Table 10 Total Staffing Impact (FTE) by Program Status and Position

Department/Position	Year 1			Years 2-5		
	Existing Programs	New Programs	Total Year 1	Existing Programs	New Programs	Total Years 2-5
Community Development	0.4	1.7	2.1	0.5	2.5	3.0
Building Official	0.0	0.1	0.1	0.0	0.2	0.2
Director	0.0	0.1	0.2	0.0	0.2	0.2
Associate Planner	0.4	1.4	1.8	0.4	2.2	2.6
Planning Technician	-	0.0	0.0	-	0.0	0.0
Community Service	0.1	0.0	0.1	0.1	0.1	0.3
Management Analyst	0.1	0.0	0.1	0.1	0.1	0.2
Director	0.0	0.0	0.0	-	-	-
Manager	-	-	-	0.0	0.0	0.0
Finance	0.0	0.1	0.1	-	0.2	0.2
Purchasing Officer	0.0	0.1	0.1	-	0.2	0.2
Police	0.0	0.0	0.0	0.1	0.1	0.1
Administrative Coordinator	0.0	-	0.0	0.1	0.0	0.1
Police Services Manager	0.0	0.0	0.0	-	0.0	0.0
Sargeant	-	-	-	0.0	-	0.0
Public Works	0.3	1.1	1.3	0.6	2.1	2.7
Associate Engineer	0.3	0.7	0.9	0.5	1.4	1.9
Assistant Director	-	-	-	0.1	0.2	0.2
Director	0.0	0.1	0.1	-	0.0	0.0
Administrative Analyst II	-	0.1	0.1	-	0.3	0.3
Senior Management Analyst	-	0.2	0.2	-	0.2	0.2
Total	0.8	2.9	3.7	1.2	5.0	6.2

5.4 Staff Impacts by Measure

Mixed-Use and Transit-Oriented Development (T-4) has the highest staffing impact with a total of 0.55 FTE. The staffing level associated with this position is 0.62 FTE in year one and then drops to 0.55 FTE in years two through five, one of the few measures that has lower staffing impacts in the second time period. Others are Waste Diversion (SW-3) and Zero Net Energy Construction (E-8), which have relatively low total staffing requirements of 0.1 FTE or less (indicated in the figure with negative orange bars). The next several measures all have a total staffing impact around 0.5 FTE: Alternative Refueling Infrastructure Development (T-5), Building Retrofit Program (E-1), and Municipal Fleet Transition (T-6). Figure 26 summarizes these findings.

Figure 26 Total Staff Effort (FTE) by Measure

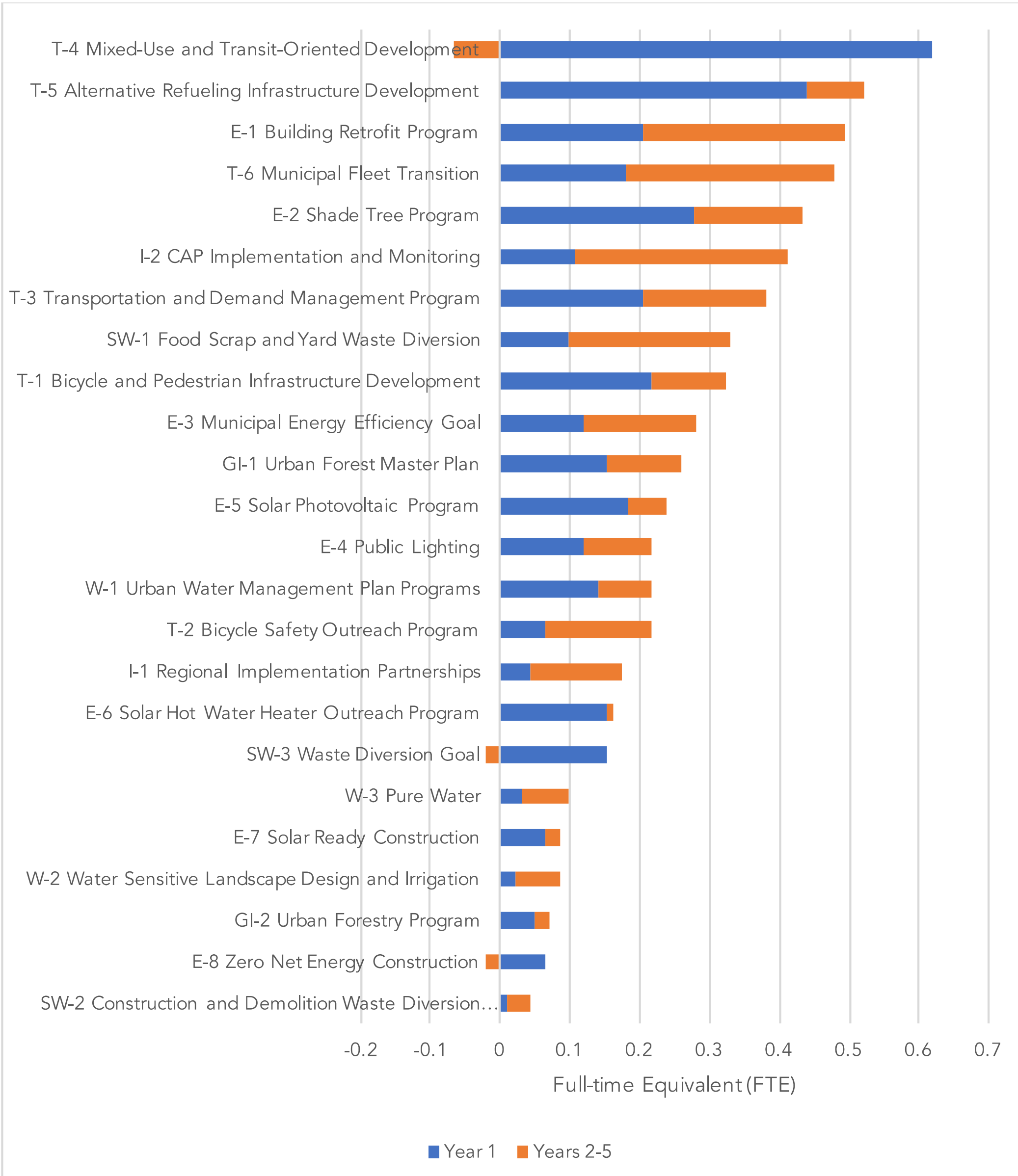


Table 11 shows total staffing requirements by program status for both timeframes. Values for years two through five represent the cumulative staffing levels needed to complete the work anticipated during that time period. Alternative Fueling Infrastructure Development (T-5) would have the highest staffing impact for a new activity with a total of 0.5 FTE – 0.4 FTE in year one and an additional 0.1 FTE in years two through five. The next two CAP measures with the next highest staffing impact for new activity would be the Building Retrofit Program (E-1) and Municipal Fleet Transition (T-6) each with a total of about 0.5 FTE – 0.2 FTE in year one and an additional 0.3 FTE in years two through five.

Table 11 Total Staff Effort (FTE) by CAP Measure

Staff Position	Year 1			Years 2-5		
	Existing Programs	New Programs	Total Year 1	Existing Programs	New Programs	Total Years 2-5
E-1 Building Retrofit Program	-	0.2	0.2	-	0.5	0.5
E-2 Shade Tree Program	-	0.3	0.3	-	0.4	0.4
E-3 Municipal Energy Efficiency Goal	-	0.1	0.1	-	0.3	0.3
E-4 Public Lighting	0.1	-	0.1	0.2	-	0.2
E-5 Solar Photovoltaic Program	-	0.2	0.2	-	0.2	0.2
E-6 Solar Hot Water Heater Outreach Program	-	0.2	0.2	-	0.2	0.2
E-7 Solar Ready Construction	-	0.1	0.1	-	0.1	0.1
E-8 Zero Net Energy Construction	-	0.1	0.1	-	0.0	0.0
GI-1 Urban Forest Master Plan	0.0	0.1	0.2	0.0	0.2	0.3
GI-2 Urban Forestry Program	-	0.0	0.0	-	0.1	0.1
I-1 Regional Implementation Partnerships	-	0.0	0.0	-	0.2	0.2
I-2 CAP Implementation and Monitoring	-	0.1	0.1	-	0.4	0.4
SW-1 Food Scrap and Yard Waste Diversion	-	0.1	0.1	-	0.3	0.3
SW-3 Waste Diversion Goal	-	0.2	0.2	-	0.1	0.1
T-1 Bicycle and Pedestrian Infrastructure Development	0.2	-	0.2	0.3	-	0.3
T-3 Transportation and Demand Management Program	-	0.2	0.2	-	0.4	0.4
T-4 Mixed-Use and Transit-Oriented Development	0.4	0.2	0.6	0.3	0.2	0.6
T-6 Municipal Fleet Transition	-	0.2	0.2	-	0.5	0.5
W-1 Urban Water Management Plan Programs	-	0.1	0.1	-	0.2	0.2
W-2 Water Sensitive Landscape Design and Irrigation	0.0	-	0.0	0.1	-	0.1
W-3 Pure Water	-	0.0	0.0	-	0.1	0.1
SW-2 Construction and Demolition Waste Diversion Program	0.0	-	0.0	0.0	-	0.0
T-2 Bicycle Safety Outreach Program	0.1	-	0.1	0.2	-	0.2
T-5 Alternative Refueling Insfrastructure Development	-	0.4	0.4	-	0.5	0.5
Total	0.8	2.9	3.7	1.2	5.0	6.2

5.5 Staff Impact by CAP Activity Type

Education and Outreach activities would require the highest level of staffing with 2.1 FTE over the analysis period. This impact would be about equally divided between the two time periods with 1.1 FTE in year one and an additional 1 FTE in years two through five. Activities associated with CAP Administration and Municipal Operations would have the next highest staff impact with about 1.1 FTE over the five-year period. CAP Administration would require 0.4 FTE in year one and an additional 0.8 FTE in years 2-5. Municipal operations would require about one half FTE in year one and an additional one half in years two through five. Figure 27 summarizes these findings.

Figure 27 Total Staff Impact (FTE) by CAP Activity Type

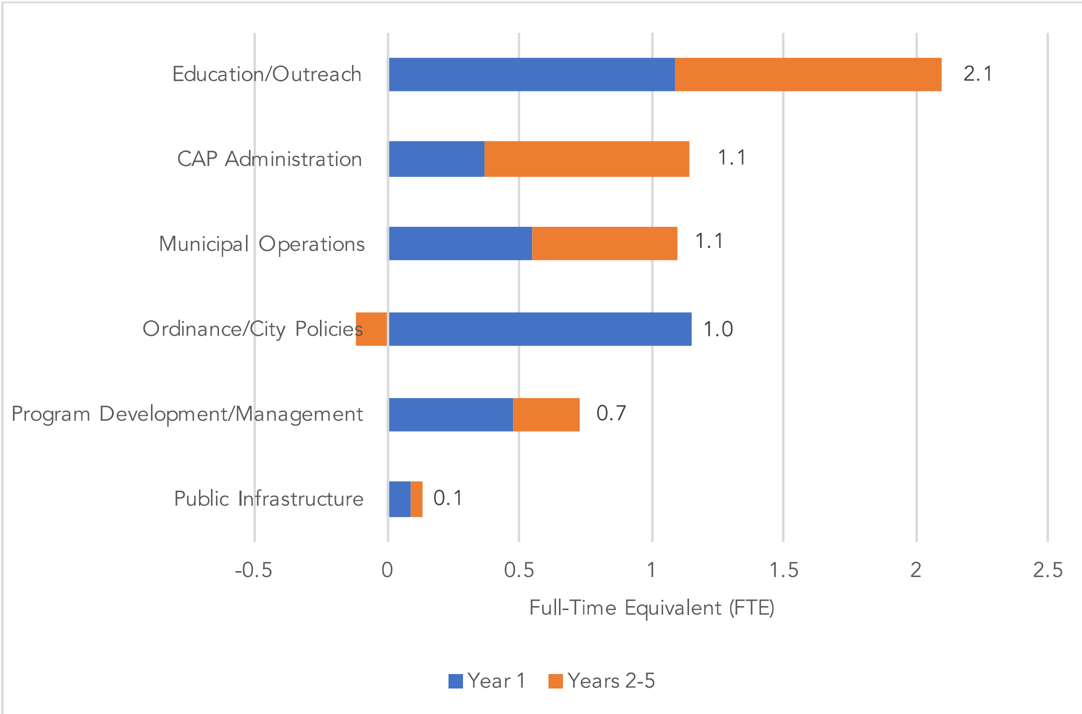


Table 12 presents the estimated staffing impact for each Activity Type by program status. Education and Outreach would require the highest level of staffing related to new activity with 1.6 FTE – 0.8 FTE in year one and an additional 0.8 in years two through five. CAP Administration would have the second highest staffing impact for new activities at 1 FTE – 0.3 in year one and an additional 0.7 in years two through five.

Table 12 Total Staff Impact (FTE) by CAP Activity Type

	Year 1			Years 2-5		
Staff Position	Existing Programs	New Programs	Total Year 1	Existing Programs	New Programs	Total Years 2-5
CAP Administration	0.0	0.3	0.4	0.2	1.0	1.1
Education/Outreach	0.3	0.8	1.1	0.5	1.6	2.1
Municipal Operations	0.1	0.4	0.5	0.2	0.9	1.1
Ordinance/City Policies	0.3	0.9	1.2	0.2	0.8	1.0
Program Development/Management		0.5	0.5		0.7	0.7
Public Infrastructure	0.1		0.1	0.1		0.1
Total	0.8	2.9	3.7	1.2	5.0	6.2

6 LIMITATIONS

There are inherent limitations with any cost analysis that result in a degree of uncertainty that should be taken into account. This cost analysis uses the best information, data, and methods available at the time. Nonetheless the following limitations should be considered.

6.1 Draft CAP

The results are a preliminary estimate of costs based on the strategies, measures, and actions, contained in the draft CAP. Because this version is still subject to change and approval, the final suite of measures and actions adopted by the City Council could have a different cost and staffing impact than what is presented here.

6.2 Staff Costs Only

This report evaluates only the staffing cost and impact (FTE) to implement CAP measures. The cost estimates here do not capture the capital, consultant, and materials and supplies costs associated with CAP measures. Additional analysis would be required to develop a more comprehensive estimate of CAP implementation costs that includes these other cost categories.

6.2.1 No Salary Increase Included

All cost estimates for this analysis are calculated using hourly rates for the current fiscal year. This introduces uncertainty into the estimates. If salaries increase over the five-year period, the total personnel cost estimate would be higher than the results presented here.

6.3 Preliminary Estimate

The cost and staffing impact results presented should be considered preliminary estimates. Because there is limited information about the specific tasks that would be required to implement the CAP measures, the estimates included are based on assumptions about the work to be performed. Over time, the specific tasks required to implement final CAP measures will become clearer and considerations for how to coordinate and sequence activities can be made, which may also affect the ultimate cost and staffing required to implement the final CAP.

6.4 CAP Time Horizon

This analysis evaluated La Mesa's staffing cost and impact (FTE) for the first five years of CAP implementation through FY 2022-23. While the CAP has an implementation horizon of 2035, this report does not estimate costs between FY 2022-23 and 2035. This could cause misinterpretation of some of the findings. For example, certain CAP measures will be implemented and have costs beyond the scope of this initial cost analysis, but only the cost during the first five years of CAP implementation are captured here. To account for future costs, cost estimates could be updated through the CAP monitoring.

Similarly, the analysis collected data for year one and an aggregate of years two through five. More detail could be needed to understand the distribution of costs across the final four years of this first implementation period.

6.5 GHG Emissions

This report does not consider the GHG emissions associated with CAP measures. It is common for cost analyses to normalize cost across GHG emission reductions in a CAP; that is, to divide costs by GHG emissions to derive a cost per ton of carbon-dioxide equivalent (CO_2e). It is not possible to derive such values from the cost information included in this report because there is no way to correlate the amount of GHG reductions that would occur due to the specific expenditures estimated for this effort. For example, it would not be accurate to divide costs for the first five years by the total GHG reduction for 2035, because there could be additional costs associated with achieving those reductions. While GHG emissions are not considered in this report, the companion Climate Action Plan Cost Effectiveness and Benefit Cost Analyses Report does estimate the cost per metric ton of GHG reductions for most CAP measures, including certain measures that affect La Mesa costs, such as energy efficiency improvements in city facilities.

7 CONCLUSION

This report summarizes the findings for the City of La Mesa CAP implementation Cost Analysis conducted by the Energy Policy Initiatives Center (EPIC) at the University of San Diego. The overall goal of the report is to identify the total and incremental staffing costs and impact (FTE) required to implement CAP Measures.

While total staffing costs associated with implementing CAP measures totals $2.7 million over the first six years, new programs account for about $2.2 million, or 80% of total staffing costs. The remaining 20% of staffing costs, around $535,000 are associated with existing programs that would have occurred regardless of CAP adoption. Two La Mesa departments would account for nearly 95% of total staffing costs – the Community Development Department (58%) and the Public Works Department (36%). A total of about 6 FTE would be needed to implement the CAP over the first five years – 3.7 FTE in year one and an additional 2.5 in years two through five, an average of about 0.6 FTE annually during this period. Of this total, 1.2 FTE are associated with existing programs and 5 FTE with new programs. Two positions would be significantly affected by CAP implementation activities and could require additional capacity or resources in year one to supplement their effort on CAP activities: the Associate Planner position in the Community Development Department and the Associate Engineer in the Public Works Department. The Associate Planner in the Community Development Department is the only position that would require 1.8 FTE in year one an additional 0.8 FTE over the final four years.

Given the preliminary nature of this estimate, which is based on the Draft CAP, regular updates may be necessary to monitor costs and to integrate any changes to measures and actions over time.

7.1 Next Steps and Recommendations

Understanding the incremental staffing impacts is an important step in determining the cost of implementing the draft CAP, especially since staffing costs are likely the most significant cost incurred by the City of La Mesa. However, several additional steps could complement this analysis to provide a more comprehensive cost estimate.

- **Distinguish between Existing Staff Capacity and Needed Capacity** – The incremental cost and effort totals provided here are the total estimated necessary to implement the actions identified in the draft CAP. Results do not distinguish between work that could be completed by existing staffing capacity and what additional staffing capacity would be needed. An important next step would to determine how much (if any) of the estimated work load for CAP implementation and administration could be done by existing staff and how much (if any) additional capacity (new positions) would be needed to implement CAP Measures.

- **Consider a CAP Administrator Role** - Given the coordination and collaboration necessary to implement many of the CAP actions, the City may want to consider developing a CAP administrator role as a stand-alone position or as part of the job description of a current position. This could be a new position or the functions could be assigned to an existing staff position. The estimated effort to implement activities associated with CAP Administration accounts for about 20% of total staffing impact, or 1.1 FTE over the first five years. The City of Carlsbad has a full-time CAP Administrator position and the City of Encinitas currently has dedicated a portion of a full-time position to CAP Administration and is exploring extending that arrangement. The City of San Diego has a Chief Sustainability Officer whose responsibilities include CAP Administration.

- **Refine Estimate for Non-Staffing Costs** – Additional analysis would be needed to develop a more comprehensive estimate for consulting services, supplies and materials, and capital expenditures to implement CAP measures. Staff estimates that about $100,000 in supplies and materials would be necessary to implement the CAP in the first five years. It also estimated that costs to conduct a feasibility study for Community Choice Aggregation could cost between $150,000 and $250,000, depending on how the analysis was conducted. Another important aspect of assessing the cost to the City are the incremental capital costs associated with CAP implementation. City of La Mesa could evaluate these costs to determine future budget impacts.

- **Identify Funding Sources and Needs of New Programs** – Once all incremental costs are identified, understanding which programs are currently funded or have identified funding sources and which programs are unfunded or do not have identified funding sources could help to link the CAP cost analysis to La Mesa's budgeting process. Identifying current funding sources and the amount of additional funds that might be needed for new programs can help to develop a comprehensive view of CAP implementation costs.