City of San José

Local Government Operations Climate Action Plan

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City of San José

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ACRONYMS & OTHER ABBREVIATIONS

Acronyms	Definition
AB	Assembly Bill
ABAG	Association of Bay Area Governments
ABAU	Adjusted-Business-as-Usual
BAAQMD	Bay Area Air Quality Management District
BACC	Bay Area Climate Compact
BAU	Business-as-Usual
C&D	Construction and Demolition
CAP	Climate Action Plan
CCA	Community Choice Aggregation
CCD	Construction and Demolition Diversion
CEQA	California Environmental Quality Act
CIP	Capital Improvement Program
CNG	Compressed Natural Gas
CPUC	California Public Utilities Commission
EBOS	Emergency Basin Overflow Structure
EMS	Energy Management System
EO	Executive Order
EP3	Environmentally Preferable Procurement Policy
EPEAT	Electronic Product Environmental Assessment Tool
ESCO	Energy Service Company
EV	Electric Vehicle
FEMP	Federal Energy Management Program
GHG	Greenhouse Gas
GGRS	Greenhouse Gas Reduction Strategy
GWP	Global Warming Potential
kWh	Kilowatt Hour
LED	Light Emitting Diode
LEED	Leadership in Energy and Environmental Design
LGO	Local Government Operations
LGOP	Local Government Operations Protocol
LPG	Liquid Petroleum Gas
MEAP	Municipal Energy Action Plan
MT CO_2e	Metric Tons of Carbon Dioxide Equivalent
MW	Megawatt

NO_X	Nitrogen Oxide
OPR	Office of Planning and Research
PG&E	Pacific Gas and Electric Company
PM	Particulate Matter
PMP	Plant Master Plan
PPA	Power Purchase Agreement
PV	Photovoltaic
QECB	Qualified Energy Conservation Bonds
REC	Renewable Energy Credit
RPS	Renewable Portfolio Standard
RWF	San José-Santa Clara Regional Wastewater Facility
SEAP	Strategic Energy Action Plan
SJC	Norman Y. Mineta San José International Airport
sq ft	Square Feet
VMT	Vehicles Miles Traveled
VOC	Volatile Organic Compound
ZWEDC	Zero Waste Energy Development Company

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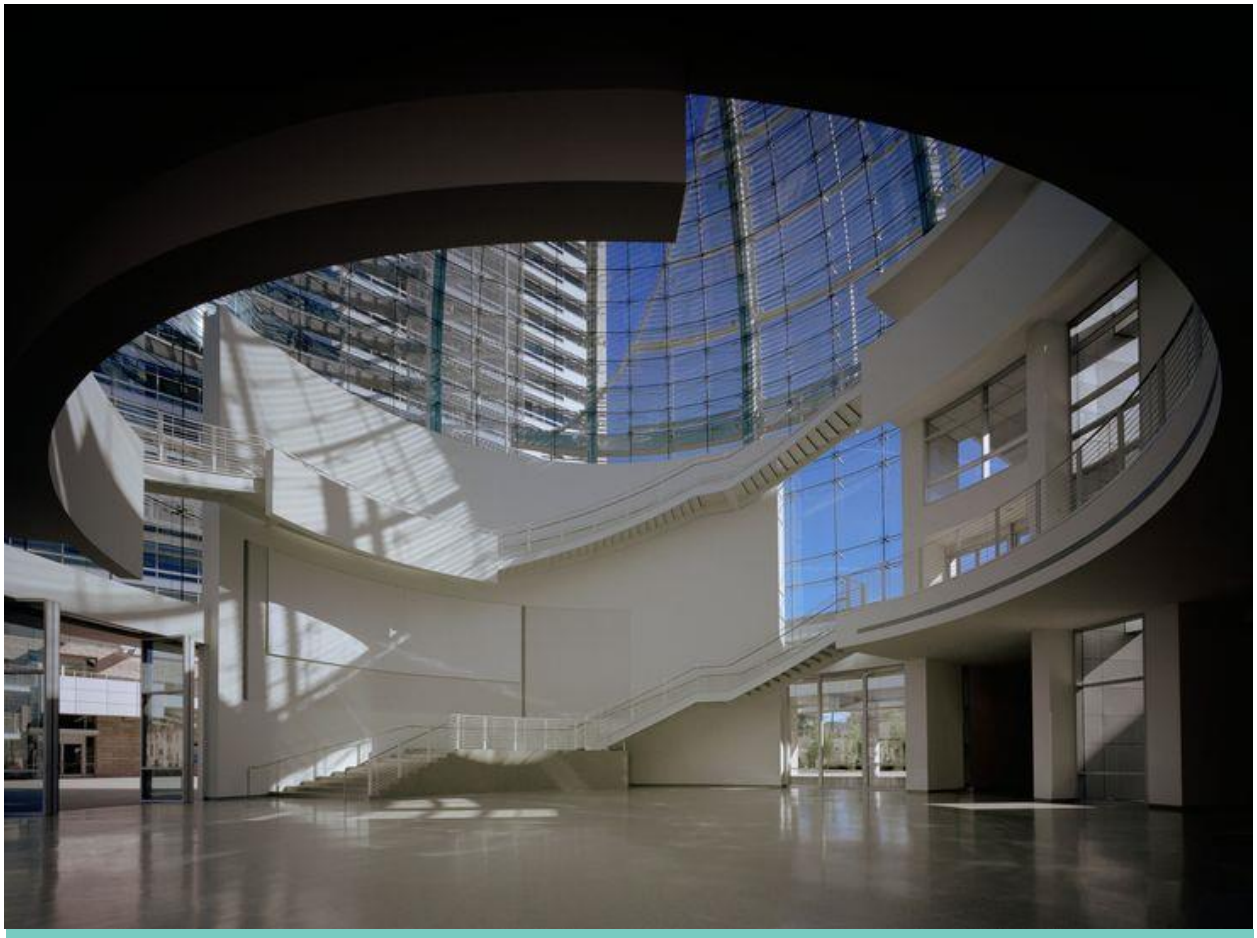


Chapter 1

INTRODUCTION

The State of California considers increasing greenhouse gas (GHG) emissions and resulting climate change impacts a major global challenge for the 21st century. According to most climatologists, the planet is starting to experience shifts in climate patterns and increased frequency of extreme weather events at both the global and local levels. At a statewide level, these impacts include reduced snow pack in the Sierra Nevada affecting California water supplies; rising sea levels threatening cities along the coast and San Francisco Bay; decreasing air quality affecting public health, particularly in the Central Valley; and, rising temperatures impacting the state's agricultural industry and energy sector.

Local governments throughout California have been proactively developing Climate Action Plans (CAPs) since the state adopted Assembly Bill 32 (AB 32), the Global Warming Solutions Action, in 2006. These local plans are typically developed to identify strategic pathways that will

put local jurisdictions on a trajectory towards a low-emissions future that aligns with the state's own goals for emissions reductions. The City of San José's Local Government Operations (LGO) CAP was developed as part of a regional approach among other Santa Clara County jurisdictions to identify local actions that can be taken to curtail GHG emissions growth and contribute to the broader climate change planning efforts underway throughout the Bay Area.

This chapter presents a brief overview of climate change science to frame the need to for local action. It defines the purpose of San José's LGO CAP within the framework of the state's climate mitigation efforts and the City's commitment to emissions reductions through effective operations and service delivery. The chapter then presents an overview of the regional project through which this CAP was developed, and the considerations for selecting appropriate local emissions reduction targets. Finally, the chapter describes the six-step process used to develop the CAP strategies and actions and how the City will ensure effective implementation.

Climate Change Science

According to the US Environmental Protection Agency, global warming refers to the recent and ongoing rise in global average temperature near Earth's surface, and is caused primarily by increasing concentrations of GHGs in the atmosphere. However, global warming itself represents only one aspect of climate change and its effects are unevenly distributed across the globe. For this reason, the broader terms of 'climate change' or 'anthropogenic climate change' more appropriately refer to the myriad changes in our atmosphere that most climate scientists have attributed to human industry and activities.

Climate change refers to any significant change in the measure of climate lasting for an extended period of time, including major changes in temperature, precipitation, or wind patterns, among other effects, that occur over several decades or longer.[i] The effects of climate change differ by region and micro climate, but have so far been most pronounced as uncharacteristic changes in the frequency or severity of storms, prolonged droughts, and persistent hot or cold periods compared to the historical norm.

Over the past century, human activities have released enormous amounts of carbon dioxide (CO_2) and other GHGs into the atmosphere. These gases act like a blanket around Earth, trapping energy in the atmosphere and causing it to warm. This phenomenon is called the greenhouse effect and is natural and necessary to support life on Earth. However, the accelerated buildup of GHGs through human activities has changed the Earth's climate resulting in potentially dangerous effects to human health and welfare as well as threats to natural ecosystems.[ii]

In the United States, 83.6% of GHG emissions are from CO_2, with 94.4% of CO_2 emissions coming from the burning of fossil fuels.[iii] Trend projections indicate that atmospheric concentrations of many GHG emissions, already at their highest levels in at least the past 1 million years, will continue to increase throughout this century. If these projections become

reality, climate change will increasingly threaten our economic well-being, public health, and the environment upon which we depend.

A solid body of vital data is available to assist state and local leaders to better understand how climate change is affecting us now, what is in store ahead, and what we can do about it. State-sponsored research has played a major role in recent advances in our understanding of the potential impacts of climate change on California. A first assessment, published in 2006, made clear that the level of impact is a function of global greenhouse gas emissions and that lower emissions can significantly reduce those impacts.[iv] The third and most recent publication, *The 2012 Vulnerability and Adaptation Study*, explores local and statewide vulnerabilities to climate change, highlighting opportunities for taking concrete actions to reduce climate-change impacts.[v]

The California legislature passed legislation (addressed later in this chapter) based upon the findings of the most comprehensive, advanced, and thoroughly reviewed documents on the science of climate change. The development of CAPs in California, including those in Santa Clara County, is based upon the actions of the California legislature and its reliance on these findings. These strategic plans are intended to help mitigate local contributions to climate change by identifying and supporting implementation of emission-reducing actions. For further information on Climate Science, please visit the California Climate Change Portal at http://www.climatechange.ca.gov/.

Purpose of Local Government Operations Climate Action Plan

California's Commitment to Climate Action

California has long been a sustainability leader, as illustrated by Governor Schwarzenegger signing Executive Order (EO) S-3-05 dating back to 2005. EO S-3-05 recognizes California's vulnerability to a reduced snowpack, exacerbation of air quality problems, and probable sea level rise due to a changing climate. To address these concerns, former Governor Schwarzenegger established the following targets to reduce statewide GHG emissions:

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

In 2006, California became the first state in the country to adopt a statewide GHG reduction target through AB 32, the California Global Warming Solutions Act. This law codifies the EO S-3-05 requirement to reduce statewide emissions to 1990 levels by 2020. AB 32 also 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, voluntary

actions, market based mechanisms, and funding. The Scoping Plan includes a broad range of actions to influence emissions reductions across various sectors, such as requirements directing the amount of emissions-free electricity provided from utility companies, vehicle efficiency standards, vehicle fuel carbon content regulations, and incentives to increase solar photovoltaic installations, among many others. In addition, the state has encouraged local governments to develop CAPs as a way to identify local actions that can be taken to support the state's long-term emissions reduction goals, while providing additional local environmental benefits (e.g., air quality improvements, reduced heat island effects, improved natural stormwater management).

CITY'S COMMITMENT TO CLIMATE ACTION

The City continues to be a leader in developing policies and programs that support local environment sustainability. In 2007, the City adopted its Green Vision, a 15-year plan for economic growth, environmental sustainability, and an enhanced quality of life for its community. The Green Vision consists of ten aggressive goals related to jobs, energy, water, waste, trees, and transportation.

In 2010, the City formalized its response to climate change by adopting a community-wide Greenhouse Gas Reduction Strategy (GGRS) as part of its Envision San José 2040 General Plan. The City is seeking to reduce its contribution to global climate change through implementation of both the Green Vision and the GGRS. Building on these efforts, this LGO CAP is the next step in the City's actions to mitigate the future impacts of climate change. The CAP provides a strategy through which the local government can demonstrate its leadership role in this area to both San José residents and businesses.

In 2011, the City decided to partner with other local governments in Santa Clara County to jointly develop climate action plans and address emissions from local government operations sources. This CAP establishes emissions reduction targets for 2020, 2035, and 2050, and describes actions the City can take (including actions it has already taken) toward target achievement. Voluntary preparation of the CAP demonstrates the City's continued commitment to statewide climate mitigation efforts.

In addition to climate mitigation planning and efforts to improve resilience, the City is dedicated to providing services, programs, and facilities in a fiscally responsible manner. The City has already made numerous investments that promote efficient resource use, reduce operation and maintenance costs, reduce risks to future cost uncertainty, and strengthen long-term resilience. Examples of these past initiatives include:

- Re-lamping hundreds of indoor and outdoor City-owned lighting fixtures with energy and cost-efficient lighting technologies
- Upgrading five City garages and one floor of the Airport Terminal A garage with energy and cost-efficient lighting technologies, and installing an occupancy and programmable lighting control system at the Airport's new Terminal B

- Installing over 2,500 (as of 2013) light emitting diode (LED) streetlights with control systems to improve lighting conditions and decrease maintenance costs, and solar powered warning lights at over 20 pedestrian sites, and converting all City traffic lights to LED
- Replacing all Airport diesel shuttle busses with new compressed natural gas (CNG) buses and retiring 40 diesel vehicles, some of which were replaced with the latest emission reduction technology. Airport on-site CNG station constructed and upgraded, and open for public use.
- Installing 52 electric vehicle (EV) charging stations downtown and in City-owned garages, as well as 10 charging stations at that airport Terminal A garage (Lot 2) and in Lot 5
- Operating more than 950 alternative-fueled vehicles (41% of the City's fleet), including all fire trucks using B20 diesel, and CNG and electric vehicles for airport maintenance activities
- Installing approximately 4.8 megawatt (MW) of solar photovoltaic (PV) capacity on municipal facilities and a 1.4 MW fuel cell system at the Regional Wastewater Facility that uses digester gas as its primary fuel source
- Performing energy audits on more than 80 facilities to identify retrofit opportunities
- Reducing water use in public parks through irrigation updates and turf conversion efforts that provide more sustainable landscaping in passive green spaces
- Incorporating recycled water use in landscape irrigation at Airport
- Using recyclable or compostable boxes at Airport concessions

During the development of the CAP, City staff focused on the selection of actions that could further reduce emissions and contribute to effective delivery of municipal operations and services. Therefore, implementation of the CAP is anticipated to contribute both environmental and fiscal performance benefits.

Plan Preparation

San José's LGO CAP was prepared as part of a regional effort led by the Santa Clara County Office of Sustainability. Through this effort, local governments within Santa Clara County were invited to participate in the joint preparation of community-wide and/or local government operations climate action plans to leverage grant funding provided by the Pacific Gas and Electric Company (PG&E), and additional funding provided by the Santa Clara County Office of Sustainability. Participants included the cities of Cupertino, Gilroy, Morgan Hill, Mountain View, Saratoga, and San José, as well as the County of Santa Clara. As part of this process, all of the CAPs were developed from a similar template to provide overall consistency from one CAP to the next. This also included development of a comprehensive list of best management practices in emissions reduction strategies from municipal governments in California as well as

internationally. This list served as the basis for CAP strategy development in each of the participating jurisdictions, to provide a foundation of consistency among the project partners, which could result in collaborative opportunities during plan implementation in the future.

WHAT THE PLAN DIRECTS

The purpose of the LGO CAP is to define mitigation measures that City leaders, department managers, and staff can implement to reduce GHG emissions resulting from internal operations (e.g., use and operation of government buildings, facilities, and vehicle fleet). In addition to the emission reduction benefits, implementation of the CAP can increase community resilience by helping to lower energy, water, and fuel usage, as well as reducing the City's exposure to future increased resource costs. City staff developed the CAP to identify priority actions and implementation steps, key performance targets, and departmental responsibility for implementation. The CAP also describes steps for monitoring implementation effectiveness and updating the plan's strategy and implementation priorities at regular intervals to ensure the City is on track to achieve its future emissions reduction targets.

TARGET SETTING RATIONALE

An important consideration when developing a CAP is how to select an appropriate local emissions reduction target. While there are currently no requirements for local governments to develop a CAP or directing the adoption of specific reduction targets, the following sources of guidance were considered when selecting the CAP's targets:

- The state's Scoping Plan recommends that local governments reduce municipal operation emissions to a level approximately **15% below baseline levels by 2020** to assist in achieving the statewide 2020 reduction target defined in AB 32 (i.e., a return to 1990 levels by 2020).
- Recent guidance from the State Office of Planning and Research (OPR) further recommends that local governments 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).
- BAAQMD adopted California Environmental Quality Act (CEQA) Air Quality Guidelines in 2010 that presented substantial evidence for three community-wide emissions reduction targets: 1) 1990 levels by 2020, 2) 15% below current (2008 or earlier) levels by 2020, or 3) use of an efficiency threshold of 6.6 metric tons of carbon dioxide equivalent per year (MT CO_2e/yr) per service population (i.e., residents plus employees) by 2020.[1]

[1] BAAQMD's target-setting guidance applies to baseline inventories prepared for 2005-2008, and has not yet been revised for baseline years of 2009 or later. However, it is common for jurisdictions to prepare a baseline inventory using the most recent set of annual data available. San José and the other participating jurisdictions prepared baseline inventories for 2010. See Appendix A for a description of how BAAQMD's target-setting methodology was applied to more recent baseline years.

Table 1.1 presents California's statewide emissions targets with the City's corresponding LGO CAP targets. These targets serve to demonstrate the City's commitment to supporting the state's emissions reduction goals.

Table 1.1
Emissions Reduction Target Comparison

	2020	2035	2050
Statewide Emissions Reduction Targets	Return to 1990 levels	Undefined [1]	80% below 1990 levels
City of San José Emissions Reduction Targets [2]	15% below 2010 levels	49% below 2010 levels	83% below 2010 levels

[1] At the time of CAP preparation, interim statewide emissions reduction targets had not been defined.

[2] See Appendix A for a description of how San José's emissions reduction targets were selected.

To further reinforce regional collaboration on climate change planning, the project participants named above selected the same emissions reduction targets for the community-wide and LGO CAPs, unless a jurisdiction had previously adopted targets through a public process, such as a General Plan Update or other long-range planning project. During future CAP updates, more refined target guidance may be available for incorporation into the plan, but at this time the selected targets represent the best available data and guidance to allow local governments to demonstrate consistency with statewide reduction targets.

Understanding the magnitude of these reduction targets can be challenging for community members and policymakers who do not interact regularly with the type of GHG information presented in this CAP. In order to help illustrate the relationship between GHG emissions and more relatable daily activities, the EPA developed its Greenhouse Gas Equivalencies Calculator (http://www.epa.gov/cleanenergy/energy-resources/calculator.html). The City's reduction targets presented in Table 1.1 (and other GHG information found in this CAP) can be put in perspective using this tool. For example, the near-term 2020 target would result in emissions reductions equal to removing approximately 3,800 passenger vehicles from roadways each year or the energy needed to power more than 1,600 homes. The long-term 2050 target would equate to removing nearly 18,500 passenger vehicles or powering 8,000 homes. This tool can be referenced while reading the CAP to help make the emissions information presented herein more meaningful.

Climate Action Plan Framework

The LGO CAP was developed using a climate action planning framework that includes the following steps:

1. Understand Current and Anticipate Future Emissions

2. Set Emission Reduction Goals
3. Identify and Leverage Existing Actions
4. Propose and Coordinate Future Actions
5. Implement Action Plan
6. Monitor and Evaluate Effectiveness, Revise CAP

UNDERSTAND CURRENT AND FUTURE EMISSIONS

Understanding the source and scale of GHG emissions and the underlying emission generating activities is a critical element for any climate action plan. The City's 2010 baseline GHG emissions inventory and future year emissions projections for 2020, 2035, and 2050 identify the amount of emissions generated by each municipal sector (i.e., energy, vehicle fleet, water, wastewater, and solid waste) and relevant subsector. This information, described in detail within Chapter 2, identifies both the challenges and opportunities facing the City and will assist the City Council in selecting appropriate actions to reduce emissions. It also forms the basis for setting emission reduction targets and strategies for future years.

To facilitate municipal climate mitigation efforts, the state prepared the Local Government Operations Protocol (LGOP). The LGOP provides guidance on how to inventory GHG emissions resulting from government buildings and facilities, government fleet vehicles, wastewater treatment and potable water treatment facilities, landfill facilities, and other operations and services.[vi] Local governments are also encouraged to use the LGOP to conduct annual inventories and report their GHG emissions so that achieved reductions can be tracked in a transparent, consistent, and accurate manner. The City's CAP was developed in conformance with the guidance provided within the LGOP.

SET EMISSION REDUCTION GOALS

As described above, statewide guidance recommends that local governments adopt emissions reduction targets that mirror the state's efforts towards its 2050 target. Through this CAP, the City will adopt the following 2020, 2035, and 2050 reduction targets for its local government operations:

- 2020 – 15% below 2010 baseline
- 2035 – 49% below 2010 baseline
- 2050 – 83% below 2010 baseline

These adopted targets are ambitious, yet attainable, and will encourage City staff to develop and implement actions that will further reduce emissions and improve local government operations and services. As shown in Chapter 3, the 2020 target can be achieved through a combination of coordinated current and near-term actions to expand resource efficiency within

the City as well as adopted state legislation that increases the generation of clean electricity. Achievement of the 2035 and 2050 targets will require the City to consider implementing additional emission reduction measures, such as broader conversions of the municipal fleet to alternative fuel vehicles, additional building energy efficiency retrofits, and pursuit of clean electricity options.

Further, these targets are consistent with the community-wide emissions reduction targets included in the City's Greenhouse Gas Reduction Strategy, though that document uses an efficiency threshold as opposed to the mass emissions targets used in this CAP. Refer to Appendix A for further description of BAAQMD's recommended emissions reduction targets.

IDENTIFY AND LEVERAGE EXISTING ACTIONS

GHG mitigation within local governments is most effective when a city can use existing efforts as a foundation on which to build additional future initiatives. During development of the LGO CAP, the City identified a wide range of actions that have already been taken to reduce energy and water use, improve vehicle efficiency, and reduce landfill and wastewater treatment plant emissions. While the purpose of the CAP is to identify, define, and propose new actions, the momentum from these existing actions will increase the impact of future mitigation activities. Discussion of the City's past and on-going efforts is provided within Chapter 3, where relevant to the implementation of a future action.

DEVELOP FUTURE ACTIONS

Future actions to reduce GHG emissions need to be feasible, effective, and compatible with other City objectives. A review of best practices from other leading jurisdictions was conducted to develop the actions contained within the CAP. City staff reviewed these best practices and identified strategies that are compatible with City Council and organizational priorities and on-going City efforts. Once the preliminary list of strategies was identified, draft actions and implementation steps were developed that could be used to implement these strategies by 2020. GHG reduction estimates were then developed that reflect the influence of these strategies. Once completed, these estimates were used to refine the strategies and further develop the proposed actions and specific implementation steps contained within Chapter 3.

IMPLEMENT PLAN

The LGO CAP directs a variety of implementation efforts to achieve the City's long-term emission reduction goals. Each action identifies specific implementation steps, responsible parties, and recommended performance indicators. Some of the actions can be directly executed by department managers and relevant staff, while other actions will require additional research, development, and coordination in order to achieve the desired outcomes. Chapter 4 provides guidance on how the LGO CAP should be implemented and monitored over time.

MONITOR AND EVALUATE EFFECTIVENESS, REVISE CAP

A key step in climate action planning is to monitor and evaluate the effectiveness of a plan and its actions. Effectiveness can be defined in terms of:

- Overall and sector-level emissions reductions as demonstrated by periodic inventories
- Progress toward performance indicators defined for each action
- Reduction in City energy and fuel use, and related operations and maintenance costs

Chapter 4 concludes by defining a framework and schedule for monitoring and evaluating CAP effectiveness and a process for updating the document in the future if implementation evaluation shows that the City is not on track to achieve its reduction targets.

Chapter 2

GREENHOUSE GAS EMISSIONS

Developing a set of strategies and actions that can reduce the City's GHG emissions requires an understanding of baseline and future emissions-generating activities and associated emission factors. Once this accurate baseline is established, the City can more easily identify opportunities to leverage limited resources that yield the most effective emission reductions and improved resource efficiency. This chapter provides a summary of the 2010 inventory, and emission forecasts for 2020, 2035, and 2050. Appendix B provides a detailed discussion of methodologies used to develop the inventory and forecasts.

Greenhouse Gas Inventories

Emissions inventories provide a snapshot of the amount and source of GHG emissions in a given year. The baseline inventory serves as a reference point for reduction targets and informs the strategy and action selection process. Additional inventories can demonstrate progress

toward the adopted targets and assess effectiveness of City actions. In 2012, as part of the Santa Clara County Multiple-Jurisdiction Climate Action Planning process, the City prepared a 2010 inventory that assessed emissions from City buildings and facilities, vehicle fleet, solid waste generation, and water and wastewater services.

The emissions inventories were prepared using facility energy consumption data from the Pacific Gas and Electric Company (PG&E), and solid waste generation and vehicle fleet fuel consumption data from City staff. Wastewater treatment plant emissions were estimated with help from San José-Santa Clara Regional Wastewater Facility (RWF) staff. Empirical activity data was converted into GHG estimates using emission factors provided by PG&E and state and regional agencies.

UNITS OF MEASUREMENT

As carbon dioxide (CO_2) is the most widely recognized GHG, emissions inventories comprising a variety of gases are commonly expressed in metric tons (or tonnes) of carbon dioxide equivalent per year (MT CO_2e/yr). This metric provides a standard measurement that incorporates the varying global warming potential (GWP) of different GHGs. GWP describes how much heat a GHG can trap in the atmosphere relative to carbon dioxide, which has a GWP of 1. For example, methane has a GWP of 25, which means that 1 metric ton of methane will trap 25 times more heat than 1 metric ton of carbon dioxide, making it a more potent GHG. Some gases used in industrial applications can have a GWP thousands of times larger than that of CO_2. See Table 2.1 for a sample of common GHGs and their global warming potential.

Table 2.1
Greenhouse Gases and Global Warming Potential

Common Name	Chemical Formula	Global Warming Potential (100-yr)
Carbon Dioxide	CO_2	1
Methane	CH_4	25
Nitrous Oxide	N_20	298
Tetrafluoromethane (PFC-14)	CF_4	7,390
Fluoroform (HFC-23)	CHF_3	14,800
Sulfur Hexafluoride	SF_6	22,800

Source: IPCC Fourth Assessment Report, Climate Change 2007[vii]

EMISSIONS SOURCES

In general, baseline inventories organize emissions into categories, or sectors, based on the source of emissions. Emissions are also categorized based upon how they are generated in relation to the jurisdiction's ability to influence their mitigation. Local government operations inventories are primarily developed to include those emissions over which the City has direct operational or financial control. The methodology for emissions accounting is described in the Local Government Operations Protocol (LGOP), and classifies emissions sources into the following three scopes:

- **Scope 1: Direct Emissions** – Scope 1 emissions primarily include energy combustion that occurs within the local government's organizational boundary and from facilities and equipment over which the local government has operational or financial control, such as natural gas combustion for building heat or fuel consumption in municipal fleet vehicles.
- **Scope 2: Indirect Emissions** – Scope 2 emissions refer only to emissions that result from the generation of electricity, steam, heating, or cooling that is purchased or acquired by a local government. These emissions occur outside of the local government's organizational boundary (e.g., at the source of electricity generation), but occur as a result of government operations.
- **Scope 3 Emissions** – Scope 3 emissions include all other indirect emissions not included in Scope 2, and represent emissions over which local governments do not have direct financial or operational control. For example, emissions from City employees' personal vehicles resulting from commutes to and from work are an indirect emissions source. The City does not own or have financial control over those vehicles, but can take actions that might influence their management, such as offering alternative work schedules or coordinating carpool opportunities. Reporting Scope 3 emissions is considered optional (as opposed to Scope 1 and 2 emissions, which are considered mandatory for GHG reporting purposes). Another common Scope 3 emissions source comes from waste generated by government operations. In many instances, the local government reporting the waste emissions does not have operational control over the landfill from which the emissions are generated (i.e., through an anaerobic decomposition process). However, local governments can take actions to reduce the volume of waste sent to landfills, thereby decreasing their associated emissions.

San José's baseline inventory includes emissions from the following sources:

- **Energy (buildings, airport, wastewater facility, public lighting, stationary sources)** – This sector includes Scope 1 and Scope 2 emissions associated with the consumption of electricity and natural gas used in City buildings and facilities. It also includes Scope 1 emissions form the consumption of diesel fuel to power stationary equipment.
- **Vehicle Fleet** – This sector includes Scope 1 emissions resulting from the combustion of vehicle fuels used by the City's municipal fleet. It does not include emissions associated with City employee commutes.

- **Water Services** – This sector includes Scope 2 emissions associated with the pumping, fluoridation, and transport of potable water for use in municipal operations, such as indoor plumbing uses and outdoor landscape irrigation.
- **Wastewater Services** – This sector includes process emissions that occur as a result of operations at the Regional Wastewater Facility (RWF). Influent received at the RWF contains organic material that would generate methane emissions during wastewater treatment processes (Scope 1). Effluent discharged from the RWF contains nitrogen that could generate N_2O emissions offsite (Scope 3). While the RWF also uses electricity (Scope 2) to power plant operations and natural gas (Scope 1) for water heating, emissions associated with these activities are included in the Energy sector.
- **Solid Waste** – This sector includes Scope 3 emissions estimated to occur from the anaerobic decomposition of municipally-generated solid waste. Organic materials decompose in a landfill environment to produce carbon dioxide and methane gases. Common sources of organic waste material include office paper and cardboard, food scraps, landscape clippings, and scrap lumber.

While employee commute (travel to and from work) emissions were not included in San José's baseline LGO GHG emissions inventory, it is important to note that the City of San José has a number of employee-specific measures in place to encourage employees to choose commute options with reduced GHG emissions, including:

- EcoPass
- Pre-tax transit benefit
- City Hall secure employee bike parking and showers
- Bike to Work Month events
- Get Back on Your Bike trainings
- Green Commute Challenge

The City of San José should continue to promote measures to reduce GHG emissions related to its employee commute.

2010 Baseline Inventory

The baseline inventory identifies that the City's local government operations generated a total of 66,766 MT CO_2e in 2010. As shown in Table 2.2 and Figure 2.1 on the following page, emissions from the energy sector were the largest contributor of emissions (79%), followed by the vehicle fleet sector (19%). Water and wastewater services and the solid waste sector comprise the remaining emissions (3%).

Within the energy sector, emissions result from the consumption of electricity, natural gas, and diesel fuel, as shown in Figure 2.2. Electricity consumption in City facilities (i.e., buildings,

Airport, and RWF) generated approximately 31% of total emissions, while natural gas consumption in those same facilities generated an additional 36% of emissions. Public lighting, including streetlights and traffic control lights, contributes 11% of municipal emissions. Stationary sources, including diesel-powered equipment, contribute the remaining energy-related emissions, representing less than 1% of the total inventory.

Within the vehicle fleet sector, approximately 84% of emissions come from gasoline vehicles. Nearly 16% come from biodiesel vehicles. Less than 1% of fleet emissions come from the City's diesel, liquid petroleum gas, or methanol-based vehicles.

Table 2.2
Baseline 2010 Local Government Operations Emissions

Emission Sector and Subsector	Emissions (MT CO_2e/yr)	City Total (%)
Energy	**52,423**	**78.5%**
Buildings	17,982	26.9%
Airport	7,097	10.6%
Regional Wastewater Facility	20,097	30.1%
Public Lighting	7,137	10.7%
Stationary Sources	110	0.2%
Vehicle Fleet	**12,700**	**19.0%**
Water Services	**797**	**1.2%**
Wastewater Services	**456**	**0.7%**
Process Emissions	456	0.7%
Solid Waste	**389**	**0.6%**
Total	**66,766**	**100.0%**

Source: AECOM 2013
Note: MT CO_2e = metric tons of carbon dioxide equivalent; column sums may not match total shown due to rounding

Figure 2.1 – Baseline 2010 Inventory Emissions by Sector

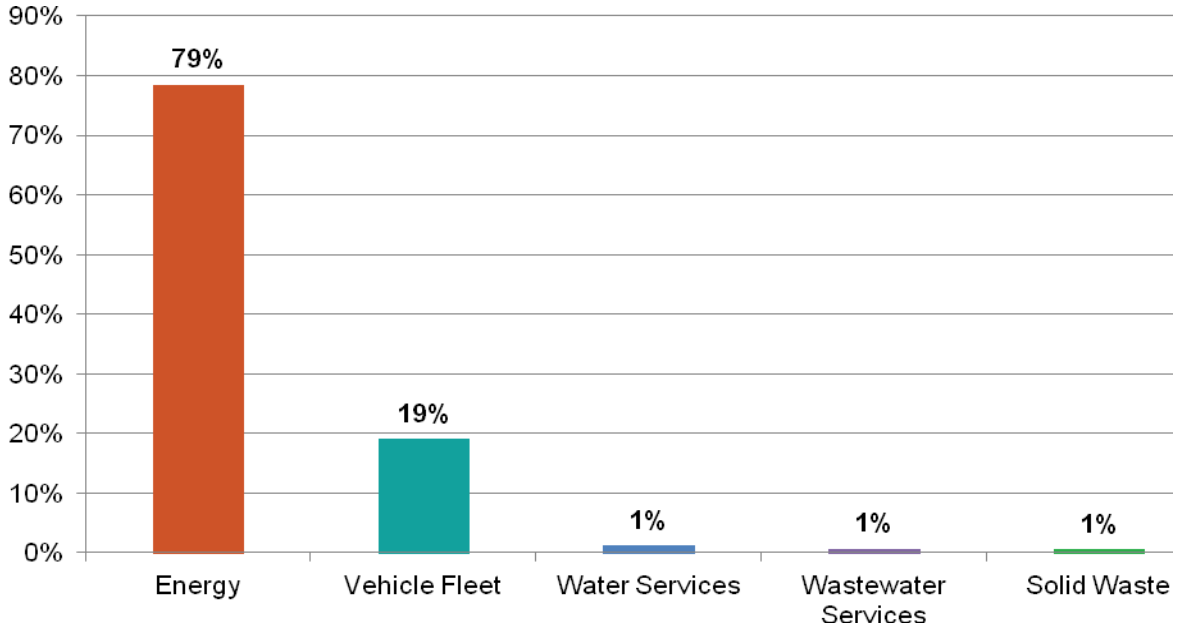
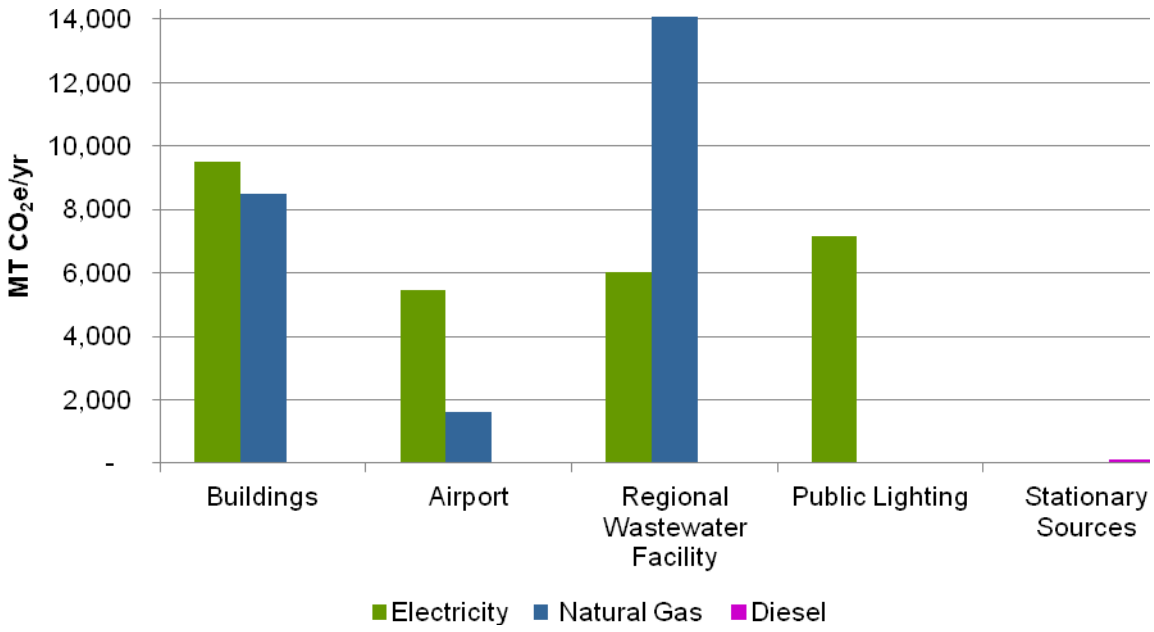


Figure 2.2 – Energy Subsector Emissions by Fuel Type



Greenhouse Gas Forecasts

Business-as-Usual Emission Forecasts (2020, 2035, 2050)

Business-as-usual (BAU) scenario forecasts are used to estimate the amount of emissions that are likely to occur in future years assuming that current activity intensity factors (i.e., level of activity per sector per capita) and emissions factors (i.e., emissions per unit of activity) are held constant. BAU forecasts provide insight regarding the scale of reductions necessary to achieve a future emissions target assuming a future scenario in which no additional local or statewide actions are taken to curb emissions generation. The CAP's reduction measures from Chapter 3 will then be applied to these emissions forecast levels to determine if the City is on track to achieve its emissions reduction targets.

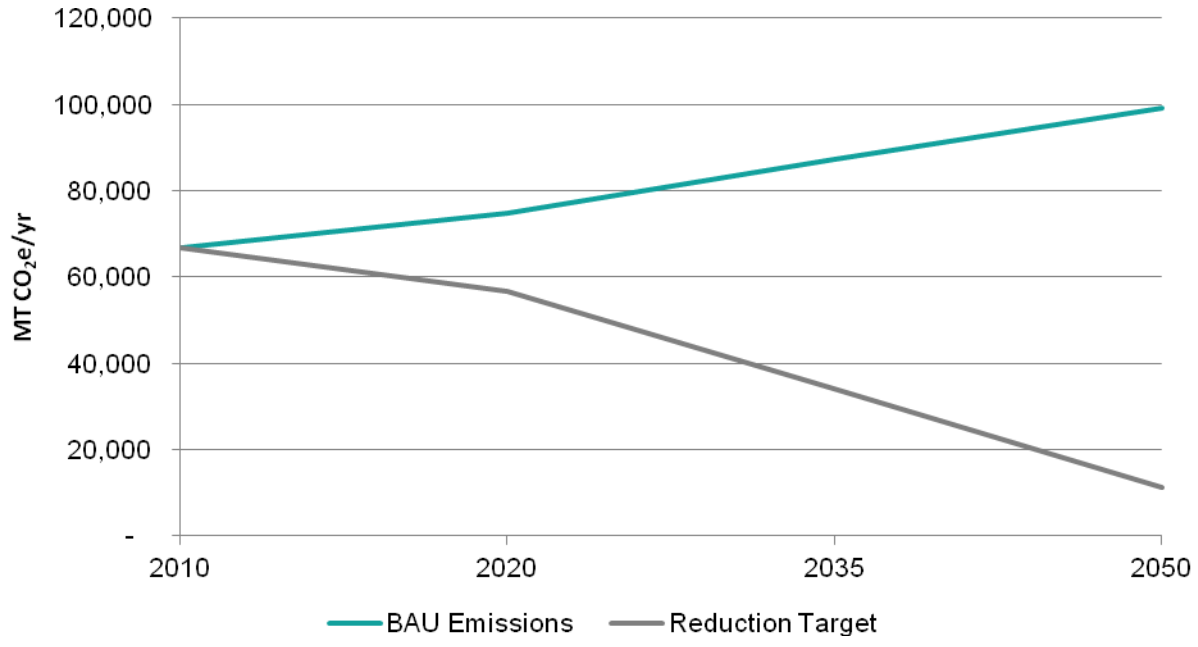
Forecasts for the City's municipal operation emissions were developed for the years 2020, 2035, and 2050, in order to align with the CAP's reduction target years described in Chapter 1. These forecasts assume that 2010 activity intensity and emissions factors are held constant and that emissions grow in proportion to projected population and employment growth as well as the associated need for at least current levels of government services. The regional CAP project, under which this CAP was prepared, used population and employment growth estimates from the Association of Bay Area Governments (ABAG) to provide consistency in the preparation of emissions forecasts. See Appendix B for details on the emission forecast methodology.

Table 2.3 and Figure 2.3 identify projected BAU local government operations emissions by sector for the target years. Further, Table 2.3 includes the City's baseline emission levels, future year emissions reduction targets, and the resulting reductions needed to achieve the emissions targets. Local government operations emissions are estimated to increase in future years under the business-as-usual scenario based on ABAG's population and employment growth estimates for San José, with future emissions levels growing to:

- 74,904 MT CO_2e/year by 2020 (12% above the 2010 baseline),
- 87,445 MT CO_2e/year by 2035 (31% above the 2010 baseline), and
- 99,157 MT CO_2e/year by 2050 (49% above the 2010 baseline).

Table 2.3 City Operations BAU Emissions (2010 - 2050)				
Emission Sector and Subsector	**2010 Emissions (MT CO_2e/yr)**	**2020 Emissions (MT CO_2e/yr)**	**2035 Emissions (MT CO_2e/yr)**	**2050 Emissions (MT CO_2e/yr)**
Energy	**52,423**	**58,616**	**68,178**	**77,136**
Buildings	*17,982*	*19,330*	*21,281*	*22,957*
Airport	*7,097*	*7,363*	*7,734*	*8,039*
Regional Wastewater Facility	*20,097*	*23,863*	*29,885*	*35,769*
Public Lighting	*7,137*	*7,939*	*9,141*	*10,221*
Stationary Sources	*110*	*121*	*136*	*149*
Vehicle Fleet	**12,700**	**14,366**	**16,904**	**19,233**
Water Services	**797**	**947**	**1,186**	**1,419**
Wastewater Services	**456**	**542**	**679**	**812**
Process Emissions	*456*	*542*	*679*	*812*
Solid Waste	**389**	**433**	**498**	**557**
Total	**66,766**	**74,904**	**87,445**	**99,157**
Reduction Target	-	15% below baseline	49% below baseline	83% below baseline
Target Emission Level	-	56,751	34,050	11,350
Reductions Needed to Achieve Target	-	18,153	53,394	87,807

Figure 2.2 – Local Government Operations Business-as-Usual Emissions (2010 - 2050)



As described above, these BAU projections are based on estimated population and employment growth within the City, which would lead to increased demand for government services. However, emissions growth across the sectors is estimated to occur at different rates based on the relationship between the types of government services provided within each sector and population and employment growth (see Appendix B for a description of the emissions forecast methodology).

It should be noted that forecasting local government operations emissions growth is not an exact science. Numerous factors can influence emissions growth within a city (e.g., the City's ability to accommodate future service growth demands with existing facilities, staff, and equipment). The forecasts presented above represent a best estimate of how those factors would contribute to growth within San José's local government operations. However, regular inventory updates are the best method to accurately track emissions growth and future reductions as the City continues to implement strategies that result in lower resource consumption and fewer associated GHG emissions. See Chapter 4 for further description of the role of regular inventory updates.

ADJUSTED BUSINESS-AS-USUAL EMISSION FORECASTS (2020, 2035, AND 2050)

Adjusted-business-as-usual (ABAU) forecasts are used to estimate future local emissions levels, assuming the implementation of key state-adopted actions. Like BAU forecasts, ABAU forecasts also do not include any future emission-reduction actions taken by the City (i.e., actions taken after the 2010 baseline year). The State of California has set forth legislation and regulations aimed at reducing GHG emissions in a wide range of sectors. Within the ABAU forecasts developed for the CAP, it is assumed that emissions within the energy and water sectors will be reduced through implementation of the Renewable Portfolio Standard (RPS) (Senate Bill 1078). The standard effectively requires electrical utilities to reduce the carbon intensity of their electricity by obtaining 33% of their generation portfolio from renewable sources by 2020.

This state action will help reduce local government operations emissions and contribute toward achievement of the City's emissions targets. The City will need to monitor the effectiveness of this state action to ensure that the anticipated level of reductions is achieved locally, and to ensure that all applicable statewide reductions are accounted for, should additional actions be developed that would apply to the CAP.

Notably the CAP does not apply separate reductions from state actions related to vehicle fleet sector emissions, including Assembly Bill 1493 (Pavley I and II), Executive Order S-1-07 (Low Carbon Fuel Standard), and other vehicle efficiency regulations. These actions were excluded to avoid double counting between the state actions and the City's own efforts at transitioning its fleet towards lower emissions vehicles. However, as with the RPS the City will need to continue to monitor the state's implementation of these vehicle-related regulations. Future inventory updates should incorporate vehicle emissions factors that account for higher levels of efficiency

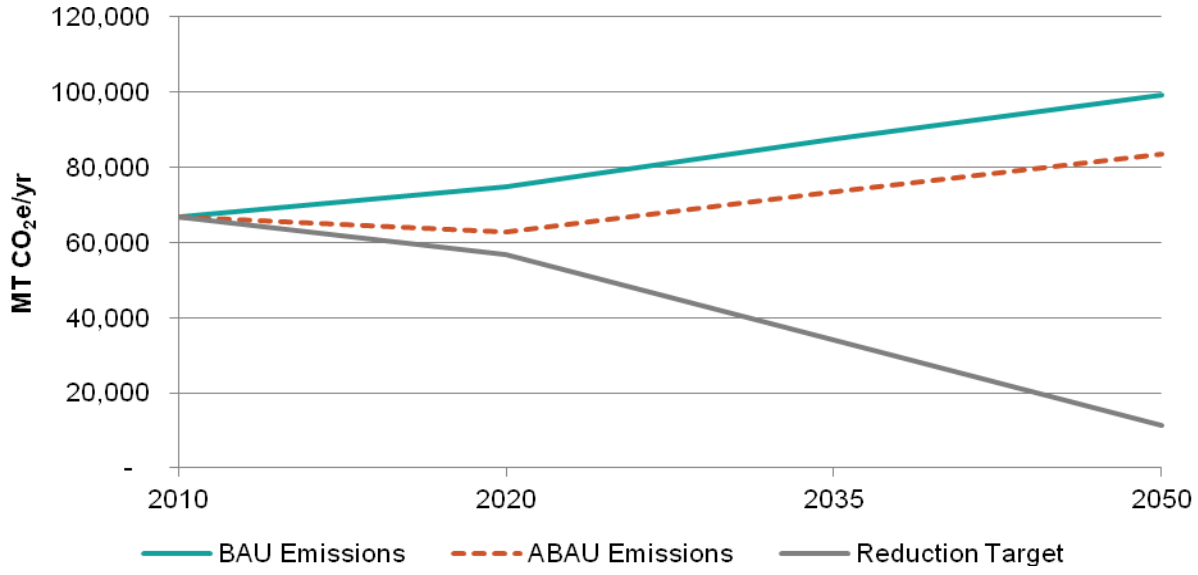
and lower fuel carbon content related to implementation of these regulations, which will likely provide another source of emissions reductions.

Table 2.4 identifies projected ABAU municipal operation GHG emissions by sector for 2020, 2035, and 2050 after estimating the impact of the RPS. The table also shows the City's baseline emission levels, reduction targets, and the resulting reductions needed from local actions to achieve the emissions targets. In 2020, municipal operation emissions will decrease to approximately 62,776 MT CO_2e/year following full implementation of the RPS, representing a level approximately 6.0% below 2010 baseline levels, setting the City on a trajectory towards its 2020 target. However, the impact of the RPS does not maintain the City's trajectory towards the 2035 and 2050 targets (which become increasingly more aggressive), indicating a future role for more robust local action and/or enhanced statewide action. As shown in Figure 2.4, the gap between the red ABAU forecast line and the gray reduction target line indicates the amount of additional reductions needed to achieve the targets.

Table 2.4
City Operations ABAU Emissions (2010 - 2050)

Emission Sector and Subsector	2010 Emissions (MT CO_2e/yr)	2020 Emissions (MT CO_2e/yr)	2035 Emissions (MT CO_2e/yr)	2050 Emissions (MT CO_2e/yr)
Energy	**52,423**	**46,821**	**54,634**	**61,974**
Buildings	*17,982*	*15,746*	*17,335*	*18,700*
Airport	*7,097*	*5,367*	*5,637*	*5,859*
Regional Wastewater Facility	*20,097*	*20,439*	*25,597*	*30,636*
Public Lighting	*7,137*	*5,149*	*5,929*	*6,629*
Stationary Sources	*110*	*121*	*136*	*149*
Vehicle Fleet	**12,700**	**14,366**	**16,904**	**19,233**
Water Services	**797**	**614**	**769**	**921**
Wastewater Services	**456**	**542**	**679**	**812**
Process Emissions	*456*	*542*	*679*	*812*
Solid Waste	**389**	**433**	**498**	**557**
Total	**66,766**	**62,776**	**73,483**	**83,497**
Percent Change from Baseline	-	-6%	10%	25%
Reduction Target	-	15% below baseline	49% below baseline	83% below baseline
Target Emission Level	-	56,751	34,050	11,350
Reductions Needed to Achieve Target	-	6,025	39,433	72,147

Figure 2.4 – BAU and ABAU Emissions Forecasts (2010-2050)



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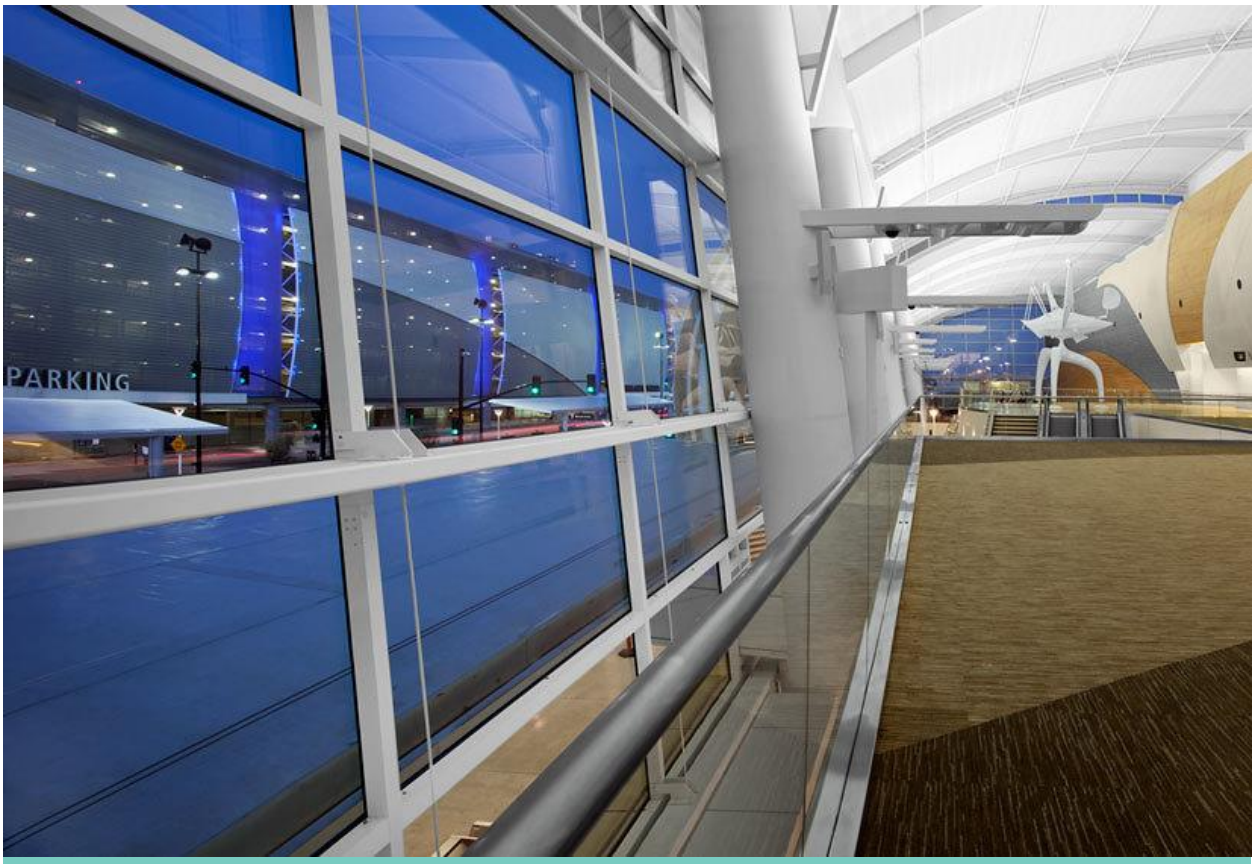


Chapter 3

REDUCTION STRATEGIES

This chapter describes the strategies and actions that the City could implement to reduce GHG emissions to achieve its local government operations targets. The chapter provides a description of the CAP strategy development process, a summary of the emission reductions anticipated from implementation of each proposed strategy, a discussion regarding estimated achievement of the City's 2020 emissions reduction target, and recommendations for putting the City on a pathway toward reaching its 2035 and 2050 targets. The remainder of the chapter provides descriptions of the individual strategies and implementation actions.

Strategy Development Process

The purpose of the LGO CAP strategies is to define future actions and implementation steps that the City could take to reduce its local government operations emissions. To develop the strategies and actions contained within the plan, the City conducted the following steps:

1. Reviewed existing and past City efforts
2. Reviewed best practices
3. Selected strategies compatible with City management priorities
4. Developed preliminary actions and implementation steps to carry out strategies
5. Calculated GHG reduction potential
6. Further refined proposed strategies, actions, and implementation steps (with performance goals and departmental responsibility)

During the development of the LGO CAP, staff identified a wide range of efforts the City has already implemented to reduce energy and water use, improve vehicle efficiency, and generate clean electricity. These past and ongoing efforts are foundational to the development of additional future efforts, and were reviewed to identify opportunities for further implementation and development of new actions. Some existing measures have the potential for expansion or increased adoption within the City's operational framework, and are included in the CAP's strategy discussion below. As an example, the City could expand its broad shift within the municipal vehicle fleet towards alternative fuel technologies. Alternatively, some past activities may not be primary candidates for expansion at this time, such as the City's initiative to retrofit its traffic lights to high-efficiency technology (as all traffic lights have already been retrofitted), but are still described in this chapter to provide the context for future City actions. And finally, some actions were completed prior to the CAP's 2010 baseline year and cannot be included as reductions for purposes of this plan. However, these actions have already contributed emissions reductions that served to reduce the City's 2010 baseline emissions inventory to a level lower than would otherwise have been possible without their implementation. Therefore, while this CAP and the City's emissions reduction targets are based on the most current local government operations inventory for 2010, the City's past actions have already set it on a path towards mirroring California's statewide reduction targets. This CAP attempts to capture the reduction potential of City actions taken since 2010 and those estimated for future implementation, but falls short of documenting the full historical impact of the City's past efforts towards reducing emissions.

Past and Existing Municipal Strategies

Table 3.1 lists the City's past and existing actions that were considered during CAP development to identify opportunities for expanded or new municipal action.

Table 3.1 Existing City Emissions Reduction Initiatives	
ENERGY	
Renewable or Low-Carbon Energy Generation	
• Solar Photovoltaic Installations • Fuel-Cell System Installations	• Landfill Biogas-to-Energy Facility[1]
Existing Building Energy Retrofit	
• Revolving Energy Fund • Building Energy Benchmarking • Building Energy Audits • Indoor Building / Parking Garage Lighting Retrofits • Exterior Building Lighting Retrofits • Advanced Lighting Controls / Monitoring Systems	• Building Systems (e.g., HVAC) Retrofits • Green Roof Installations • Low-Flow Fixtures / Low-Flow Toilets at Public Facilities • Municipal Building Energy Retrofit Targets
New Building Energy Performance	
• Green Building Standards – LEED® Silver Certification	• Solar-Ready Construction
Behavior Conservation / Energy Management	
• Energy Efficient Procurement Policy – ENERGY STAR® Appliances	• Energy Management Systems – Office Equipment
Public Realm Lighting Efficiency	
• Traffic Signal Retrofits • Streetlight Retrofits • Public Streetlight Design Guide	• Parking Lot/Parking Facility Lighting Retrofits • Energy Efficiency or Solar Lighting in New Parks
District Heating Efficiency	
• Energy Efficient Heating/Cooling Unit Installation	
Water System Energy Efficiency	
• Variable Frequency Drives at Pumping Stations	• Wastewater Treatment Facility Process Improvements
Landscape Water Conservation	
• Water Conservation Plan for Public Parks	
Airport Energy Efficiency Retrofits	
• Green Building Standards • Indoor Lighting Fixture Retrofits	• Runway Lighting Retrofits

VEHICLE FLEET	
Alternative Fuel Vehicles	
• Alternative Fuel Vehicle Procurement Policy	• Electric Vehicle Charging and CNG Fueling Stations
Behavior / Fuel Conservation	
• Anti-Idling Policy • Municipal Bike Fleet • Car Share Program	• Fuel-Efficient Operational and Maintenance Policies • Fleet Reduction Program
Airport Ground Operations	
• Equipment Fuel Conversion	
SOLID WASTE	
Waste Reduction	
• Zero-Waste Strategy • Green Product Procurement Specifications • Collection and Composting Program	• Diversion Rate Tracking • Waste Container Hand-Sorted Recycling
Landscape Waste Diversion	
• On-Site Landscape Waste Reduction Program	• Municipal Landscape Waste Composting Program
Construction and Demolition (C&D) Waste Diversion	
• C&D Waste Diversion Ordinance – 75% Diversion	
Landfill Operations	
• Landfill Biogas Capture and Flare System	

Note: The items presented in this table represent a review of past City actions undertaken in 2012 / 2013 as part of the initial CAP development process and does not reflect all actions taken to date

[1] The City has received landfill gas in the past from the Newby Island Resource Recovery Park to use in a landfill gas-to-energy system at the Regional Wastewater Facility. As of 2013, the City was not receiving this landfill gas. However, at the time of CAP preparation, the City was reevaluating options to begin receiving gas again.

To ensure that the CAP contains a full spectrum of emission reduction strategies, staff performed a review of best practices from other leading jurisdictions and compared it to the City's prior actions. From this list, best practices compatible with City Council and organizational priorities were selected to move forward as potential CAP strategies. Staff then reviewed and selected preliminary draft actions and implementation steps that could be used to implement the strategies. The City's GHG reduction estimates presented in this chapter were developed using this list of strategies, proposed actions, and implementation steps.

Proposed Municipal Strategies – 2020 Target Year

The strategies and reduction estimates presented in this chapter are based on reasonable estimates for what is possible and likely to occur by the 2020 target year (i.e., emissions reductions to occur between 2010 baseline year and 2020 target year). These estimates were prepared based on conversations with key staff in various City departments regarding the City's past efforts and what is planned for the near-term. Table 3.2 summarizes the proposed LGO CAP strategies that are described in the following section of this chapter, along with their total GHG emission reductions anticipated from implementation by 2020. Several strategies are described in the table as "Supporting Strategies" either because no emissions reductions are directly associated with their implementation or the necessary data and/or quantification methodologies are currently unavailable to support a reasonable estimate of associated emissions reductions. Similarly, throughout this chapter specific actions within the strategy discussions may be described as a "Supporting Action" or "Not Quantifiable" based on this same premise. However, these supporting strategies and actions still play an important role in the implementation of other strategies and achievement of the City's reduction targets. In the future, as data collection practices and emissions analysis become more refined it may become feasible to estimate the reductions from a broader range of strategies and actions.

A description of the specific actions to be taken by the City when implementing these strategies is presented throughout the remainder of this chapter. Details describing calculation of the emissions reduction estimates are provided in Appendix C.

Table 3.2
Proposed 2020 Local Government Operations Emissions Reduction Strategies

Reduction Strategies	Emission Reductions in 2020 (MT CO_2e/year)	Contribution to 2020 Target
ENERGY STRATEGIES		
Statewide Renewable Portfolio Standard	12,125	67%
E-1 Strategic Energy Action Plan	Supporting Strategy	
E-2 Sustainable Energy Portfolio	1,140[1]	6%
E-3 Renewable Energy Generation	8,995	42%
E-4 Advanced Energy Management	350	2%
E-5 Existing Building Energy Retrofit	Supporting Strategy	
E-6 New Building Energy Performance	Supporting Strategy	
E-7 Public Realm Lighting Efficiency	2,060	14%
E-8 Landscape Water Conservation	200	1%

Table 3.2 Proposed 2020 Local Government Operations Emissions Reduction Strategies		
Reduction Strategies	**Emission Reductions in 2020 (MT CO_2e/year)**	**Contribution to 2020 Target**
AIRPORT FACILITY AND OPERATION STRATEGIES		
A-1 Airport Runway Lighting Improvements	25	<1%
A-2 Airport Operation Efficiency Improvements	135	1%
WASTEWATER TREATMENT FACILITY STRATEGIES		
WW-1 Wastewater Facility Innovation Opportunities	4,900	27%
VEHICLE FLEET STRATEGIES		
VF-1 Low Emissions Vehicles	220	1%
VF-2 Alternative Fuel Infrastructure	Supporting Strategy	
VF-3 Behavior / Fuel Conservation	Supporting Strategy	
SOLID WASTE STRATEGIES		
SW-1 Waste Reduction	250	1%
SW-2 Landscape Waste Diversion	35	<1%
SW-3 Construction and Demolition Waste Diversion	10	<1%
TOTAL REDUCTIONS	**30,445**	**168%**
Reductions Needed to Achieve Target	18,153	
Remaining Reductions Needed	(12,292)	
Reduction Target Achieved	33% below 2010 levels	

[1] Only reductions associated with implementation of Strategy E-2 Action B are presented here; it is assumed that implementation of the clean electricity option described in Strategy E-2 Action A, if pursued, would occur after the 2020 horizon year. If implementation of the clean electricity option is pursued prior to 2020, then the emissions reductions associated with strategies that reduce electricity-related emissions would be reduced.

2020 TARGET ACHIEVEMENT

As shown in Table 3.2, emissions reductions by 2020 are estimated to exceed the City's near-term reduction target, in large part driven by the state's Renewable Portfolio Standard (RPS) described in Chapter 2. Reductions associated with the RPS would occur regardless of the City's decision to develop a CAP, and provide the majority (i.e., 67%) of reductions needed to achieve the 2020 target, resulting in emissions levels 6% below the 2010 baseline. The City is expected to achieve its 2020 reduction target through a combination of reduction strategies across the CAP's five strategy areas: Energy, Airport Facility and Operation, Wastewater

Treatment Facility, Vehicle Fleet, and Solid Waste. Implementation of these strategies could achieve reductions of 33% below 2010 baseline levels by 2020. This would exceed the City's near-term target of 15% below 2010 levels by 2020, and would set the City on a pathway towards achievement of its longer-term targets (e.g., 2035, 2050). Figure 3.1 illustrates the City's 2020 business-as-usual (BAU) emissions forecast, reduction target, and estimated reduction level assuming implementation of these CAP strategies and the RPS. Figure 3.2 illustrates the relative impact of each reduction strategy considered for implementation by 2020 (excluding the RPS). As shown, the primary contributors to achievement of the 2020 target are energy and wastewater facility strategies. The following section presents these CAP reduction strategies and associated implementing actions in greater detail.

Figure 3.1 – CAP Strategy Emission Reduction Potential 2010 to 2020

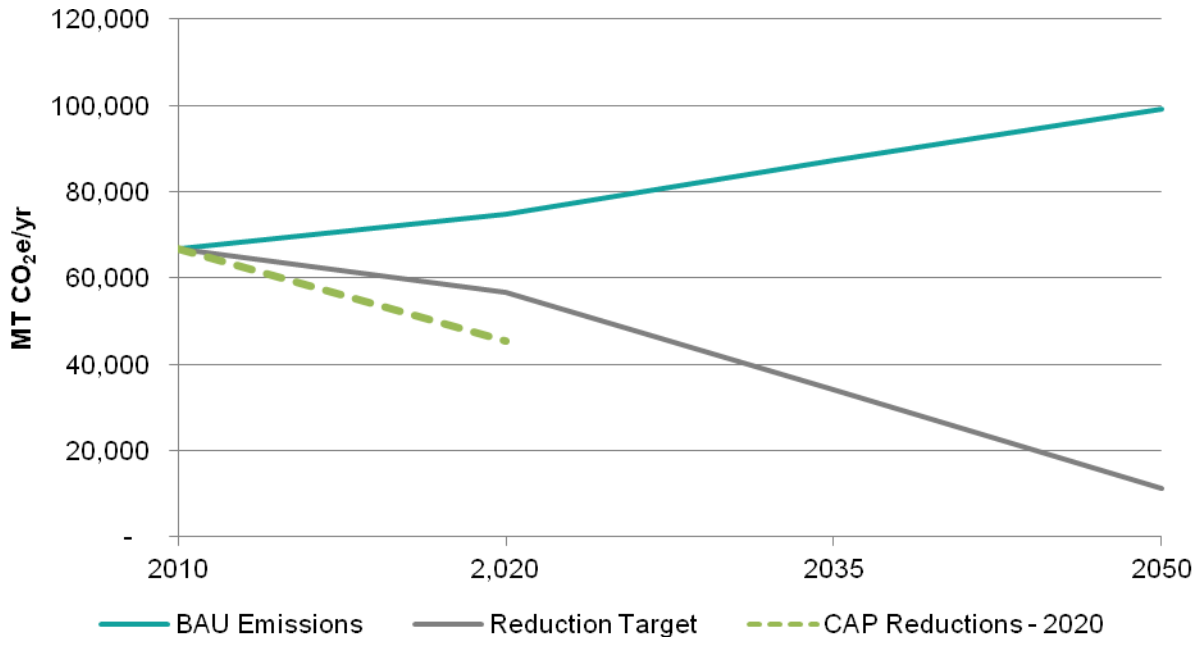
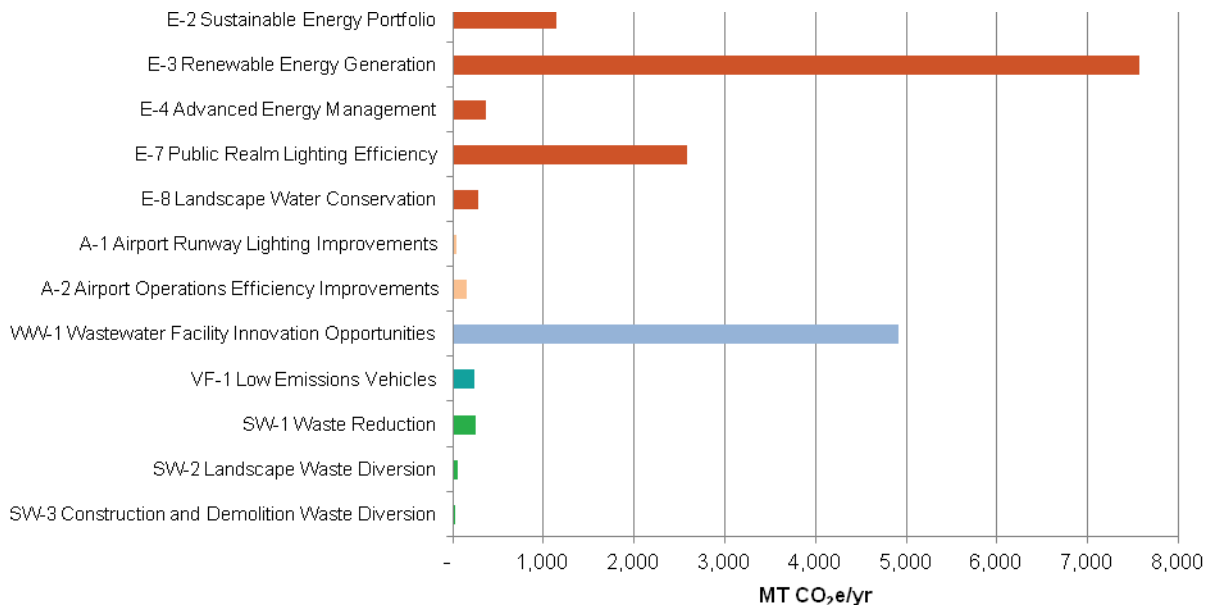


Figure 3.2 – Comparative Emission Reduction Potential of CAP Strategies (2020)



ENERGY STRATEGIES

Emissions from the energy sector represented approximately 48% of total municipal emissions in 2010. The sector's proportional share of total emissions, however, is only forecast to account for 44% of total municipal emissions by 2035, as the City's facilities and buildings continue to decrease emissions over time through efficiency gains in energy production and use. Energy emissions are generated as electricity and other resources are used to supply the City's buildings and facilities with power and water. Electricity from the public utility grid is generated from a variety of sources, including natural gas and coal power plants, hydro-electric generators, wind farms, and large-scale solar facilities. This mix of energy sources used to supply the grid is one factor used to calculate the City's energy-related emissions. Electricity powers the City's building and facility lighting, air conditioning, computers, and other office equipment that support daily operations. Electricity is also used to power City-owned water and wastewater pumps and public lighting, including streetlights, traffic lights, municipal parking lot lights, and park and recreational lighting. Energy-related emissions also include natural gas used for indoor space heating, hot water use, and other government operations.

While the energy-related goals in the City's Green Vision are focused on the community level, local government operations are a part of the San José community and the City has historically acted to lead by example. For example, the City is striving to achieve overlapping Green Vision Goals #2 and #3. These targets have respectively tasked the City to reduce per capita energy use by 50% as well as receive 100% of its electrical power from clean renewable sources by 2022.

The City has already taken a number of steps to reduce energy emissions through energy-efficiency improvements and renewable energy installations. Existing buildings and facilities

have been made more energy-efficient with indoor lighting retrofits, lighting occupancy sensors, office equipment energy management systems, exterior lighting and traffic signal retrofits, parking garage lighting upgrades, and green roof installations. Municipal installations of solar photovoltaic (PV) systems total approximately 4.8 MW, and provide a source of emissions-free electricity to offset part of the City's energy demand.

The City has also demonstrated a leadership role through policy and operational guidance, including adoption of a green building policy in 2001 (subsequently updated in 2007) that requires new construction and significant retrofits of City facilities to meet Leadership in Energy and Environmental Design (LEED) Silver standards. To lead by example, the City Hall was among the nation's first to achieve LEED Platinum Certification for existing Buildings. Other municipal buildings that have achieved LEED certification include five community centers (Camden, Edenvale, Mayfair, Roosevelt, and Starbird), six libraries (Dr. Martin Luther King Jr. Main Branch, East San José Carnegie Branch, West Valley Branch, Santa Teresa Branch, Educational Park Branch, and Calabazas Branch), two joint-use facilities (Bascom Library and Community Center and Seven Trees Library and Community Center), one fire station (No. 35), and seven additional municipal facilities including the Happy Hollow Park and Zoo, Environmental Services Building, San José Airport North Concourse, San José Airport Terminal B, Police Substation, Convention Center Expansion, and Central Service Yard. A municipal purchasing policy encourages use of ENERGY STAR-rated appliances and equipment to increase operational efficiency. Landscape water conservation practices on City property are also contributing to energy and water conservation through use of water budgets, recycled water for irrigation, and training park staff in water conservation best management practices. It should also be noted, that while it is difficult to measure, the City's parks and open space provide a variety of GHG mitigating effects such as carbon sequestration in plant matter and heat island mitigation that can reduce energy use in nearby City facilities.

This sector includes eight new strategies that expand upon these previous successes in energy efficiency and renewable energy development to help the City achieve its 2020 target, and establish a framework for achieving its 2035 and 2050 targets. The following strategies will provide emission reductions through cleaner grid electricity, expanded renewable energy development, advanced energy management practices, additional building retrofits, enhanced energy performance standards for new construction, public lighting retrofits, and enhanced landscape water conservation.

The actions described in Strategy E-2 would lower emissions from all municipal electricity use. Therefore, this strategy directly influences other electricity use-reducing strategies and will affect their potential emissions reductions. In essence, the implementation of Strategy E-2 will lower the reduction potential of the other electricity-related strategies because the electricity those strategies conserve would already have lowered emissions through the cleaner electricity portfolio resulting from Strategy E-2. However, it is assumed that the City will not implement the clean electricity actions described in Strategy E-2 prior to the 2020 horizon year. As such, the emissions reduction potential of all strategies that reduce electricity usage was estimated based on the assumption that PG&E will achieve compliance with the RPS by 2020. The emissions

estimates should be considered above and beyond the reductions associated with implementation of the RPS. If all CAP energy sector strategies are implemented by the year 2020 (excluding Strategy E-2 Action A), their total reduction potential would be approximately 12,745 MT CO_2e per year.

STRATEGY E-1 STRATEGIC ENERGY ACTION PLAN

Prioritize, implement, and monitor energy efficiency improvements and leverage investments to optimize energy efficiency outcomes and reduce renewable energy development needs.

Municipal buildings and facilities in San José consumed 142 million kilowatt hours[viii] (kWh) of electricity in 2010. While the use of renewable energy sources will help to reduce the City's carbon footprint, development of such systems can be expensive to install and maintain. In order to balance the overlapping goals of improved energy efficiency and increased renewable energy development, the City should further develop its existing Strategic Energy Action Plan (SEAP) or supplement the SEAP with a Municipal Energy Action Plan (MEAP) to clearly outline a pathway to achieve its municipal energy-related goals.

Action A. Strategic Energy Action Plan

San José's City Council adopted the SEAP in 2010, which was developed to guide implementation of several Green Vision goals, with primary focus on Goals #2 and #3, reducing energy use by 50% per capita and receiving 100% of electricity from renewable resources. As a strategy to achieve the 100% renewable electricity goal, the SEAP included a near-term goal to install 50 MW of renewable electricity generation capacity on City-owned facilities and land for municipal use. The SEAP also included a preliminary assessment of renewable energy facilities that have already been developed or have been planned for near-term implementation. That assessment has identified approximately 9 MW of renewable electricity capacity from biogas generation and a fuel cell installation at the Regional Wastewater Facility as well as solar PV installations at the Central Service Yard, airport, and other smaller municipal facilities. The SEAP also estimated the location of approximately 43 MW in additional solar PV potential that could be realized within 2-5 years, with the assumption that solar generation is currently the most viable technology option to achieve the City's renewable energy goals.

The SEAP proposes an implementation strategy for renewable energy systems that mirrors the CEC's energy loading order. This strategy first prioritizes energy efficiency improvements to reduce total building energy demand, and is followed by the installation of renewable energy generation systems that are designed to meet the remaining electricity demand of City facilities. The SEAP considers the following locations to be viable:

- new facilities that were constructed to be energy efficient,
- facilities at which energy efficiency improvements were recently completed, and
- facilities with planned energy efficiency improvements.

The SEAP also generally describes actions that the City can take to advance energy efficiency in public buildings and facilities. Such actions include the completion of energy audits at municipal facilities, tracking and managing the efficacy of City energy activities, and continuing use of the City's energy efficiency fund. The SEAP however, does not outline specific efficiency projects that pursue or estimate potential energy savings from remaining municipal efficiency retrofits, as it does in describing paths to achieve the 50 MW renewable energy generation goal.

As part of its next SEAP update, (planned for May 2015, the City should establish a MEAP with a municipal energy efficiency target that is consistent with and supports the broader community-wide energy use reduction target included within the Green Vision (i.e., 50% per capita energy use reduction). This target could be expressed as a City-employee efficiency target (e.g., kWh/City employee) or as a total municipal energy use target (e.g., kWh/yr), consistent with the manner in which municipal electricity reductions are currently tracked for the Green Vision Goal #2 reporting.

In addition to establishing a clear municipal energy target, the SEAP update should also include an analysis of any remaining energy efficiency potential within municipal facilities, particularly among priority facilities referenced in the SEAP. In this analysis, it is likely that the gains toward energy efficiency targets will not be even across all buildings/facilities or energy end uses, since some opportunities will have greater energy reduction potential than others. For example, a 50% electricity use reduction in any one building could be easier and cheaper to achieve than a 50% natural gas use reduction in the same building. This analysis should estimate the energy savings that can be achieved at the priority facilities, and then estimate additional energy savings from other facilities that will allow the City to achieve its energy use target.

E-1. Strategic Energy Implementation Plan

Actions and Implementation Steps

A. Municipal Energy Action Plan • Supplement the community-wide SEAP by developing a Municipal Energy Action Plan (MEAP) to serve as an overarching energy strategy to help City achieve long-term renewable energy use goals and energy conservation goals; Plan should identify priority energy efficiency retrofit projects anticipated in near-term, and list longer-term opportunities; Plan should also identify renewable energy development opportunity sites to show where overlap exists with anticipated or potential energy efficiency opportunities • Develop implementation phasing strategy that pursues retrofit projects in advance of renewable energy systems to minimize designed generation capacity for energy systems (i.e., install smallest	***Responsibility*** Public Works Department

E-1. Strategic Energy Implementation Plan	
Actions and Implementation Steps	
renewable energy system possible to offset building electricity load, unless excess generation credits can be transferred to other municipal utility meters) • Develop list of and outline tracking procedure to monitor all municipal renewable energy projects (across all departments) as means to measure progress towards renewable energy development goals and report annual emissions reductions associated with energy systems • Conduct analysis of viable technologies and financing options to achieve City's renewable energy development goal, and consider if intent of goal can be achieved through pursuit of clean electricity purchase options described in Strategy E-2 or purchase of carbon offset credits Note: The following measures (i.e., E-2 through E-8) are assumed to be prioritized in the MEAP; some may be found to be infeasible at that time; the MEAP may build from the City's Draft Energy Conservation Plan, which had not yet been approved at the time of LGO CAP preparation	
Performance Indicator (2020) City makes energy efficiency retrofit and renewable energy development decisions within context of comprehensive municipal energy-related project / program strategies and goals	***2020 Reduction Potential (MT CO_2e/yr)*** Supporting Action

STRATEGY E-2 SUSTAINABLE ENERGY PORTFOLIO

Procure low-carbon grid electricity through purchase options or utility-scale renewable energy development.

The GHG emissions attributed to electricity use are a direct result of the energy-generating sources contained within the electricity grid's portfolio. Shifting the grid's portfolio to cleaner energy sources (e.g. wind, solar, geothermal) will reduce emissions related to building energy use, such as lighting, mechanical systems, and office equipment. The Pacific Gas and Electric Company (PG&E) currently provides electricity and natural gas to City buildings and facilities, and is responsible for determining the grid's energy portfolio. This strategy presents the City's opportunities to either influence the portfolio mix of energy provided to the City or develop utility-scale renewable energy systems to meet municipal energy demands.

There are several options to implement this strategy, including purchasing cleaner electricity directly from PG&E through its Green Option Program; partnering with other area jurisdictions to develop a community power-purchasing aggregation district that can independently buy cleaner

electricity (commonly known as Community Choice Aggregation or "CCA"); or developing a utility-scale renewable energy system to meet some or all of the municipal electricity demand. These actions are not necessarily mutually exclusive; though it is likely the City would not opt to pursue them all.

This strategy is supported by other LGO CAP strategies and existing City actions that reduce electricity demand, either through energy-efficiency improvements or educational programs that promote energy conservation, and should continue to be pursued in tandem. Implementation of this strategy could reduce emissions by as much as 11,725 MT CO_2e/year in 2020, if either the utility-enhanced clean generation portfolio or the community choice aggregation options are implemented with 100% renewable electricity. The City continues to evaluate whether a CCA is a viable option.

Action A. Utility-Enhanced Clean Generation Portfolio

PG&E has finalized its Green Option Program, which will allow customers to voluntarily purchase 100% renewable electricity, and will be accepting subscriptions beginning in late 2015.The program is capped at 272 MW of demand and for a five-year pilot period, with a minimum of 50% being reserved for residential customers. The program will open to new enrollment through 2018, and PG&E may seek to expand/extend the program should it become fully subscribed. The City should explore the potential feasibility of this program, including cost implications, as information becomes available from PG&E, so that a decision to participate can be made shortly following program launch.

This type of action would help facilitate the City's Green Vision goal to receive 100 % of electric power from clean renewable sources, and could achieve emissions reductions totaling 11,725 MT CO_2e/yr in 2020.

Action B. Utility-Scale Renewable or Low-Carbon Electricity Generation

Instead of purchasing renewable electricity from PG&E, the City could also continue to develop its own utility-scale renewable energy projects, such as a solar farm. The City could finance, own, and maintain its own project(s) to increase local government use of renewable energy. The Local Government Renewable Energy Self-Generation Bill Credit Transfer Program (formerly AB 2466) allows local governments to develop renewable generating facilities of up to 5 MW each. The facilities would be interconnected to the utility grid, and the City would receive utility bill credits for the amount of energy generated at the facilities. Alternatively, the City is already using Power Purchase Agreements (PPA) with a solar service provider, in which the City agrees to purchase a set amount of electricity from a renewable generating facility at a set price ($/kWh).

Solar service providers typically pay up-front installation costs, own, and maintain the generating facilities. A PPA also provides a guaranteed price of electricity for the life of the contract. It is possible to install solar PV systems through a PPA approach without also buying the associated renewable energy credits (RECs) associated with the solar installation. The

buying and selling of RECs allows consumers to claim the environmental benefits associated with renewable energy development, even if they do not physically receive the associated energy (e.g., wind energy generated in Nebraska with RECs sold to a public utility in Oregon). In theory, RECs can only have one owner, to avoid over-estimating the benefits of existing renewable energy systems. However, accurately tracking RECs is an evolving practice. The City should identify which of its current leased solar installations also include the RECs, to verify that emissions reduction estimates do not inadvertently claim reductions belonging to another entity. The City should also include the associated RECs within its future solar lease projects to further support the renewable energy development market and continue to make progress towards the CAP and Green Vision goals.

The City has previously considered development of a 5 MW solar facility at the Regional Wastewater Facility, but is currently not pursuing that specific option. Other locations such as closed landfills or public parking garages may be viable for such large-scale renewable energy installations, or the City may opt to pursue multiple smaller, 1 MW systems instead.

E-2. Low-Carbon Grid Electricity

Actions and Implementation Steps

A. Utility-Enhanced Clean Generation Portfolio • Conduct feasibility study of PG&E Green Option financial costs (per kWh costs have not been finalized yet as part of program development) for City to purchase part or all of its electricity from renewable sources • Develop resolution to opt into PG&E Green Option program for municipal electricity purchases (Note: program is currently capped at 272 MW and 5 year pilot program; it is currently unknown how enrollment decisions will be made should program become fully subscribed)	***Responsibility*** Public Works Department/ Environmental Services Department/ Airport
Performance Indicator (2020) Assumes 100% of municipal electricity use in 2020 comes from 100% renewable (or zero carbon) sources via PG&E Green Option program	***2020 Reduction Potential (MT CO_2e/yr)*** 11,725

E-2. Low-Carbon Grid Electricity

Actions and Implementation Steps

B. Utility-Scale Renewable or Low-Carbon Electricity	***Responsibility***
• Perform cost-benefit analysis comparing options of: A) direct purchase of clean energy from PG&E, B) joint development of and participation in CCA, or C) City-owned development of renewable energy facilities • If development of City-owned renewable facilities is found to be preferred option (and legislative barriers are removed), identify City property that can support large-scale renewable energy installations (e.g., unused areas of landfill property) • Consider available finance / funding options (e.g., City-owned, PPA)	Environmental Services Department/ Public Works Department
Performance Indicator (2020) Assumes installation of additional (i.e., beyond existing 4.8 MW installed) solar PV system with 5 MW generation capacity	***2020 Reduction Potential (MT CO_2e/yr)*** 1,140

STRATEGY E-3 RENEWABLE ENERGY GENERATION

Develop additional renewable energy facilities according to guidance described in the Strategic Energy Action Plan.

At the time of CAP preparation, the City had already installed approximately 4.8 MW of solar PV capacity at City buildings and facilities. Additionally, separate co-generation and fuel cell systems at the Regional Wastewater Facility (RWF) were installed to take advantage of nearby renewable fuel sources from landfill methane and biogas from wastewater treatment operations. The City is working with its energy service company (ESCO) to develop an additional 1.3 MW of small-scale PV capacity in 2015. In pursuit of its goal for 50 MW of renewable energy generation, the City will continue to consider the availability of financing options, including potential energy bonds or additional use of solar service providers. As described in the SEAP, the City expects that the majority of future renewable energy projects will be solar installations, though it will continue to explore opportunities for other systems, such as geothermal, wind, and additional fuel cell projects.

The City has also evaluated opportunities to install solar thermal systems on municipal facilities with high hot water use to offset conventional hot water heating systems. The low cost of natural gas and high cost of solar hot water systems limit broad application of these systems because the low cost savings result in payback periods that may exceed the useful operating life of the systems. However, in its commitment to reducing municipal energy use, the City is exploring a variety of project designs to overcome these financial challenges. The following actions will help

to outline a pathway towards increased use of building-scale renewable energy systems. Implementation of this strategy could reduce emissions by nearly 9,000 MT CO_2e/year.

Action A. Energy Bonds

Qualified Energy Conservation Bonds (QECBs) provide low-interest financing for large local governments to promote the use of alternative energy and energy efficiency improvements. QECBs provide a finance option to support capital expenditures, feasibility analyses, and installation of projects to help implement various CAP strategies. The City received a QECB allocation of $9M from the state. The City has not utilized this funding option. Therefore, funds may be available to pursue additional direct install solar PV projects or as contributing funding to a utility scale solution.

Action B. Solar PV Installations on City Buildings, Parking Lots, Land

The SEAP identified 43 MW of solar PV capacity that could be installed within 2-5 years (as of the SEAP release date in 2010). However, conversations with the City's Facility Department staff held during CAP development indicated that estimates for new installations totaling 1.3 MW by 2015 may be possible, with an additional 1.2 MW in 2016. The City may also consider the possible addition of a 5 MW solar farm system within a City parcel by 2020 to increase renewable generation at municipal facilities.

Currently, the City is pursuing direct solar installation projects rather than the PPA installation model it has used in the past. Additional near-term installation opportunities totaling 1.3 MW are currently being analyzed with the City's ESCO, and could be pursued within the 2015 calendar year. The remaining solar potential capacity identified in the SEAP may provide longer-term renewable energy development opportunities, and should be analyzed further to develop a realistic implementation timeframe. As described in Strategy E-2 above, the City should also balance its renewable energy development strategy with other opportunities to achieve its clean electricity goals, such as purchasing clean electricity from utility providers. Depending on the various rate structures of the options described in Strategy E-2, purchasing clean electricity may be cheaper than pursuing development of enough renewable energy systems to offset total municipal electricity use.

Action C. Solar Thermal Installations on City Facilities

Solar water systems collect the heat generated from the sun to heat water, thereby replacing the more conventional use of natural gas or electric heaters. Solar thermal systems tend to be most cost-effective for large hot water consumers (e.g., shower facilities, public pools, laundry facilities) because the systems are currently expensive compared to the relatively inexpensive cost of natural gas. The City will continue to explore opportunities to install solar thermal systems as it already has at two community centers (with swimming pools) and three fire stations. However, recent analysis with the City's ESCO and relevant department managers indicate that of these five previously identified sites, only two may be priority candidates at this time. Old roofing systems on the community centers and one of the fire stations may also

preclude them from solar thermal system installation unless those structures are retrofitted in the future. The remaining two fire stations could install systems to offset the hot water heating load associated with shower facilities, laundry, and cooking needs to support the 24-hour use of the stations. Meanwhile, the City is considering ground-mounted micro co-generation systems for the community center sites, in lieu of solar thermal systems. Based on the actual performance of any installed solar thermal systems, the City will consider additional building and facility opportunities in the future.

Action D. Regional Wastewater Facility Renewable Energy Systems

The Regional Wastewater Facility (RWF) uses landfill gas from the nearby Zanker resource management facility and biogas from the RWF methane digesters. The RWF uses these gas sources to generate a portion of the facility's electricity demand through a cogeneration facility and a recently installed 1.4 MW fuel cell systems.

E-3. Renewable Energy Generation

Actions and Implementation Steps

A. Energy Bonds • Pursue use of City's QECB funding to implement energy efficiency improvement projects identified as part of the City's current ESCO agreement	***Responsibility*** Public Works Department
Performance Indicator (2020) Broadly supports achievement of City's energy reduction and renewable energy development goals	***2020 Reduction Potential (MT CO_2e/yr)*** Supporting Action
B. Solar PV Installations on City Buildings, Parking Lots, Land • Pursue installation of 1.3 MW capacity of identified solar PV projects • Prepare MEAP that identifies priority candidate sites for next phase of solar projects, including near-, medium-, and long-term installation phasing options • Continue to evaluate new solar PV opportunities in context of City's broader energy efficiency and renewable energy development goals to minimize total installed capacity needed to achieve clean electricity goals	***Responsibility*** Public Works Department
Performance Indicator (2020) City maintains existing 4.8 MW of solar PV facilities and installs additional 7.5 MW of capacity to generate 21.2 million kWh/yr of electricity	***2020 Reduction Potential (MT CO_2e/yr)*** 2,800

E-3. Renewable Energy Generation

Actions and Implementation Steps

C. Solar Thermal Installations on City Facilities • Pursue implementation of two solar thermal systems at City fire stations; re-evaluate options for solar thermal systems at two community centers and one additional fire station at time of roof system replacement / retrofit • Work with PG&E account representative to identify utility rebate / rate incentive programs applicable to City natural gas accounts that could increase financial viability of additional solar thermal systems • Pending results from installed projects, conduct feasibility analysis for additional solar thermal opportunities at other buildings / facilities	***Responsibility*** Public Works Department
Performance Indicator (2020) City installs two identified solar hot water systems at fire station facilities to offset 900 therms of natural gas use	***2020 Reduction Potential (MT CO_2e/yr)*** 5
D. Regional Wastewater Facility Renewable Energy Systems • Continue to use landfill gas and / or digester gas to generate electricity for RWF operations	***Responsibility*** Environmental Services Department
Performance Indicator (2020) City maintains use of RWF co-generation systems and fuel cell system to generate at least 47 million kWh/yr of electricity from landfill gas and/or RWF biogas (i.e., not natural gas combustion); assumes approximately 40 million kWh/yr generated from existing co-generation system, and 7 million kWh/yr from existing fuel cell system	***2020 Reduction Potential (MT CO_2e/yr)*** 6,190

STRATEGY E-4 ADVANCED ENERGY MANAGEMENT

Reduce energy consumption in existing municipal buildings through energy efficiency improvements, interactive management systems, employee education, and building operation and maintenance policies.

Improving energy efficiency and management in existing buildings can provide the immediate benefits of reduced emissions and operational savings through utility cost savings, and potentially provide longer-term maintenance cost savings. Additionally, advanced analytic energy management systems (EMS) have increasingly become more sophisticated and offer another tool to achieve deep cost-effective energy savings. For example, detailed consumption data helps to identify peak periods of energy use or which appliances use the most energy. As

described in the preceding strategies, building efficiency and conservation improvements also support the City's plans for additional renewable energy generation; with more efficient buildings using less energy, which requires smaller, cheaper solar PV systems to offset remaining electricity demand.

The City has already performed building energy benchmarking at some facilities, but has not pursued broad application of a comprehensive program due to staff time and financial constraints. A municipal partnership with an energy analytics provider could potentially remove some constraints and allow the City to track energy use at all municipal buildings and facilities to identify low- or no-cost efficiency improvements.

The actions included within this measure are intended to reinforce the City's previous energy efficiency activities, identify future candidates for retrofit programs (see Strategy E-5), facilitate scheduled collection of energy use data at a building or facility level, provide policy guidance for regular building system commissioning, and elevate energy conservation awareness across all levels of City employees. Implementation of this strategy could reduce emissions by up to 350 MT CO_2e/year (if the clean electricity options described in Strategy E-2 are not yet implemented).

Action A. Consumption Data Collected per Facility

The ability to monitor and analyze energy use in City buildings and facilities is largely a function of the number and location of utility meters. For example, without dedicated meters, electricity used for park lighting is not measureable if the park lights are on the same meter as an adjacent City building. Cross-metering is common, and makes it difficult to isolate opportunities for improvement or monitor the results of any installed retrofit programs. To address this issue, the City could partner with PG&E to install additional utility meters or sub-meters at City buildings and facilities. However, this option may entail expensive installation work, and would depend on staff availability to regularly monitor new meters. Alternatively, the City could install energy use data loggers on primary pieces of building equipment or systems to digitally track energy use. The ability to disaggregate utility consumption at a finer-grain of detail would support the City's energy use benchmarking efforts and help to remotely identify efficiency improvement opportunities, without the need to physically audit each individual building.

Action B. Advanced Energy Efficiency Analytics

Analyzing building-specific energy use data can help to identify operational improvement opportunities or faulty mechanical systems, allowing facilities managers to more closely control operating costs. The advanced energy efficiency analytics process uses daily and hourly building energy meter data, weather data, GIS mapping, and other inputs to determine how a building uses energy. This type of data analysis allows for remote building audits that can often identify low- or no-cost operational improvements leading to greater building efficiency. Numerous third-party service providers offer advanced analytics services through software subscriptions or direct monitoring. The City should consider using an advanced analytics service to monitor its building energy use more conveniently, to identify and correct operational issues

more quickly, and to track and quantify post-installation, measure-specific impacts. The City could pursue such a service on its own, or consider aggregating its building portfolio with other neighboring jurisdictions to negotiate a group rate. Results from an advanced analytics program could also inform the types of additional building retrofits the City should pursue (see Strategy E-5).

Action C. Energy Management Systems

Energy management systems (EMS) can help conserve energy by automatically turning off building systems, equipment, or appliances after normal business hours or a period of inactivity. Automatic lighting controls are increasingly common, in which motion sensors detect activity within a room and automatically turn the lights off when a room is not in use. Installing an EMS in office environments can help reduce plug load electricity use associated with computers and monitors, personal space heaters, speakers, printers, fax machines, and other office equipment. The City has installed EMS at libraries, community centers, and other civic buildings. Plans to install an EMS that puts office computers in sleep mode when not in use have been delayed, but should be considered for near-term installation. The City should work with its IT department, ESCO provider, and advanced analytics provider (if Action B is pursued) to review existing systems and capabilities and ensure proper functioning. The City is also beginning to explore new facility-monitoring applications from third-party providers through the Demonstration Partnership Program. These systems may provide a more comprehensive alternative to EMS options in the future.

Action D. Employee Information / Education

Providing employees with information about energy-efficient policies and practices, as well as energy use within their buildings, can promote a culture of conservation within various departments. The City could install energy use dashboards in public areas of the City's primary buildings (e.g., City Hall, community centers, libraries) and connect the dashboards to its website for more visible tracking of energy use in specific buildings. Different City departments or buildings (depending on the distribution of utility meters) could also set energy-use reduction targets and encourage staff to help achieve them. This could include training on day-to-day energy conservation practices and use of existing equipment energy-saving settings. Additionally, facility management staff should receive training on how to optimize building energy components through use of the City's building management systems.

E-4. Advanced Energy Management

Actions and Implementation Steps

A. Consumption Data Collected per Facility • Install equipment to better facilitate facility-level energy use analysis; options could include installation of additional utility meters or data loggers placed on primary pieces of equipment / systems [Note: installation of additional meters may not be feasible in some situations, and access to meters may be precluded in tenant-leased	***Responsibility*** Public Works Department

E-4. Advanced Energy Management

Actions and Implementation Steps

spaces at SJC] • Evaluate costs / benefits of options available to increase building energy data analysis, including consideration of staff resources needed to review / analyze data results • Following installation of additional meters or data loggers, organize utility data by facility and City department (e.g., Meters 1, 2 and 3 represent City Hall) • Prepare annual energy use benchmarking reports by facility and department to more accurately track energy use and improvements	
Performance Indicator (2020) Broadly supports achievement of City's energy reduction goal	***2020 Reduction Potential (MT CO_2e/yr)*** Supporting Action
B. Advanced Energy Efficiency Analytics • Identify appropriate energy analytics firm with which to partner; this could be regional implementation opportunity to secure discounted large group rate, if possible - consult other area jurisdictions when pursuing this option • Create operating framework that allows facility managers to implement findings into building operations • Use high-resolution data from analytics (e.g., appliance end-use) to inform development of targeted energy efficiency retrofit programs [see Strategy E-5]	***Responsibility*** Public Works Department
Performance Indicator (2020) City participates in advanced energy analytics program, which identifies building energy use reduction opportunities totaling 2.6 million kWh/yr in 2020	***2020 Reduction Potential (MT CO_2e/yr)*** 350

E-4. Advanced Energy Management

Actions and Implementation Steps

C. Energy Management Systems • Work with IT department, ESCO provider, and energy analytics team to identify opportunities for office system EMS to automate control and monitoring of office equipment (e.g., computers, monitors, printers) • Work with energy analytics firm to review existing advanced lighting controls / monitoring systems (e.g., automatic dimmers), ensure proper operation, and identify opportunities for additional installations in other City buildings / facilities • Explore new third-party energy management software applications through Demonstration Partnership Program, and consider benefits of application within City buildings and facilities	***Responsibility*** Public Works Department
Performance Indicator (2020) Broadly supports achievement of City's energy reduction goal	***2020 Reduction Potential (MT CO_2e/yr)*** Not Quantifiable
D. Employee Information / Education • Install energy use dashboards in City Hall and primary municipal buildings (e.g., public-facing and high energy use); work with PG&E to install individual building meters, as necessary, to allow building-specific energy use reporting • Provide facility managers with training on advanced building operations in order to maximize effectiveness of City's building systems	***Responsibility*** Public Works Department
Performance Indicator (2020) Broadly supports achievement of City's energy reduction goal	***2020 Reduction Potential (MT CO_2e/yr)*** Supporting Action

STRATEGY E-5 EXISTING BUILDING ENERGY RETROFIT

Reduce energy consumption in existing municipal buildings through energy efficiency improvements.

Improving energy efficiency and management in existing buildings can provide the immediate benefits of reduced emissions and operational savings through utility cost savings, and potentially provide longer-term maintenance cost savings. Building efficiency and conservation improvements also support the City's plans for additional renewable energy generation. More

efficient buildings use less energy, which requires smaller, cheaper solar PV systems to offset remaining electricity use. As previously described, the City's Green Vision Goal #2 directs a per capita energy use reduction of 50% by 2022.

The City implemented an Energy Fund in 2005 to provide ongoing support for energy efficiency and renewable energy projects at municipal facilities. The initial funding came from a rebate check from PG&E for the City-wide traffic signal LED retrofit project. The fund is replenished with one-to-five years of energy costs savings associated with energy retrofit projects financed through the fund. The City has used this fund to complete energy efficiency projects at municipal facilities, to install energy systems at the Parks, Recreation, and Public Safety facilities, and to cover the costs associated with hiring an Energy Officer who facilitates the implementation of municipal energy efficiency and renewable energy projects. However, due to the integration of the ESCO program, which funding is financed through a third party lending institution, the City Administration decided to no longer replenish the Energy Fund beyond Fiscal Year 2013 – 2014. As such, funding for energy improvements in facilities outside of the ESCO scope is not readily available.

The actions included within this strategy are intended to support the City's existing energy efficiency activities, enhance the current revolving funding source for energy efficiency improvements, establish green building design standards and targets for energy efficiency retrofits in existing buildings, identify future candidates for retrofit programs, and create a retro-commissioning program to ensure that building systems are performing optimally.

Action A. Energy Efficiency Fund

The establishment of an energy efficiency fund provides a self-sustaining source of funding to support additional future retrofit programs. This type of revolving loan fund can often leverage matching funds from utilities or other sources to help offset total startup costs. As mentioned above, the City already has such a fund which has been used as a model for similar programs in other jurisdictions. The 23 projects completed since its inception have generated over 1,300,000 kWh and 500 therms of savings, with an average return on investment of 2.2 years. An additional 14 projects were scheduled through June 2014. While the Energy Efficiency Fund is not the City's primary project finance strategy, the City can broaden the fund's benefit by exploring opportunities to extend the program to support retrofit programs not covered by the City's current ESCO contract.

Action B. ESCO Program

The City entered into an ESCO contract with Chevron Energy Solutions (now OpTerra Energy Services) in 2013 to prepare investment grade audits on City facilities, which would then be analyzed with energy-conservation projects identified for implementation as part of the contracted services. Pending successful implementation of building and facility retrofit projects through this contract, the City should analyze lessons learned from its current ESCO experience and either pursue a contract extension, release a new RFP for another ESCO contract, or identify other financing strategies to pursue future retrofit projects. If an ESCO contract

extension or new ESCO contract are pursued, the City should expand the scope of work to include additional City facilities.

As part of its ongoing ESCO project, the City could evaluate building energy audit results to identify retrofit program types, such as solar projects, that could also be pursued under third-party financing strategies (if the ESCO's rate structure makes certain projects financially unviable). The City is also interested in large-scale ESCO opportunities that would benefit from an overarching, comprehensive strategic approach to performing building audits and implementing results. Future ESCO work should contribute to and build off of the Municipal Energy Action Plan described in Strategy E-1, such that the ESCO program can be used to strategically implement projects that will help the City achieve its overlapping energy conservation and renewable energy development goals.

Action C. Standards and Targets

San José adopted a municipal Green Building Policy that requires all new municipal buildings or projects receiving City funds to achieve LEED Silver certification. However, this policy does not yet apply to municipal retrofit projects. In pursuit of Green Vision Goal #4 to build or retrofit 50 million square feet of green buildings, the City should revise its Green Building Policy to apply to existing municipal buildings as well. While the LEED certification program identifies minimum thresholds for various aspects of building design (e.g., energy and water use, indoor air quality, solid waste generation), its minimum energy requirements, in some certification programs, may currently be less stringent than those found in the CalGreen Code. To ensure that building energy conservation remains a priority in City retrofit projects, the City could voluntarily strive to focus its LEED design points within the energy strategy area, possibly by identifying a minimum number of energy points that municipal retrofit projects need to achieve.

Action D. Building Retrofits

The City has already made numerous energy-efficiency retrofits at municipal buildings and facilities, including indoor lighting retrofits and lighting control systems, LED exit signs, and green roof systems, low-flow toilets and water fixtures in public facilities, and PC power management software and plug load controller hardware in City buildings. The City has also performed more than 80 building energy audits to help identify retrofit opportunities. The City should continue to pursue implementation of remaining retrofit opportunities based on recommendations and analysis prepared as part of the ESCO's building energy audits.

As described in Strategy E-1, the City should also develop a tracking procedure to maintain accurate records of energy audit results, retrofit opportunities identified, and associated potential energy savings. Storing this information in one location will assist in analyzing big-picture energy use reduction opportunities, and will assist the City in analyzing the cost/benefits associated with pursuing deep building energy retrofits versus pursuit of clean electricity options through utility-based programs or renewable energy development.

Action E. Retro-Commissioning Program

Commissioning and retro-commissioning are the processes of verifying that building systems are operating at optimal efficiency as intended by building architects and engineers. The state's building code already requires commissioning in new construction. Development of a City policy that requires all major building systems (e.g., mechanical, electrical, ventilation) to be retro-commissioned at five-to-ten year intervals will help ensure optimal facility operations. This policy could also help extend the life of existing systems, defer expensive upgrades, and ensure timely identification of energy-efficiency opportunities. This policy should be developed in a way to provide efficiencies and/or cost savings associated with the City's existing service agreements for regular maintenance of various City buildings.

E-5. Existing Building Energy Retrofit

Actions and Implementation Steps

A. Energy Efficiency Fund • Explore opportunities to extend program life of energy efficiency fund to support retrofit programs not covered by ESCO program • Reinstate Energy Efficiency Fund as a municipal resource to support future energy efficiency improvement projects	***Responsibility*** Public Works Department
Performance Indicator (2020) Broadly supports achievement of City's energy reduction and renewable energy development goals	***2020 Reduction Potential (MT CO_2e/yr)*** Supporting Action
B. ESCO Program • Identify opportunities to extend ESCO program to include previously excluded City facilities / buildings (e.g., small park units) • Evaluate success of current ESCO program; use results to consider program extension / expansion beyond 2015 contract date and to identify retrofit program types that should be pursued using other financing strategies, such as QECBs.	***Responsibility*** Public Works Department
Performance Indicator (2020) Broadly supports achievement of City's energy reduction and renewable energy development goals	***2020 Reduction Potential (MT CO_2e/yr)*** Supporting Action

E-5. Existing Building Energy Retrofit

Actions and Implementation Steps

C. Standards and Targets

- Establish building retrofit standard (e.g., LEED Silver certification) and size threshold (e.g., projects over 5,000 sq ft) applicable to municipal building and facility retrofits
- As part of retrofit standard, define explicit energy efficiency performance levels or design features to be achieved / included (e.g., 25% energy conservation over baseline design levels)
- Consider developing a Green Building policy for existing buildings (e.g., LEED Silver Certification); include minimum size thresholds (e.g., projects over 5,000 sq ft)

Responsibility

Public Works Department

Performance Indicator (2020)

Broadly supports achievement of City's energy reduction and renewable energy development goals

2020 Reduction Potential (MT CO_2e/yr)

Not Quantifiable

D. Building Retrofits

- Use results from building advanced energy analytics program (see Strategy E-4) to identify appliances and building systems that are underperforming (from energy use perspective);
- Prepare retrofit opportunity tracking framework that identifies building/facility, retrofit project components, and energy use reduction estimates by energy source (i.e., electricity, natural gas); analyze results of remaining energy retrofit analysis within context of clean electricity options described in Strategy E-2 to determine cost-benefit of each strategy compared to its impact on achievement of City's energy-related goals; analyze need to pursue retrofit projects that reduce natural gas use to achieve long-term emissions reduction goals (e.g., 2050 emissions target)
- Continue to implement cost-effective lighting retrofits in City buildings / facilities; work with ESCO to prioritize remaining lighting retrofit opportunities
- Pursue other quick-payback retrofits as primary implementation strategy; defer to results of MEAP (see Strategy E-1) when prioritizing longer-term payback retrofits
- Consider water-savings potential of retrofit projects (e.g., low-flow fixtures), in addition to energy savings, when prioritizing improvement projects
- Continue to consider cool roof system options at normal time of roof replacement or during major renovations, as appropriate (e.g., clay tile roofs may not have cool roof counterparts that would maintain aesthetics of original roofing system)

Responsibility

Public Works Department

Performance Indicator (2020)

Broadly supports achievement of City's energy reduction and

2020 Reduction Potential (MT CO_2e/yr)

E-5. Existing Building Energy Retrofit	
Actions and Implementation Steps	
renewable energy development goals; specific building retrofit energy savings indicators can be developed following further analysis of remaining retrofit opportunities	Not Quantifiable
E. Retro-Commissioning Program • Formalize program that requires all major systems (e.g., HVAC) in existing buildings / facilities to be retro-commissioned at 5-year intervals • Provide facility managers with training on advanced building operations systems in order to maximize effectiveness of City's building systems • Sync regular retro-commissioning efforts with services provided by any existing building systems maintenance contracts to reduce redundancies • Consider retro-commissioning opportunities at international airport terminal as part of this program	***Responsibility*** Public Works Department
Performance Indicator (2020) Broadly supports achievement of City's energy reduction and renewable energy development goals	***2020 Reduction Potential (MT CO_2e/yr)*** Not Quantifiable

STRATEGY E-6 NEW BUILDING ENERGY PERFORMANCE

Establish energy efficiency targets for new municipal buildings.

Green Vision Goal #4 aims to build or retrofit 50 million square feet of green buildings within the San José community. Green building standards can emphasize sustainability characteristics, such as energy conservation, water efficiency, waste reduction, and alternative transportation for new construction. San José was the first city in Santa Clara County to adopt a municipal Green Building Policy (2001), which was revised in 2007, requiring all new municipal buildings or projects receiving City funds to achieve LEED Silver certification. This also applies to all projects constructing new buildings or adding more than 10,000 square feet of occupied space.

While the LEED certification program identifies minimum thresholds for various aspects of building design (e.g., energy and water use, indoor air quality, solid waste generation), its minimum energy requirements, in some certification programs, may currently be less stringent than those found in the CalGreen Code. To ensure that building energy conservation remain a priority in new City construction, the City could voluntarily strive to focus its LEED design points within the energy and water strategy areas, possibly by identifying a minimum number of energy

and water points that municipal projects should achieve. Other green building strategies could include incorporating passive solar design requirements (e.g. solar orientation) into the Green Building Policy for new municipal buildings, where appropriate.

While implementation of this strategy supports the City's long-term emissions reduction goals and achievement of Green Vision Goal #4 by providing highly-efficient new construction, the exact emissions reduction potential is currently unknown and would be difficult to estimate without baseline building energy models against which to compare each new structure. As new municipal buildings and facilities are designed, the City should nonetheless strive towards providing the highest levels of energy efficiency to model leadership within the community and minimize the increase in emissions from new City facilities.

Action A. Enhanced Municipal Green Building Standard – Energy Performance Requirement

The City will continue to implement its municipal Green Building Policy standard and work toward enhancing the policy by incorporating minimum energy efficiency levels or guidance for new construction to reach beyond LEED Silver's basic energy modeling requirements. Any additional standards should be developed to allow flexibility in compliance, rather than prescribing certain technologies to allow application of the most cost-effective design strategies.

E-6. New Building Energy Performance

Actions and Implementation Steps

A. Enhanced Municipal Green Building Standard – Energy Performance Requirement • Continue to implement City's Green Building Policy (e.g., LEED silver certification) applicable to new municipal buildings / facilities; include minimum size thresholds (e.g., projects over 10,000 sq ft) • Consider developing additional guidance for new municipal building projects that encourages pursuit of energy- or water conservation-related points towards achievement of required LEED certification to prioritize these building efficiency outcomes; alternatively, City could define explicit energy efficiency performance levels or design feature expectations for new projects, including consideration for passive energy design and solar ready construction, where feasible • Consider including solar-ready construction requirements for new municipal buildings with appropriate solar orientation, roof size, etc. • Incorporate recommendations into City's Capital Improvement Program	***Responsibility*** Public Works Department
Performance Indicator (2020) All new municipal construction complies with the City's Green Building Policy	***2020 Reduction Potential (MT CO_2e/yr)*** Not Quantifiable

STRATEGY E-7 PUBLIC REALM LIGHTING EFFICIENCY

Continue to upgrade public realm lighting to more efficient technology.

Lighting efficiency upgrades typically represent one of the most cost-effective solutions for energy conservation, providing lower utility costs and, often, lower maintenance costs as well due to less-frequent bulb replacements. Public realm lighting in San José includes traffic and streetlights, municipally-owned parking lot lights, and public park lights. To support future energy conservation in public lighting, the City follows its Public Streetlight Design Guidelines which recommend LEDs for streetlights and LEDs or induction technology for pedestrian lights.

The City has already upgraded its traffic signal lights from incandescent bulbs to LEDs, and has begun converting its streetlights to LED systems as well. The City has already converted more than 3,000 streets lights to date with LED adaptive control systems to improve lighting conditions and decrease maintenance costs; the City further plans to complete conversion of all City-owned streetlights by 2022. More than 18,000 streetlights were identified for retrofits in the first round of the ESCO. The remaining 43,000 will be converted in the next several years.

The City has begun retrofitting some of its parking lot lighting, including installation of LED lighting at parking lots at the airport, and plans on identifying additional parking lot lighting retrofit opportunities for possible implementation through its ESCO. No T-12 lighting fixtures are left in any municipal parking lots/garages, so future retrofits may focus on converting T-8 lights to LEDs, though this action is currently not a priority item. The SEAP recommends pursuing solar streetlights as well, but this option is not considered viable at this time and no actions have been taking yet to implement this strategy.

Implementation of this strategy could reduce emissions by up to 2,060 MT CO_2e/year in 2020 (if the clean electricity options described in Strategy E-2 are not yet implemented).

Action A. Streetlight Efficiency Retrofits

The City should continue to upgrade the remaining City-owned streetlights with plans for full conversion by 2022. A total of 18,100 are planned for conversion in the first round under the current ESCO contract. The City plans to convert the remaining 43,000 over the next several years, with estimates for 80% conversion to be completed by the CAP's 2020 near-term target year. While the City Design Policy recommends upgrading to LEDs, the City should continue to monitor advancements in lighting technology, including solar lights, to select the best available option at the time of retrofit with considerations for application need, cost, and available rebates or financing options. In addition to working through its ESCO contract, the City should consult with its PG&E account representative to identify available rebates or rate incentives to pursue additional lighting retrofits.

Action B. Parking Lot Garage Lighting Retrofits

Retrofitting parking lot and garage lights with more efficient technology can help reduce energy consumption and reduce long-term operating costs. Advancements in lighting technology have resulted in substantial energy savings in indoor and outdoor applications by replacing high-intensity bulbs (e.g., T-12, low and high pressure sodium) with increasingly more efficient bulbs (e.g., T-8, LED, plasma, induction). Currently, the majority of the City's garages have T-8 lighting. In the process of identifying additional parking lot lighting upgrades, the City should also consider piloting conversion of its T-8 parking lighting to more energy efficient fixtures (e.g., LEDs). As lighting technology continues to advance, the City should stay informed of new opportunities for deeper energy and utility cost savings opportunities.

Action C. Park Facility Lighting

As with other lighting retrofits, upgrading park facility lighting to more efficient technology can reduce energy consumption and long-term operating costs. To date, the City has upgraded some common areas and pathways with high-efficiency lighting through use Energy Efficiency and Conservation Block Grant funding. Opportunities to expand on these efforts include upgrading restroom and sport field/court lighting, and additional area lighting and pathways. The City should develop an 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).

E-7. Public Realm Lighting Efficiency

Actions and Implementation Steps

A. Streetlight Efficiency Retrofits • Identify City-owned streetlights that have not yet been converted to LED • Develop implementation timeline and funding program	***Responsibility*** Public Works Department/ Department of Transportation
Performance Indicator (2020) 80% of City-owned streetlights are converted to lighting technologies that use 50% less energy than consumed in the 2010 baseline year (i.e., reduction of 15.6 million kWh/yr)	***2020 Reduction Potential (MT CO_2e/yr)*** 2,060
B. Parking Lot and Garage Lighting Retrofits • Identify City-owned parking lot / garage lighting that has not yet been converted to LED, magnetic induction, or similar highly-efficient technology • Develop implementation timeline and funding program that considers pursuit of higher-priority objectives first; determine if additional lighting upgrades can be pursued through ESCO contract	***Responsibility*** Public Works Department/ Department of Transportation

E-7. Public Realm Lighting Efficiency

Actions and Implementation Steps

Performance Indicator (2020) Broadly supports achievement of City's energy reduction goals	***2020 Reduction Potential (MT CO_2e/yr)*** Not Quantifiable
C. Park Facility Lighting • Identify park lighting (e.g., pathways, restroom facilities, area lighting, sport field lighting) that has not yet been converted to solar, LED, magnetic induction, or similar highly-efficient technology • Identify appropriate energy-efficient lighting technologies for sports fields / courts that still provide lighting levels required for applicable sporting use • Identify opportunities for application of solar lighting systems within park facilities, and analyze cost-benefit of solar technology versus traditional energy-efficiency upgrades • Install energy efficient lighting in all new public park and recreational facilities, as appropriate	***Responsibility*** Public Works Department/ Parks, Recreation, and Neighborhood Services Department
Performance Indicator (2020) Broadly supports achievement of City's energy reduction goals	***2020 Reduction Potential (MT CO_2e/yr)*** Not Quantifiable

STRATEGY E-8 LANDSCAPE WATER CONSERVATION

Formalize existing landscape conservation practices into a Green Grounds Policy.

Treating, pumping and distributing water throughout cities is often an energy intensive activity. About half of San José's water is imported from the Sierras through the State Water Project and Central Valley Project, both of which are energy-intensive. The Santa Clara Valley Water District, one of the two wholesale water providers to San Jose, has calculated an embodied energy of 1,544 kWh per Acre-Foot of their water supply. Regardless of the energy savings attainable through water conservation, the City believes water should be conserved as a natural resource, especially in light of recent drought conditions affecting all of California. The City's Environmental Services Department works with other departments to improve water efficiency at City facilities and irrigation efficiency in City parks. To expand on this effort, the City could develop a Green Grounds landscaping policy that directs water-conservation practices in City parks, medians, and other landscaped areas. This policy could also address the beneficial treatment of landscape waste as described in Strategy SW-2.

The following action describes a framework to support the City's water conservation practices and help identify additional opportunities. Implementation of this strategy could reduce emissions by up to 200 MT CO_2e/year in 2020 (if the clean electricity options described in Strategy E-2 are not yet implemented), though as previously stated, the main benefit from its implementation is in conserving a limited resource.

Action A. Green Grounds Policy

As described above, the City continues to work toward improving water efficiency. The City could support and enhance its conservation of potable water through adoption of a Green Grounds Policy that promotes high- and low- priority water zones, selection of water-efficient and climate-sensitive plants, and compost-friendly landscape maintenance, as well as installation of smart irrigation that automatically adjusts landscape watering schedules and amounts based on local weather conditions. The City should train Parks, Recreation and Neighborhood Services Department and Department of Transportation staff on implementation of this Greens Grounds Policy and other best management practices for water conservation in City landscapes. The City could also consider developing water budgets and evapotranspiration estimates for parks and other landscaped areas to ensure future landscaping practices consider water conservation in design and operation. The City of Mountain View currently uses water budgets in many of its public parks, and could serve as a local example for program development. In addition, pursuant to its Green Vision Goal #6, the City has already begun preparing new parks for connection to the City's recycled water system. The City will continue to identify opportunities for recycled water use in municipal landscape areas, ultimately seeking the goal to beneficially reuse 100% of the City's wastewater. The City can also identify buildings or landscaped areas that could incorporate graywater catchment systems to increase use of non-potable water in landscape irrigation.

In order to track the successful implementation of the Green Grounds Policy, the City also can benchmark its municipal water use, establish water conservation targets (e.g., conserve 1,500,000 gallons/yr over 2010 levels), and develop water conservation measures to achieve those reduction goals over time. Staff should develop a database to store water utility information collected from historic billing statements. Historic water use and cost-per-meter data can be used as a benchmark to measure against current use to demonstrate measureable improvements, as well as identify deficiencies in the City's water management strategies. This will allow for targeted strategy adjustments in the near- and long-term. With appropriate and accurate record keeping, the City will have pertinent information readily available to review the efficacy of current water conservation strategies and efficiently identify meters in need of improvement.

E-8. Landscape Water Conservation

Actions and Implementation Steps

A. Green Grounds Policy (e.g., Watering Schedules, Plant Selection)

- Establish operational framework for tracking and reviewing water use at the meter level to allow identification of improper irrigation system use, leaks, or other wasteful water activities; incorporate water use reporting into overarching annual CAP reporting procedure
- Develop landscaping policy that promotes efficient watering schedules, high- and low-priority water zones (for use during pre-drought conditions), water-efficient and climate-sensitive plant selection, and compost-friendly landscape maintenance
- Install water-efficient irrigation technology systems, particularly in areas of high irrigation use (e.g., turf playing fields), with ET sensors and integration with streaming weather data to automate watering schedules based on current and near-term environmental conditions
- Train maintenance crews in use and maintenance of irrigation systems and implementation of Green Grounds policy.
- Consider use of water budgets for irrigated landscape areas
- Incorporate graywater plumbing and/or rainwater catchment systems in new municipal buildings, where appropriate
- Utilize the South Bay Water Recycling system where possible to service additional parks and landscape areas throughout City
- Develop public-facing informational placards/signs that explain these systems and quantify their potable water-savings potential

Performance Indicator (2020)

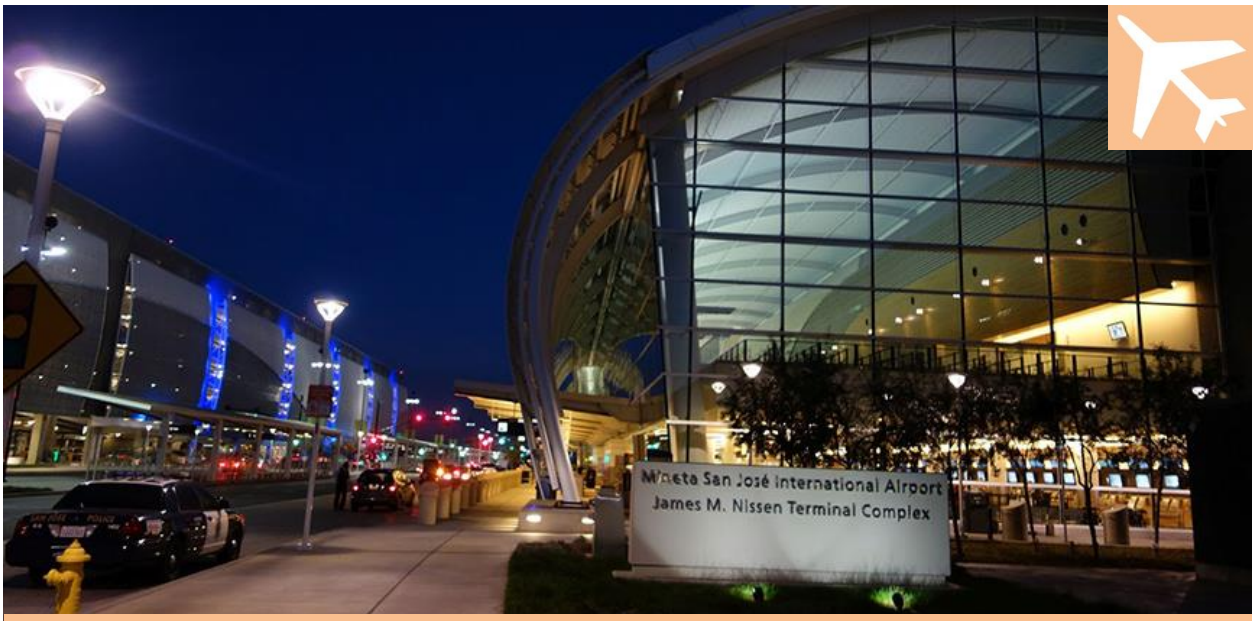
20% water use reduction below 2010 baseline levels by 2020 (i.e., reduction of 1.5 million kWh/yr related to water supply)

Responsibility

Parks, Recreation, and Neighborhood Services Department

2020 Reduction Potential (MT CO_2e/yr)

200



AIRPORT FACILITY AND OPERATION STRATEGIES

Located three miles north of downtown San José, the Norman Y. Mineta San José International Airport (SJC) is a self-supporting enterprise, owned and operated by the City of San José. The airport is located on over 1,000 acres, consisting of two 11,000-foot runways and two terminals, and serves approximately 24,000 passengers daily. As a subsector of the energy sector emissions, airport operations are responsible for approximately 10% of total municipal emissions in the 2010 baseline year. Ground vehicle operations also contribute to the transportation sector emissions, but airport-specific vehicles were not analyzed as a separate subsector in this CAP. Similarly, solid waste generated at the airport contributes to the City's municipal solid waste emissions but are not accounted for separately.

The airport facilities are a mixture of older and new construction. Terminal A was originally opened in 1990. An Airport Modernization Program was completed in 2010, resulting in an award-winning international airport serving San José and the greater Silicon Valley. The comprehensive improvements included the construction of the new Terminal B and modernization of the existing Terminal A. The Terminal B project earned LEED Silver certification from the U.S. Green Building Council in recognition of the airport's significant commitment to environmentally sustainable design and construction.

SJC served more than 9.4 million total passengers in 2013-2014, representing a nearly 7% increase over the previous fiscal year. The growth was due to more air service choices for Silicon Valley residents and businesses and new carriers serving SJC. Similar to other sources of municipal emissions, those generated from airport energy consumption are expected to

continue to rise in the future. A significant source of airport energy demand comes from facility heating, cooling, and lighting.

The City has already made numerous energy-efficiency improvements at the airport, as well as renewable energy development installations and air quality-related improvements to ground operation vehicles. Indoor and parking lot lighting fixtures at Terminals A and B were retrofitted with more energy-efficient options. Occupancy sensors and a programmable lighting control system were also installed in Terminal B to further optimize lighting efficiency, and a portion of the lights in the Terminal A parking garage were retrofitted to LED technology in 2010. In addition, Terminal B's central plant that heats and cools the airport campus was designed to use circulating water for building cooling, which is more efficient than conventional roof top AC units. These improvements combined resulted in approximately 1 million kWh/yr in electricity savings. Runway lighting conversions to LED technology have also been made, with other lighting conversions planned for near-term implementation, which would save an additional 190,000 kWh/yr.

This Airport strategy area describes two strategies that take credit for the City's past actions aimed at airport energy and transportation efficiency improvements. Total emissions reductions from this strategy area total approximately 160 MT CO_2e/yr. Reductions associated with the airport's solar PV installation are included with other municipal renewable energy development estimates in Strategy E-3.

STRATEGY A-1 AIRPORT RUNWAY LIGHTING IMPROVEMENTS

Lighting efficiency upgrades typically represent one of the most cost-effective solutions for energy conservation, reducing utility costs and often maintenance costs as well due to less-frequent bulb replacements. Airport runway lighting represented an opportunity to achieve substantial electricity savings while maintaining safe airport operations. The following action describes improvements the City has already made to runway lighting, as well as near-term opportunities for additional retrofit projects.

Action A. Runway Lighting Efficiency Improvements

To date, the City has updated runway centerline lighting to separately controlled bidirectional LED fixtures. This allows the airport to illuminate a single direction of centerline lighting at one time. For one runway, the LED fixtures reduced the energy load by approximately 70%, from 68 watts per fixture to 21 watts per fixture. With 219 fixtures on the runway, it resulted in a savings of approximately10,300 watts (or 41,300 kWh/yr). Replacement of lighting with LED fixtures on the second principal runway has resulted in additional energy savings of approximately 7,250 watts (or 29,000 kWh/yr).

The City is also progressing with a project to replace edge lighting on both runways, retrofitting one runway at a time. This project will upgrade lights from 126-watt fixtures to approximately 20-

watt LED fixtures, resulting in savings of approximately 14,750 watts per runway (or 59,000 kWh/yr each).

Combined, these runway lighting improvements could reduce airport electricity consumption nearly 190,000 kWh/yr, resulting in emissions reductions of 25 MT CO_2e/yr. The City will continue to identify lighting upgrade opportunities that can conserve airport energy use, while maintaining the safe, high-quality level of operational service provided at SJC.

A-1. Airport Runway Lighting Improvements

Actions and Implementation Steps

A. Runway Lighting Efficiency Improvements • Maintain recent centerline lighting retrofits on runways and continue to operate efficiently with only one direction of centerline fixtures illuminated at any time • Replace edge lighting along both runways as planned; phase projects as funding allows • Identify additional outdoor lighting improvement opportunities and pursue implementation through City's ESCO, with funding from City's Energy Fund, or as part of airport capital improvement budgeting process	***Responsibility*** Airport Department
Performance Indicator (2020) Runway lighting electricity use is reduced by approximately 190,000 kWh/yr from 2010 baseline levels	***2020 Reduction Potential (MT CO_2e/yr)*** 25

STRATEGY A-2 AIRPORT OPERATION EFFICIENCY IMPROVEMENTS

As mentioned above, numerous airport energy efficiency improvements have been pursued in the past at SJC. The City also has a history of pursuing projects and programs that reduce air pollutants and GHG emissions resulting from operation and use of the airport. Numerous operational and service improvements were implemented prior to the CAP's 2010 baseline year. Many of these projects were designed to reduce vehicle emissions related to passenger travel to and from the airport, as well as airport operations vehicles. The City installed a CNG refueling station on-site to fuel airport shuttle buses, and the Airport Operations & Maintenance vehicle fleet switched to 100% alternative fuel vehicles through CNG and electric vehicle purchases. Electric vehicle charging stations were installed in the Terminal A (Lot 2) parking garage and in Lot 5 for public use. A free shuttle bus program connecting SJC to the VTA station was implemented, as was a free bus/rail program for all airport employees. The City has also influenced the vehicle mix of taxis and vans serving airport passengers by implementing an Alternative Fuels Program that requires 25% of all taxi/van trips at the airport to be made by low- or zero-emission vehicles. More recently, the City received grant funding to help pursue

retrofits that would result in additional air quality improvements, including the provision of pre-conditioned air at aircraft boarding bridges and the replacement of 11 gasoline-powered tarmac vehicles with electric vehicles.

While these actions will broadly contribute to GHG emissions reductions, many of their impacts cannot be individually quantified or are not directly applicable to the City's LGO CAP (e.g., supporting community-wide electric vehicle use through public recharging stations). However, airport staff does maintain a list of energy-related facility retrofits to assist in monitoring the efficacy of those projects for energy-use reporting purposes. The nature and impact of those projects are described in the action below.

In the future, the City will continue to pursue operational efficiency improvements that will result in direct energy conservation as well as local air quality improvements. As described above in Strategy E-1, future energy efficiency improvements at the airport should be considered in the context of the City's overlapping energy goals. While the airport facility tends to operate with more autonomy than other municipal facilities, emissions resulting from its operations are reflected in the City's municipal GHG inventory. Therefore, emissions reduction projects at the airport should be coordinated with other City strategies to ensure cost-effective attainment of the City's environmental goals.

Action A. Past Airport Energy Efficiency Initiatives

City staff track implementation of airport energy retrofit projects and provided relevant information from the 2010 baseline year through 2013 for incorporation in the CAP. The focus of past improvement projects has been on interior lighting retrofits, both to lighting fixtures as well as intelligent lighting/building operation control systems. Several indoor lighting retrofit projects within Terminal B were installed to connect sections of lights to the Terminal's building management system and lighting sensors. These improvements allow sections of lighting to operate automatically depending on natural lighting conditions, turning off when ample lighting is available from other sources. Other improvements were made to connect lighting with motion sensors allowing unoccupied areas to remain dark until needed, including within many of the airport's jet bridges. The City also made pumping system improvements at the airport's central plant, which provided further energy use reductions. Finally, the City constructed Terminal B to use recycled water in all restroom facilities and some landscaping applications, as well as for pressure washing. In total, the identified airport improvements installed between 2010 and 2013 resulted in energy savings of approximately 1 million kWh/yr, or 135 MT CO_2e/yr. Further, these improvements resulted in annual operational cost savings of approximately $130,000 per year.

As one of the City's primary facilities, an update to the previous airport energy audit would assist with identifying additional near-term energy conservation opportunities, as well as outline longer-term opportunities that would need to be incorporated into capital improvements planning. Additional opportunities that can be further evaluated include modernization of the airport's nearly 20 escalators, replacement of less-efficient gas package cooling units, expanding the existing use of recycled water in restroom and landscaping applications, and

additional parking garage lighting retrofits. The City will continue to identify cost-saving energy-efficiency improvements that can be implemented at the airport.

A-2. Airport Operation Efficiency Improvements

Actions and Implementation Steps

A. Past Airport Energy Efficiency Initiatives • Prepare new energy audit for airport buildings/facilities to identify near-term retrofit opportunities; discuss implementation of near-term findings with City's ESCO; define long-term energy conservation goals for SJC and projects to achieve goals; incorporate high-cost projects into airport's capital improvement budgeting process and identify available grant funding to further defer costs • Continue to regularly assess indoor and parking garage/lot lighting requirements and make necessary timing/schedule adjustments that ensure safety and comfort while minimizing lighting duration; continue pursuing indoor and outdoor lighting retrofits to install best available high-efficiency technologies; over long-term, consider efficacy and financial benefits to additional lighting retrofits should City pursue implementation of clean-electricity options described in Strategy E-2 • If security considerations allow it, include airport as one of City's first facilities to pursue to advanced energy management program as described in Strategy E-4 to identify low-cost operational and maintenance improvements to further reduce airport energy use	***Responsibility*** Airport Department
Performance Indicator (2020) Assumes airport retrofits installed between 2010 and 2013 continue to save approximately 1,015,000 kWh/yr; reduction potential does not estimate possible future retrofit-related savings	***2020 Reduction Potential (MT CO_2e/yr)*** 135

WASTEWATER TREATMENT FACILITY STRATEGIES

As with other similar facilities, the San José-Santa Clara Regional Wastewater Facility (RWF) is a large energy user. Approximately 30% of the City's baseline municipal GHG emissions inventory is related to energy use at the RWF; greater than two-thirds of the facility's energy emissions are derived from natural gas use, and therefore would not be offset through implementation of the clean electricity strategies described in Strategy E-2. The facility also produces GHG emissions from operational processes. These process-related emissions contribute an additional 1% of total baseline GHG emissions.

Located on 2,600 acres of the South Bay, the RWF includes a 175-acre wastewater operations area, a 750-acre sludge drying area, and an 850-acre former salt production pond. The remaining acreage is open land that buffers adjacent communities and provides wildlife habitat. The RWF was constructed in 1956 and subsequently expanded in response to population and economic growth. However, most of the facility's infrastructure is now more than 50 years old. The RWF treats an average of 110 million gallons of wastewater per day, with the capacity to treat up to 167 million gallons per day. The facility serves eight cities with 1.4 million residents and a business sector with more than 17,000 main sewer connections.

The Plant Master Plan (PMP) adopted in November 2013 recommended over 100 projects to be included in a $2 billion, 30-year Capital Improvement Program (CIP) to rebuild and modernize the RWF. Projects recommended in the PMP were organized into five- and 10-year CIP planning horizons. In addition to energy use reduction opportunities, on-site power generation equipment at the RWF can produce up to 8 MW, or 75%, of the facility's current daily power needs. The plant generates renewable energy on-site using a blend of anaerobic digester gas, landfill methane, and natural gas, including use of a new 1.4 MW fuel cell system. The RWF has

been recognized with awards numerous times in the past for its energy accomplishments. Though implementation of the PMP, the City can continue to make strides towards its Green Vision goals of 50% per capita reductions in energy use and 100% renewable energy use.

The following strategy presents three actions that characterize operational efficiency improvements at the RWF. The first action broadly describes those items included in the PMP, and estimates the emissions reductions (or marginal increases, in some instances) associated with their implementation. The two other actions describe potential long-term strategies that could be incorporated into future CIP updates, pending additional analysis of on-the-ground conditions at the plant. Reductions associated with these potential actions have been preliminarily estimated, but are not included in the total 2020 reduction estimates since their implementation would likely occur on a much longer planning horizon. Operation of the facility's existing renewable energy development systems are described in Strategy E-3.

STRATEGY WW-1 WASTEWATER FACILITY INNOVATION OPPORTUNITIES

Based on the PMP, the RWF will be undertaking a number of improvement projects that will include new construction and equipment upgrades and refurbishments, as well as implementation of new technology and process optimization strategies. While the RWF generates much of its own energy from on-site renewable energy systems, its secondary treatment aeration process and pumping/heating represent two major sources of energy demand. Improvements to these high-energy use systems have the potential to further reduce operational energy demand, but should be considered within the context of the facility's energy use profile following implementation of the PMP. Additional detailed analysis will be required in the future to more accurately estimate emissions reduction potential from these further operational improvements.

Action A. Implementation of Capital Projects in Plant Master Plan

The PMP outlines numerous building and operational improvements to be pursued at the RWF over the next 30 years. Most of the identified improvements would result in emissions reductions, while others would become new sources of emissions. However, taken together, full implementation of the capital projects in the PMP could reduce facility emissions by nearly 25% (including renewable energy generation associated with the newly installed fuel cell).

Action B. Revised Pumping Scheme

A high-level analysis of the RWF's capital projects in the PMP was performed as part of the CAP preparation, which identified pumping scheme changes that could potentially further reduce operational energy use. Main sewage pumping typically constitutes 20-30% of a treatment facility's electrical load. The facility's current pumping scheme consists of three stages, with efficiency typically declining for each additional stage. Consolidating the pumping process into one stage could reduce facility energy demand by 1 MW, or approximately 1,140 MT CO_2e/yr if implemented by 2050. Implementation of this action could necessitate

modifications to the facility's Emergency Basin Overflow Structure (EBOS), and would need to be considered within the context of long-term growth forecasts at the facility.

Action C. Secondary System Improvements

Coarse bubble diffusers typically use 30-40% more air than fine bubble diffusers, which requires more energy use, to achieve the same treatment goals. Converting the facility's secondary system to fine bubble diffusion and revising the secondary system to include denitrification could further improve operational efficiencies. Use of fine bubble diffusers could provide energy savings of up to 2 MW (assuming that the aeration system accounts for 50% of the facility's electrical load). Converting the secondary system to denitrification could further reduce the facility's energy load by 0.9 MW to 2.1 MW. The secondary system is largely driven by on-site engines and generators, which has been fueled by a mix of natural gas, digester gas, and landfill gas. As previously noted the City received landfill gas in the past from the nearby Newby Island Resource Recovery Park for use at the RWF. As of 2013, the City was not receiving landfill gas, but was reevaluating options to begin receiving it again. The current engines operate with a combination of direct drive blowers and electrically-driven blowers. Discontinuing use of the electrically-driven blowers in the future could provide additional emissions reductions. Implementation of both the fine bubble diffusers and inclusion of denitrification could reduce emissions by up to 3,600 MT CO_2e/yr if implemented by 2050.

WW-1. Regional Wastewater Facility Innovation Opportunities

Actions and Implementation Steps

A. Implementation of Capital Projects in PMP • Headworks Enhancements – modify raw sewage distribution structure, construct new connection pipeline, and re-route recycled and other process water flows; install new odor control facilities • Iron Salt Feed Station – design and construct Iron Salt Feed Station to control hydrogen sulfide gas formation, reduce corrosion and odor, and improve sludge settling to reduce load on secondary system • Biosolids Transition – switch from open lagoons to mechanical drying of biosolids to reduce release of methane gas • Digester and Gas Line Rehabilitation – rehabilitate four digesters, including installation of new covers and mixing systems; upgrade heating and gas handling systems; modify six dissolved air flotation tanks for sludge co-thickening and new odor control, and replace gas pipeline system • Combined Heat and Power Equipment Repair and Rehabilitation – upgrade digester gas compressor to house two new gas compressors that replace older systems; replace failing digester gas holder with new storage system • Energy Generation Improvements – design and construct new cogeneration building that will house three new gas turbines or advanced internal combustion engines, new gas treatment system,	***Responsibility*** Environmental Services

WW-1. Regional Wastewater Facility Innovation Opportunities

Actions and Implementation Steps

and several other miscellaneous energy modifications and improvements • Electrical Reliability Upgrades – replace substations and switches, modify power distribution buses and cabling, and provide backup systems to enhance safety and reliability • Advanced Process Control and Automation – install or replace various meters and monitoring equipment throughout facility to allow automatic collection of facility process control data, such as solids content of wastewater • Distributed Control System Upgrades – completely upgrade system's hardware and software to allow for new process areas to be added to Distributed Control System	
Performance Indicator (2020) Assumes 20% reduction in RWF 2020 emissions projections presented in Chapter 2 (i.e., energy use and process emissions combined)	***2020 Reduction Potential (MT CO_2e/yr)*** 4,900
B. Revised Pumping Schedule • Evaluate opportunities to revise facility's pumping scheme/hydraulic profile to pump main process stream once, instead of three times • Consider modifications to EBOS	***Responsibility*** Environmental Services
Performance Indicator (2020) Assumes 3% reduction in RWF 2050 emissions projections presented in Chapter 2 (i.e., energy use and process emissions combined)	***2050 Reduction Potential (MT CO_2e/yr)*** 1,140 in 2050
C. Secondary System Improvements • Evaluate opportunities to convert diffusers from coarse to fine bubble diffusers • Evaluate opportunities to convert the secondary system to denitrification to reduce overall oxygen demand • Evaluate opportunities to discontinue use of electrically-driven blowers currently used in secondary system	***Responsibility*** Environmental Services
Performance Indicator (2020) Assumes 10% reduction in RWF 2050 emissions projections presented in Chapter 2 (i.e., energy use and process emissions combined)	***2050 Reduction Potential (MT CO_2e/yr)*** 3,600 in 2050

VEHICLE FLEET STRATEGIES

The City vehicle fleet sector is responsible for approximately 19 % of the City's GHG emissions. Similar to the energy sector emissions, as the population increases, the proportional share of vehicle fleet emissions is also expected to increase over time. Emissions from this sector are generated through the combustion of fuels used to operate the City's vehicle fleet. The fleet is used to perform a wide range of services, such as police patrols and emergency response, maintenance at municipal facilities, Public Works project inspections and construction, community building inspections and code enforcement, and maintenance of municipal parks, landscapes, sewers, streetlights, and traffic signals.

The Green Vision includes a goal to ensure 100% of public fleet vehicles run on alternative fuels by 2022. To that end, the City has already converted a portion of its fleet to more efficient, lower emission vehicle models. In the 2010 baseline year, approximately 525 vehicles (24% of the municipal fleet) were powered by alternative fuels, including biodiesel, all-electric, hybrid, liquid petroleum gas (LPG), and methanol models. The City has also begun installing alternative fuel infrastructure to support further fleet conversion, including CNG refueling stations at the airport and South Yard and more than 50 electric vehicle (EV) charging stations around downtown and in City-owned garages, with more planned for near-term installation.

The City's Green Fleet Policy helps to guide transformation of the City's fleet with a recent goal to decrease vehicle fleet emissions 25% by FY 2012-2013 over FY 2002-2003 levels. During the procurement process, the City will look for the most fuel-efficient vehicle available for a specific task and down-size vehicles when feasible. The Green Fleet policy allows flexibility in

vehicle purchase options to allow use of a range of alternative fuel vehicles for various tasks. An anti-idling policy also prohibits non-emergency vehicles from idling under most conditions.

The following three strategies build upon the City's previous successes in assembling a more efficient, cleaner vehicle fleet. The strategies address preparation of a strategic vehicle fleet transition plan, further development of alternative refueling infrastructure, and promotion of fuel-conserving operational behavior.

As with the energy strategies, implementation of Strategy E-2 will influence the reduction potential of vehicle fleet strategies, specifically those that include shifting the municipal fleet towards electric or hybrid-electric vehicle models. Strategies in this sector have the ability to reduce GHG emissions by approximately 220 MT CO_2e/year in 2020.

STRATEGY VF-1 LOW-EMISSIONS VEHICLES

Transition municipal fleet to fuel-efficient and alternative-fuel vehicle models.

As a signatory of the Bay Area Climate Compact (BACC), the City is aiming to achieve the BACC's Action Area Goal #10 to "increase the number of zero emission and other advanced ultra-low emission light duty vehicles to 10% of municipal fleets by the end of 2013, and to 25% by the end of 2018." The City's Green Vision expands upon this goal through pursuit of a 100% alternative fuel fleet through replacement of older, less-efficient models. The City developed its Green Fleet Policy to guide achievement of these two similar goals.

To that end, the Green Fleet Policy identifies the following seven objectives:

- Optimize the municipal fleet size
- Purchase vehicles that provide the best available net reduction in fleet emissions (excluding emergency vehicles)
- Consider options for lower emission emergency vehicles with comparable performance levels
- Consider carbon offset purchases when reduction targets are not being met
- Make CO_2 reduction an important vehicle purchase criterion
- Select vehicles that also reduce other air pollutants (e.g., CO, NO_x, PM)
- Implement advanced emission control programs on all City owned/operated vehicles

While the Green Fleet Policy provides a broad outline and starting point to achievement of the City's fleet goals, development of a strategic vehicle replacement plan would help to further guide purchase considerations and accelerate transition towards a highly-efficient fleet.

Action A – Strategic Vehicle Fleet Transition Plan

The City's fleet-oriented goals are currently framed in terms of the desired vehicle type (e.g., alternative-fuel vehicles, low- and very-low emissions vehicles). While these goals will generally help to guide vehicle purchasing decisions, they could be further refined to explicitly state emissions targets for the municipal fleet (e.g., reduce fleet emissions by 25% over 2010 baseline levels, achieve zero-emissions fleet by 2050). This would allow closer correlation to the CAP's emissions reduction targets to show how the vehicle fleet transition can support long-term municipal emissions reduction goals.

As part of the Green Fleet Policy implementation strategy, the City developed and is committed to maintaining a complete vehicle fleet inventory that identifies the type and number of vehicles, amount and type of fuel used, fuel use costs, and corresponding emissions. To assist in future calculations of vehicle fleet emissions, vehicle fleet inventory data collection could also include the annual mileage use for each vehicle. If not already included, the City can track the kWh use of all-electric and hybrid-electric vehicles as well, in addition to other fuel use in hybrid models (e.g., CNG, gasoline). This will allow more accurate accounting of total emissions related to electric vehicle use, which will change over time as the energy generation profile of the electricity grid continues to change. The inventory could also track vehicle age and/or vehicle lease expiration dates to assist in long-term planning for vehicle replacements.

To further support implementation of the Green Fleet strategies, the City can develop a comprehensive fleet conversion plan. The plan would use the vehicle fleet inventory to identify which vehicles already comply with the City's fleet goals and outline a phasing plan to convert the remainder of the fleet according to interim target dates. For example, if the City wishes to comply with BACC Goal #10, then approximately 28% of the fleet would need to comprise alternative or low-emissions vehicles by 2020. As of 2014, nearly 41% of the fleet achieved this standard, exceeding the BACC goal and setting the City on the path towards achievement of its 100% alternative fleet goal.

As the total number of vehicles in the fleet shifts (e.g., due to optimizing the fleet size), the number of vehicles to be replaced will also change, which will require annual monitoring to revise future fleet conversion targets. Because a full fleet transition to alternative fuel vehicles is dependent on the availability of vehicle models suitable for specific tasks, refueling infrastructure, and budget considerations, the plan could also include vehicle procurement and long-term infrastructure investment guidance. Additional fleet carbon emission reductions could also be achieved through vehicle miles traveled (VMT) reductions, including expansion or greater promotion of the City's municipal bike fleet and car share programs. These actions can also support optimization of the vehicle fleet size.

Targets will also need to be revised based on available funding to implement vehicle fleet goals. It is unlikely that the municipal fleet will comprise 100% alternative fuel vehicles by 2022, so realistic estimates for near-term achievement should be developed and updated as necessary. For example, the City could aim to replace all passenger and light-duty vehicles with alternative fuel models by 2035, including emergency vehicles (assuming vehicle technology continues to

advance, making suitable alternatives available for this vehicle type). A longer-term goal could be to convert all heavy-duty vehicles to low-emissions/hybrid options by 2050, with revisions to this target year as additional heavy-duty vehicle options come to market. There are currently various models of battery electric, hybrid electric, compressed natural gas (CNG), and fuel cell vehicles that can perform many of the functions required of municipal fleet vehicles. While electric and hybrid models of heavy duty trucks are not yet widely available domestically, CNG options are available that could be used as a bridge technology in the meantime to provide emissions reductions. The City has already developed two CNG refueling stations and incorporated CNG vehicles into various aspects of the municipal fleet, such as airport shuttles. As the City outlines its pathway towards achievement of longer-term emissions targets (e.g., 2050 CAP target), it may discover that deeper emissions reductions from the vehicle fleet are required, which can only be achieved through broad incorporation of all-electric models (powered by emissions-free electricity). The City should regularly estimate the future reduction potential of its vehicle fleet strategy as part of its Green Fleet strategy monitoring process, and incorporate those findings into future CAP updates to provide a holistic view of where future reduction potential lies.

In vehicle sectors without current alternative fuel options, there have been significant advances in clean emissions and fuel efficiency. Over the next five to six years the City's current police vehicles will retire and the next generation of patrol vehicle will emerge. These new units have been incorporated into the patrol fleet since the beginning of 2014. Early data show a few miles per gallon of improved fuel economy. This is significant when considering the total miles traveled and fuel consumption for patrol operations. The patrol fleet can collectively travel more than 4 million miles and consume 500,000 gallons of fuel in one year. A few miles per gallon of improvement can reduce fuel consumption by 90,000 gallons per year, compared to the fuel consumption of the City's current police vehicle. This reduction in fuel consumption reduces GHG emissions. It is important to recognize these opportunities in the transition period where significant reductions in GHGs can occur in the absence of an available dedicated alternative fuel option.

VF-1. Low-Emissions Vehicles

Actions and Implementation Steps

A. Strategic Vehicle Fleet Transition Plan • Modify 100% alternative fuel vehicle goal to include specific fleet emissions targets (can be achieved through reduced VMT, technology, mode shift, etc.) • Expand Green Fleet inventory data collection to include annual mileage use by vehicle, vehicle age / lease expiration dates, and kWh to charge electric vehicle models; review existing vehicle fleet lifespan to identify number and type of vehicles to be replaced by 2020, and which could be replaced with existing models of zero- or low-emissions vehicles	***Responsibility*** Public Works Department, Department of Transportation, Environmental Services Department

VF-1. Low-Emissions Vehicles

Actions and Implementation Steps

- Define vehicle fleet transition pathway to implement Green Vision and Green Fleet policy that reflects market conditions and existing vehicle fleet lifespan, including consideration of existing CNG vehicle options and their expansion within City's fleet; establish additional interim goals to support final Green Vision goal achievement based on available funding, existing vehicle model options, alternative fuel infrastructure, and other implementation considerations
- At time of replacement, replace passenger vehicles with EV, biofuel, CNG, or hybrid models; consider new vehicles' carbon emissions and fuel efficiency as regular procurement criterion
- Continue to pursue implementation of municipal bike fleet in instances where vehicle trips can safely and easily be replaced with trips via bicycle; comprehensive bike fleet could result in opportunities to downsize municipal vehicle fleet
- Continue to pursue implementation of municipal car share program, which could support City efforts to downsize municipal vehicle fleet
- Explore joint procurement options with other area jurisdictions to leverage regional shift towards cleaner municipal fleets into lower per vehicle costs; connect with Public Fleet Supervisors Association as access point for collaboration opportunities, competitive vendor pricing, and industry best management practices

Note: Implementation of this action is budget- and technology-dependent; emergency vehicles could be excluded from near-term fleet target calculations and progress monitoring, until suitable vehicle alternatives become widely available

Performance Indicator (2020)	***2020 Reduction Potential (MT CO_2e/yr)***
Convert an additional 100 passenger/light duty vehicles from unleaded gasoline use to hybrid vehicle models	220

STRATEGY VF-2 ALTERNATIVE FUEL INFRASTRUCTURE

Increase availability of alternative refueling infrastructure to support municipal fleet transition.

This strategy supports Strategy VF-1 by providing the alternative fueling infrastructure necessary to transition the entire municipal fleet to zero- or low-emissions vehicles. To support the incorporation of alternative fuel vehicles in its fleet, the City will need to further develop charging and alternative refueling infrastructure, including additional electric vehicle charging

stations and possible development of local bio-fuel for use in the City's numerous bio-fuel vehicles. Biofuel and CNG infrastructure will allow the City to transition heavy-duty vehicles away from diesel fuel, and can be viewed as bridge technologies until electric or hybrid-electric options are widely available to perform heavy-duty vehicle tasks. In the future, the City may wish to consider fuel cell technology as well.

Action A – Biofuel Production/ Use

Biogas is the byproduct of organic waste fermentation, mostly methane, a GHG that might otherwise escape into the atmosphere if not put to productive use. As of 2010, the City was operating more than 400 biogas (or biodiesel) vehicles. This technology currently represents the largest share of alternative fuel vehicles in the fleet. The Zero Waste Energy Development Company (ZWEDC) uses anaerobic digestion technology to convert organic waste collected in San José into renewable energy and compost. ZWEDC's dry fermentation anaerobic digestion facility is the largest and most advanced facility of its kind in the world and can play a significant role in helping the City meet its overlapping goals to achieve zero-waste, convert waste to energy, and receive 100% of the City's electrical power from renewable sources. As described previously, biofuels can play a primary role in helping the City to achieve its fleet transition goals and near-term emissions reduction target. However, achievement of the 2050 CAP emissions target may require even deeper vehicle fleet reductions than can be achieved through broad use of biodiesel and other biofuels. Strategy VF-1 describes a framework for establishing long-term vehicle fleet targets that align with the CAP's emissions reduction targets and maximize the reduction potential from operation of a highly-efficient and technologically advanced municipal fleet.

Action B – Electric Vehicle Charging Stations

As previously noted, the City has installed more than 50 electric vehicle charging stations for both public and municipal use, with additional stations planned for near-term installation. To provide ample recharging infrastructure that supports further incorporation of electric vehicles (EVs) in the municipal fleet, the City will need to estimate the future role of EVs as part of the vehicle fleet transition strategy described in Strategy VF-1. While the City has emphasized use of biofuels to date, it may eventually be necessary to pursue zero-emissions vehicle options in order to achieve long-term emissions reduction goals (e.g., 83% below baseline levels by 2050). One possible pathway towards an emissions-free vehicle fleet would be incorporation of EVs over the long-term, combined with implementation of the clean electricity options described in Strategy E-2. This approach would use emissions-free electricity to power the City's fleet, greatly reducing vehicle fleet emissions. This is described as a long-term strategy due to the limited availability of suitable EV options for certain municipal vehicles or tasks, such as emergency vehicles and heavy-duty vehicles. As vehicle technology continues to advance, a wider range of EV options may become available to support a full transition of the City's fleet.

As the City continues to install EV charging stations, considerations should be made to provide public access whenever possible to support broader community-wide shifts towards this type of alternative fuel vehicle as well.

VF-2. Alternative Fuel Infrastructure

Actions and Implementation Steps

A. Bio-Fuel Production/Use • Explore partnership opportunities with ZWEDC for future purchase of biogas (should supplies become available) for use in municipal fleet vehicles • Evaluate feasibility to maximize use of available biogas produced at ZWEDC facility in municipal fleet vehicles, per Strategy VF-1; consider volume and production duration of locally produced biofuel when preparing long-term vehicle transition strategy	***Responsibility*** *Environmental Services Department/ Public Works Department*
Performance Indicator (2020) Broadly supports achievement of City's alternative fuel fleet goals	***2020 Reduction Potential (MT CO_2e/yr)*** Supporting Action
B. Electric Vehicle Charging Stations • Determine municipal needs for charging infrastructure as part of overall vehicle fleet transition strategy (i.e., what role will EVs play in future composition of municipal fleet?) • Develop Alternative Vehicle Fueling Infrastructure (AVFI) standards and plan to define prospective locations and siting criteria (e.g., design guidelines, standard drawings, specifications) to facilitate on-street and off-street applications • Install additional electric vehicle charging stations for municipal fleet use; as share of electric vehicles in fleet increases, ensure adequate access to charging stations for municipal vehicles through additional installations or controlled access • Install portion of electric vehicle charging stations in areas accessible to community members, such as Convention Center parking lots; consider new electricity load created from EV charging stations during building design phase of new City facilities to provide opportunities to offset this increased load through additional installation of rooftop PV systems	***Responsibility*** *Public Works*
Performance Indicator (2020) Broadly supports achievement of City's alternative fuel fleet goals	***2020 Reduction Potential (MT CO_2e/yr)*** Supporting Action

STRATEGY VF-3 BEHAVIOR / FUEL CONSERVATION

Encourage and promote fuel efficient driving.

Reducing vehicle fleet fuel use translates directly into emissions reductions. To accurately strategize and implement policies for promoting fleet efficiency, it is important to have accurate data about the fuel efficiency of vehicles and driver behaviors. Telematics systems installed on fleet vehicles can help optimize routes, monitor and reduce idling, provide early identification of vehicle maintenance issues, and enable managers to accurately track and monitor fuel efficiency and positively influence driver behavior. Recognizing department managers and operators who model fuel-efficient practices can raise awareness of positive behaviors and encourage more widespread fuel savings.

Action A: Telematics

Telematics systems can empower fleet managers and operators to quickly identify fuel-consumptive maintenance issues and inefficient driving patterns. Accurate telematics data provide documentation to enable confident decision-making when identifying potential vehicles for replacement and transitions to more fuel-efficient or alternative fuel vehicles. These systems also enable staff to dispatch assistance more promptly to stranded vehicles. Fleet telematics programs have been shown to produce fuel savings of 10-20% per year.

The City currently uses telematics programs in emergency vehicles for vehicle-tracking and deployment purposes, not for VMT reduction. The City should evaluate opportunities to pursue broad implementation of telematics programs on its entire municipal fleet. Vehicles with more established routes can use GPS-based route optimization analysis to reduce total VMT. The entire fleet could benefit from telematics programs that analyze vehicle operations to identify maintenance issues or fuel conservation opportunities.

Action B: Fuel-Efficient Operations and Maintenance

The City performs regular maintenance on all vehicles. According to the Federal Energy Management Program (FEMP), a regularly maintained fleet can save 12-18 % in long-term maintenance costs compared to reactive maintenance programs[ix]. Operational and maintenance behaviors, such as proper tire pressure inflation, regular vehicle inspections, timely repairs, and fuel-efficient driving techniques can extend the operating life of fleet vehicles and improve fuel efficiency by approximately 19 % (FEMP).

The City currently has policies for fuel-efficient driving and maintenance practices, including an anti-idling policy and regularly scheduled preventative maintenance. Further formalizing these policies and practices would help prioritize these actions for the City's maintenance staff and vehicle operators. Expanding he policies to document existing maintenance activities and tune-up schedules, require fuel-efficient driver training, telematics, and raise awareness among all

City employees about fuel-saving priorities. Training sessions should engage all City staff who are managing, maintaining, or utilizing fleet assets.

VF-3. Behavior / Fuel Optimization

Actions and Implementation Steps

A. Telematics • Evaluate opportunities for "route optimization" of municipal vehicles that have standard operating routes; identify VMT reduction potential through new routes • Expand existing telematics program (e.g., vehicle tracking) from emergency vehicles to entire fleet to optimize vehicle operations and identify maintenance issues and fuel conservation opportunities from fuel-efficient driving techniques including unnecessary idling	***Responsibility*** Public Works Department
Performance Indicator (2020) Broadly supports achievement of fleet emissions reduction goals described in Strategy VF-1	***2020 Reduction Potential (MT CO_2e/yr)*** Not Quantifiable
B. Fuel-Efficient Operations and Maintenance • Establish vehicle fleet efficiency policy (i.e., operation and maintenance) that includes formal vehicle maintenance check-list targeting fuel efficiency tune-ups and fuel-efficient driving training (e.g., no speeding, idling, excessive tools/gear in vehicles); fuel-efficient driving could be monitored through vehicle fleet telematics program • Continue implementation of City's anti-idling policy (with exemptions for emergency vehicles when applicable) • Provide anti-idling outreach City-wide through partnership with neighborhood and community groups, with specific campaigns targeting idling in School Zones; partner with San José Chamber of Commerce on anti-idling campaign in commercial districts	***Responsibility*** Public Works Department
Performance Indicator (2020) Broadly supports achievement of fleet emissions reduction goals described in Strategy VF-1	***2020 Reduction Potential (MT CO_2e/yr)*** Not Quantifiable

SOLID WASTE STRATEGIES

Solid waste sector emissions are relatively small compared to those from the energy and vehicle fleet sectors, contributing less than 1% of total emissions. The City's solid waste emissions are based on the disposal of waste generated from municipal activities, such as facility operations, park landscaping and maintenance, and collection at City buildings. Disposed waste 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.

The Green Vision includes a goal to divert 100% of waste from landfills and convert waste to energy. Numerous actions have already been taken or are planned for near-term implementation that will further reduce municipally-generated waste in pursuit of this goal. The City already includes minimum diversion rates of 70% in its waste hauling agreements for municipal facilities. As of 2011, the City was achieving 84% recycling rates; the highest of any municipal recycling program in the nation. The City also developed a Zero Waste Resolution in 2007 that established an interim target of 75% diversion by 2013 and achievement of zero waste by 2022. The airport also developed an independent zero-waste goal for 2022.

From an emissions reduction perspective, organic waste (i.e., waste with carbon content that will decompose in landfill environments) is currently diverted from landfills through various City efforts. The airport already separates organic waste at its sorting facility, and sends it to a nearby composting facility. Recycling and composting programs divert 85% of airport waste from the landfill. The City's Construction and Demolition Debris Deposit Program requires 60% diversion of construction and demolition waste from qualifying new construction and retrofit projects, which reduces the amount of scrap lumber that is landfilled.

The City will continue its efforts to reduce the amount of waste generated from government operations, while diverting waste from landfills through composting, recycling, and reuse. The following strategies expand upon the City's existing efforts, including establishing policies, goals, and audits to reduce waste; developing paperless office practices; expanding municipal composting activities; and increasing construction diversion requirements. When implemented, these strategies have the ability to reduce emissions by approximately 295 MT CO_2e/year.

STRATEGY SW-1 WASTE REDUCTION

Reduce municipal waste through procurement policies, waste diversion goals and waste stream monitoring and analysis.

Cities can reduce their contribution of solid waste sent to landfills through careful consideration at the procurement phase of a product's recyclability, re-use opportunities, useful life expectancy, and comparable substitutes. Green procurement specifications can be enforced through incorporation of city-wide or departmental diversion goals that elevate these considerations during decisions-making processes. Similarly, monitoring the implementation of these policies and goals is necessary to evaluate the success of a waste reduction program. This strategy includes development of procurement guidance documents, waste monitoring and tracking mechanisms, and continuation of existing office paper and food scrap diversion programs. Implementation of this strategy could reduce emissions by 250 MT CO_2e/year.

Action A. Green Procurement Specifications

Green procurement specifications can be developed to prioritize City purchases that generate lower waste across a product's lifecycle, allow local recycling or composting, incorporate recycled or re-used content, and support healthy working environments (e.g., low VOC paints and carpets). The City already adopted an Environmentally Preferable Procurement Policy (EP3) that addresses product content, extended producer responsibility, environmental product standards, and other considerations. Similarly, the City adopted Electronic Product Environmental Assessment Tool (EPEAT) standards directing energy-efficient computer purchases. City Council has also directed the City to avoid purchases of polystyrene foam cups, plates, and bowls or other single-use food service items that cannot be recycled.

To convey a consistent and comprehensive message about environmentally-conscious purchases, the City should develop a user-friendly handbook that staff can use when making procurement decisions. The handbook would incorporate previous research efforts on preferred products for use in daily operations or at City-sponsored events, with an emphasis on preference for recycled/recyclable products, compostable products, minimal packaging, and other low-waste options. The handbook should also incorporate or reference the City's existing EP3 to serve as a clearinghouse document on all City procurement policies and guidance related to resource conservation.

Action B. Waste Audits/Surveys and Diversion Rate Tracking

Analysis of municipal waste volume and composition can provide important data about diversion target feasibility and waste reduction opportunities. Waste audits and surveys at municipal facilities also provide opportunities to engage department managers and employees regarding recycling and diversion efforts, potentially leading to higher participation rates and development of new strategies. The City conducts waste audits at municipal facilities annually. The City should continue to monitor diversion rate achievement through these periodic waste audits, and should use the collected data to report on the City's actual waste characterization results (i.e., the proportional share of various waste types in the City's waste stream). Development of waste characterization data would allow the City to focus its diversion efforts on specific aspects of the waste stream, including targeted employee outreach programs to increase participation and proper use of existing waste diversion strategies.

Action C. Paperless Office Program

Office environments typically generate substantial waste from white paper, mixed office paper, newspaper, and corrugated cardboard. "Paperless office" policies can further reduce office waste and lower operating costs by reducing unnecessary printing, minimizing space needed for paper file storage, and improving file management efficiency. As a city in the heart of Silicon Valley, San José should maximize its application of computer technology and digital systems in areas where it can lead to operational cost savings and resource efficiency. As a near-term action, the City could incorporate paperless practices in the Building Department for building permits and other forms, as well as incorporate paperless agendas for use in its City Council and other regular public meetings. Development of paperless office practices will require coordination among Environmental Services and IT staff to implement the program broadly across all City departments. These joint efforts could include:

- Installing print-tracking software and investigating compliance problems,
- establishing paper use reduction goals (by department or building/facility), and
- developing employee education programs regarding electronic file management processes and paper use tracking.

Paper reduction goals can be tracked through reduced procurement costs for paper, ink, and other printer-related costs, or through municipal waste audits described in Action B. To ensure that recycled paper and cardboard can be re-used for their highest and best purpose, the City should consider developing a "dry" recycling stream to avoid paper-product contamination from liquids and food scraps.

Action D. Food Recovery

Waste from all City facilities is sorted to remove recyclable and compostable content. Many City facilities prepare food on-site. Food that is leftover but still good to eat gets disposed for composting. Some facilities practice food recovery by donating usable food to organizations like food banks that distribute the resource to people in need. These food recovery efforts could be

expanded where practical, and the City could review its facility waste audits (described in Action B) to identify the best candidates to further prioritize food recovery programs. If audits reveal that significant portions of prepared but not eaten food are still being discarded at facilities, the City could focus its efforts on educating City staff and the public on how the recovery program works before expanding to additional facilities. Publicly-oriented education campaigns could also serve to increase participation in community-wide organics collection at homes and businesses, helping to achieve the broader 100% waste diversion goal in the Green Vision.

SW-1. Waste Reduction

Actions and Implementation Steps

A. Green Procurement Specifications • Continue to implement City's various environmental purchasing policies; develop staff handbook to serve as user-friendly resource to guide City purchases of "green" products, such as furniture, carpeting / flooring, paints, packaging materials, energy-efficient appliances, etc., which combines various purchasing policies and practices into one document • Identify City staff member to lead implementation of Green Procurement Specifications, currently overseen by Finance Department • Review Green Procurement Specifications to ensure preference given to recycled products, recyclable and compostable products, products derived from renewable materials, and other products that produce lower waste across the product's lifecycle	***Responsibility*** Environmental Services Department
Performance Indicator (2020) Broadly supports achievement of City's zero-waste goals	***2020 Reduction Potential (MT CO_2e/yr)*** Not Quantifiable

SW-1. Waste Reduction

Actions and Implementation Steps

B. Waste Audits / Surveys and Diversion Rate Tracking
• Continue to perform annual waste audits at City facilities to:
  ○ determine type / quantity of waste being produced,
  ○ measure effectiveness of existing waste diversion practices,
  ○ identify opportunities for new waste diversion practices,
  ○ establish baseline data for measuring progress towards waste reduction and diversion goals
• Establish building- or department-specific waste reduction goals, and track progress using waste audits to demonstrate achievement of City's Zero Waste Strategic Plan goals (i.e., 100% diversion by 2022) and identify areas for additional program development
• Find opportunities to quantify portions of municipal waste stream that are currently unaccounted for in waste audits (e.g., C+D waste, street sweeper waste / street tree leaf waste) to allow the City to track diversion of these additional organic waste items
	Responsibility
	Environmental Services Department

Performance Indicator (2020) Broadly supports achievement of City's zero-waste goals	***2020 Reduction Potential (MT CO_2e/yr)*** Supporting Action
C. Paperless Office Program • Evaluate municipal waste audits to determine if office paper reduction strategies are beneficial use of time and City resources • Work with IT Department to install printer-tracking software that allows printer analytics • Identify third-party, paperless office solutions providers to help develop municipal strategy for increased use of electronic forms / files, as well as file management practices • Conduct analysis of paper use per department to establish data trends (e.g., reams used per year, pages printed per month); establish City-wide paper use reduction goals based on printing analysis • Meet with individual departments to discuss results of analysis and identify opportunities for printing reduction and / or conversion of some file types from hard copy forms to electronic	***Responsibility*** Environmental Services Department/ IT Department
Performance Indicator (2020) Assumes 75% diversion of municipal office paper over 2010 baseline levels (Note: 2010 levels are based on 2008 Statewide Waste Characterization Study; City-specific waste audits, as described in Strategy SW-1 Action B, would allow the City to further refine this performance indicator based on actual composition of City's waste stream and remaining opportunities for waste reduction)	***2020 Reduction Potential (MT CO_2e/yr)*** 220

SW-1. Waste Reduction	
Actions and Implementation Steps	
D. Food Recovery • Expand food recovery efforts, where practical, in order to send food that would otherwise be composted to organizations like food banks that serve people in need; develop goal to establish food recovery systems at all City buildings / facilities that prepare or sell food • Develop outreach campaigns to highlight food recovery efforts at City facilities	***Responsibility*** Environmental Services
Performance Indicator (2020) Assumes 75% diversion of municipal food waste over 2010 baseline levels (Note: 2010 levels are based on 2008 Statewide Waste Characterization Study; City-specific waste audits, as described in Strategy SW-1 Action B, would allow the City to further refine this performance indicator based on actual composition of City's waste stream and remaining opportunities for waste reduction)	***2020 Reduction Potential (MT CO_2e/yr)*** 30

STRATEGY SW-2 LANDSCAPE WASTE DIVERSION

Expand City efforts in landscape waste composting.

Organic materials such as grass clippings, leaves, branches, stumps and other landscape waste products can be composted or mulched for beneficial reuse and diversion from landfills, where they would otherwise decompose to release methane gas. Development of municipal landscaping guidelines could reduce green waste and increase outdoor water conservation. The City can also work to quantify the amount of green waste generated community-wide through street sweeping and yard trimming collection services. These waste components are currently unaccounted for in the City's municipal waste audits, making accurate diversion tracking difficult. Implementation of this strategy could reduce emissions by 35 MT CO_2e/year.

Action A. On-Site Landscape Waste Reduction

The Parks, Recreation and Neighborhood Services (PRNS) Department currently consolidates landscaping waste into bunkers from which a yard-trimming company collects the waste for composting. As part of the Green Grounds Policy described in Strategy E-8, the City could reduce the amount of collected yard trimmings by incorporating mulching mowers into its landscaping services and increasing the height of mower blades to slow the growth of grass in parks, medians, and other landscaped areas. These practices can reduce irrigation use, maintenance costs, and fertilizer needs. The City could also chip all tree trimming materials and

apply the mulch to bare landscape and turf conversion areas, reducing the need to haul these materials away and improving water conservation around trees' roots. The City should review past municipal waste audits to identify the proportion of yard waste that is currently sent to landfills, and ensure that its contracted hauler sends any collected materials to area composting facilities. Zero Waste Strategic Plan updates should establish landscape waste reduction goals and strategies. In the future, municipal green waste may be collected and sent to the ZWEDC facility for use as a biofuel to generate renewable energy.

Action B. Street Waste Composting

The City contracts with GreenWaste Recovery to collect yard trimmings and street sweeping services for all residences in San José. Collected waste is sent to a material recovery facility where it is screened for further processing. Woody materials are removed and chipped for use as a co-generation fuel, while the remaining lightweight materials are sent to a composting facility for conversion into high-quality soil amendment. Street sweeper waste and street tree leaf waste are currently unaccounted for in the City's municipal waste audits. The Environmental Services Department and the City's contracted street waste hauler should work together to develop a tracking methodology to account for this waste source within future audits, or estimate the volume of collected street waste and its current diversion rate. Some portion of collected street waste cannot be composted due to contamination concerns (e.g., glass, plastics, oils that are picked up along with organic street waste collections). The City will continue to monitor efforts in San Francisco to separate these contaminants from the organic waste components, and will pursue a similar program if found to be successful and transferable to San José's context.

SW-2. Landscape Waste Diversion

Actions and Implementation Steps

A. On-Site Landscape Waste Reduction • Review past municipal waste audits to determine percentage of organic waste generated from landscaping activities • Implement use of mulching lawnmowers in City landscaping maintenance activities • Develop program and process to chip / mulch branches, twigs, and other organic material collected during landscaping activities; find beneficial re-use opportunities for mulch (e.g., in municipal landscaping, free community self-haul) • Provide staff training on organic waste diversion in municipal landscaping activities as part of Green Grounds Policy • Incorporate landscape waste reduction strategies and goals into City's Zero Waste Plan	***Responsibility*** Parks, Recreation, and Neighborhood Services

SW-2. Landscape Waste Diversion

Actions and Implementation Steps

Performance Indicator (2020) Assumes 90% diversion of landscape waste over 2010 baseline levels (Note: 2010 levels are based on 2008 Statewide Waste Characterization Study; City-specific waste audits, as described in Strategy SW-1 Action B, would allow the City to further refine this performance indicator based on actual composition of City's waste stream and remaining opportunities for waste reduction)	***2020 Reduction Potential (MT CO_2e/yr)*** 35
B. Street Waste Composting • Evaluate barriers to and opportunities for composting street tree leaf waste / street sweeper organic waste; work with Transportation Department and franchise waste hauler on this issue • Work with franchise waste hauler to develop residential tree leaf collection program that avoids contamination concerns to allow composting; consult StopWaste.org for program implementation ideas • Continue to monitor efforts in San Francisco to separate contaminated waste items from organic street waste components; incorporate successful strategies as appropriate to San José's local context	***Responsibility*** Transportation Department/ Environmental Services Department
Performance Indicator (2020) Broadly supports achievement of City's zero-waste goals	***2020 Reduction Potential (MT CO_2e/yr)*** Not Quantifiable

STRATEGY SW-3 CONSTRUCTION AND DEMOLITION WASTE DIVERSION

Enhance construction and demolition waste diversion rates in municipal projects.

Many construction materials can be diverted from the waste stream for reuse or recycling, including scrap lumber, concrete and asphalt, bricks, scrap metal, and drywall. The California Green Building Code currently requires 50 % diversion of construction and demolition (C&D) materials for all new projects, with few exceptions. The City exceeded this requirement through adoption of its Construction and Demolition Diversion (CCD) Program, which requires at least 75% of C&D waste be diverted from landfills. As green building practices become more common in the region, waste haulers and contractors are expected to further improve their abilities to divert higher percentages of C&D waste in support of project documentation

requirements for various green building certification programs (e.g., LEED, Green Point Rated). Implementation of this strategy could reduce emissions by 10 MT CO_2e/year.

Action A. Municipal Construction and Demolition Standards

The City has adopted a community-wide CDD program requiring 75% waste diversion from qualifying construction and retrofit projects. Application of these requirements to municipal projects has been inconsistent in the past. In order to continue leading by example while striving to achieve the Green Vision goal for 100% waste diversion, the City could consider amending its Standard Provisions to require 75% C&D waste diversion in municipal projects as well. Alternatively, the City could include voluntary pursuit of waste diversion-related design points within its new construction and building retrofit design standards described in Strategies F-5 and F-6. This would emphasize design and construction practices that minimize waste generation through increased use of recycled materials, waste-conscious building design, and advanced waste management techniques at the construction site.

SW-3. Construction and Demolition Waste Diversion

Actions and Implementation Steps

A. Municipal Construction and Demolition Standards • Amend Standard Provisions to require 75% diversion of C&D waste in all municipal construction projects and major retrofits (could start with 60% target and ramp up diversion requirements over time) • Develop reporting mechanism to collect C&D waste generation data from municipal projects to be incorporated into municipal waste audits (C&D waste currently not represented in audits)	***Responsibility*** Environmental Services Department
Performance Indicator (2020) Assumes 60% diversion of construction and demolition waste over 2010 baseline levels by 2020 (Note: 2010 levels are based on 2008 Statewide Waste Characterization Study; City-specific waste audits, as described in Strategy SW-1 Action B, would allow the City to further refine this performance indicator based on actual composition of City's waste stream and remaining opportunities for waste reduction)	***2020 Reduction Potential (MT CO_2e/yr)*** 10

Trajectory towards 2035 and 2050 Targets

This CAP was primarily developed to identify strategies to help the City achieve its near-term 2020 reduction target. Numerous assumptions go into preparing emissions forecasts and plausible reduction measure participation rates, which make it difficult to accurately predict the City's ability to achieve longer-term reduction targets. For example, if building-related energy emissions grow faster than estimated, additional reductions will be needed to achieve the targets. Similarly, if the City is successful at converting its entire municipal fleet to low-emissions vehicles, other reduction measures may become less important. It is also difficult to predict new

technologies and their impact on local government operations. Despite these various assumptions and unknowns, it is possible to conservatively estimate progress towards the 2035 and 2050 targets, and identify the general measures that would be required to support target achievement in the future.

As shown in Table 3.3, if only the measures described in this chapter are pursued (and are not expanded beyond the implementation levels assumed by 2020), the City would achieve more than half of its 2035 target and a third of its 2050 target. However, it is likely that additional implementation of these measures would occur after 2020, leading to greater emissions reductions. For example, this CAP assumes the installation of approximately 17.3 MW of solar PV capacity by 2020 (from Strategy E-2 and E-3). However, pursuit of the City's goal to provide 100% of municipal electricity from renewable energy sources will likely result in additional solar PV installations on City buildings and property.

The measures and reduction estimates presented in this chapter are based on reasonable assumptions for what is possible and likely to occur by 2020, and have been vetted by City staff to refine their feasibility. However, as mentioned above, the accuracy of emissions projections and reduction estimates becomes less certain the farther into the future they are projected. This section presents a scenario demonstrating what level of City effort would be required in order to achieve the 2050 reduction target (i.e., 83% below 2010 levels).

Table 3.3
Impact of 2020 Local Government Operations Reductions on Future Target Achievement

Reduction Strategies	2020 (MT CO_2e/year)	2035 (MT CO_2e/year)	2050 (MT CO_2e/year)
Total Reductions Estimated	30,445	30,445	30,445
Reductions Needed to Achieve Target	18,153	53,394	87,807
Reduction Target	15% below baseline	49% below baseline	83% below baseline
Reduction Target Achieved	33% below baseline	15% below baseline	3% above baseline

As shown in Table 3.4, actions that result in use of cleaner electricity would play an important role in long-term target achievement. Energy-related emissions are estimated to account for nearly 78% of the City's emissions in 2050, more than half of which are related to electricity use. This means that long-term target achievement will not be possible without significant reductions from the energy sector. Similarly, water-related emissions and solid waste-related emissions contribute relatively fewer emissions to the City's inventory; forecasted to be approximately 2% of total emissions in 2050. This indicates that actions that address water conservation and solid waste diversion, while important for other ecological or financial reasons, cannot be the primary strategy for long-term emissions target achievement.

The City's path to future target achievement is estimated to focus on the use of clean energy sources for building, facility, and vehicle needs. Table 3.4 presents one possible scenario for emissions reductions by 2050 that would achieve the City's long-term target. The table is organized similarly to Table 3.2 presented earlier in this chapter, though the scope of actual measures may differ as technologies change. The following discussion sections outline the pathway to 2050 target achievement.

100% Emissions-Free Electricity

This scenario presented in Table 3.4 assumes that 100% of the City's electricity use will come from emissions-free sources by 2050. This could be achieved through a combination of municipal renewable energy projects (including maintenance of existing systems) and participation in the clean electricity options described in Strategy E-2. If all electricity comes from clean sources, then building retrofits that conserve electricity no longer have emissions reductions associated with them (i.e., the electricity they save is already emissions free, so there is no net reduction in emissions). Therefore, Table 3.4 shows that emissions reductions associated with Strategies E-4, E-7, E-8, A-1, A-2, and the Renewable Portfolio Standard are replaced by the reductions associated with emissions-free electricity from Strategy E-2.

Table 3.4
Local Government Operations Emissions Reduction Strategies – 2050

Reduction Strategies	2020 Reductions (MT CO_2e/year)	2050 Reductions (MT CO_2e/year)
ENERGY STRATEGIES		
Statewide Renewable Portfolio Standard	12,125	-[2]
E-1 Strategic Energy Action Plan	Supporting Action	
E-2 Sustainable Energy Portfolio	1,140[1]	40,660
E-3 Renewable Energy Generation	8,995	5,260
E-4 Advanced Energy Management	350	-[2]
E-5 Existing Building Energy Retrofit	-	11,920
E-6 New Building Energy Performance	Supporting Action	
E-7 Public Realm Lighting Efficiency	2,060	-[2]
E-8 Landscape Water Conservation	200	-[2]
AIRPORT FACILITY AND OPERATION STRATEGIES		
A-1 Airport Runway Lighting Improvements	25	-[2]
A-2 Airport Operation Efficiency Improvements	135	-[2]
WASTEWATER TREATMENT FACILITY STRATEGIES		
WW-1 Wastewater Facility Innovation Opportunities	4,900	12,100

Table 3.4
Local Government Operations Emissions Reduction Strategies – 2050

Reduction Strategies	2020 Reductions (MT CO_2e/year)	2050 Reductions (MT CO_2e/year)
VEHICLE FLEET STRATEGIES		
VF-1 Low Emissions Vehicles	220	17,310
VF-2 Alternative Fuel Infrastructure	Supporting Action	
VF-3 Behavior / Fuel Conservation	Supporting Action	
SOLID WASTE STRATEGIES		
SW-1 Waste Reduction	250	485
SW-2 Landscape Waste Diversion	35	50
SW-3 Construction and Demolition Waste Diversion	10	20
TOTAL REDUCTIONS	**30,445**	**87,805**
Reductions Needed to Achieve Target	18,153	87,807
Remaining Reductions Needed	(12,292)	2
Reduction Target Achieved	33% below 2010	83% below 2010

[1] Only reductions associated with implementation of Strategy E-2 Action B are presented here; it is assumed that implementation of the clean electricity option described in Strategy E-2 Action A, if pursued, would occur after the 2020 horizon year. If implementation of the clean electricity option is pursued prior to 2020, then the emissions reductions associated with strategies that reduce electricity-related emissions would also be reduced.

[2] Implementation of Strategy E-2 to purchase 100% clean electricity for local government operations would supersede reductions associated with electricity conservation programs; 2050 emissions reductions shown for Strategy E-2 equal the total electricity-related emissions forecast for 2050

DEEP NATURAL GAS USE REDUCTIONS

The 2050 reduction estimates are based on the same 2020 CAP measures described in this chapter, with increased implementation performance assumptions occurring between 2020 and 2050. Approximately 55% of the City's building-related energy use in 2010 was attributed to electricity use, while the remaining 45% was natural gas. Under the business-as-usual emissions forecast scenario described in Chapter 2, this ratio of energy use is assumed to continue in the future. That means that the 45% of future building energy use attributed to natural gas consumption will not be affected by clean electricity purchases or generation. Therefore, this scenario assumes advanced building and facility operation retrofit programs will be pursued that will reduce municipal natural gas use from City buildings, the airport, and the Regional Wastewater Facility by 32%. Achievement of this level of natural gas use reduction will depend on the City's ability to replace increasing amounts of natural gas use at the RWF with biogenic fuel sources, such as landfill gas and digester gas. Fuel switch opportunities to shift the City's use of natural gas for water and space heating to alternative low- or zero-emissions

technologies (e.g., solar hot water, electric heating) may become financially and technologically viable in the future as well.

ADVANCED VEHICLE FLEET TRANSFORMATION

In addition to significant emissions reductions within the energy sector, this scenario depends upon a widespread transformation of the City's municipal fleet towards all-electric vehicles. This scenario expands upon the assumptions described in Measure VF-1 above, and demonstrates potential reductions resulting from a fleet that comprises 90% electric vehicles. This scenario is dependent upon additional advancements in the vehicle market to provide electric vehicle models that can perform the tasks required of the municipal fleet. The level of reductions estimated here are only possible if the electricity used to power these municipal vehicles is emissions free as described above.

ZERO-WASTE ACHIEVEMENT

The remaining emissions reductions are based on an assumption that the City can achieve its zero-waste goal, such that no organic materials are sent to area landfills by 2050. This scenario assumes 100% diversion of office paper and paper materials, food scraps and green waste from landscaping activities, organic components of construction and demolition debris, and all other waste categories.

It is difficult to establish performance assumptions for horizon years far in the future given unknown budgetary conditions, emergence of new and evolving technologies, and potential state and federal actions. For this reason the CAP does not attempt to define the specific implementation actions for 2035 and 2050, as it does for 2020 within this chapter. However, because the CAP is a living document that should be reviewed and revised on a regular basis, possibly in coordination with future General Plan revisions, performance indicators that align with the long-term emissions reduction strategies described here can developed gradually over time.

Given the pathway described above for achievement of the City's 2050 reduction target, emissions reduction progress by 2035 will require implementation of actions at a level somewhere between what is described for 2020 in the measure descriptions earlier in this chapter and this high-level scenario described for 2050. For example, if the 2020 scenario assumes electricity consumed by the City is 33% emissions free by 2020 and 100% emissions free by 2050, it should be approximately 67% emissions free by 2035. Due to the numerous variables and unknowns of the future state of the City's emissions, these 2050 reduction estimates are provided for demonstrative purposes only. As described further in Chapter 4, the City will need to regularly assess the effectiveness of CAP measures to ensure future emissions levels are on track to achieve the 2050 target, as well as monitor any new future guidance from the Office of Planning and Research, BAAQMD, or other agencies on the role of local government action in supporting the state's reduction targets.

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Chapter 4

PLAN IMPLEMENTATION

This chapter describes how the City will implement the CAP's emission reductions strategies and actions. The chapter covers the following topics:

- Implementation and Monitoring: describes how City staff will implement the CAP strategies and related actions, and track progress against the goals identified for each strategy within Chapter 3.
- Plan Evaluation and Evolution: discusses a process for evaluating, updating, and amending 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 2020, 2035, and 2050 emission reduction targets. To facilitate this, each strategy described in Chapter 3 contains an associated table that identifies the strategy's estimated GHG reduction potential in 2020, implementation actions that help to achieve those reduction levels, department responsible for implementing those actions, and performance indicators used to quantify emissions reductions (where applicable). These tables are collected within Appendix D to provide a single reference document to help guide the CAP implementation process.

These tables enable City staff, the City Council, and the public to track strategy implementation and monitor overall CAP implementation progress. The 2020 performance indicators are especially important, as they provide a checkpoint to evaluate if a measure is on target to achieving its anticipated longer-term emission reductions.

Each strategy's estimated GHG emissions reductions are based on the corresponding performance indicators, which will help City staff track progress toward the GHG reduction targets. For example, Strategy E-3 (shown in Table 4.1) 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 new solar photovoltaic systems installed on City buildings and parking lots by the 2020 target year. The 2020 performance goals are based on installation of approximately 6.3 MW of photovoltaic (PV) capacity, including the previously installed 4.8 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 performance 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. The lead Department staff will work with key staff in each department to facilitate the measures and actions. To assess the status of City efforts, CAP implementation meetings should take place on a regular basis. Some actions will require inter-departmental cooperation, and appropriate partnerships will need to be established.

Table 4.1
Measure Implementation Tracking Template

Strategy E-3 Renewable Energy Generation

Develop additional renewable energy facilities according to guidance described in the Strategic Energy Action Plan.

Actions and Implementation Steps	Department and Division Responsible	Phasing
B. Solar PV Installations on City Buildings, Parking Lots, Land		
▪ Pursue installation of 1.3 MW capacity of identified solar PV projects	Department, Division	Establish a target date or timeframe for Implementing each action, (e.g., September 2015, Fall 2015, or FY 2015-16.)
▪ Prepare MEAP update that identifies priority candidate sites for next phase of solar projects, including near-, medium-, and long-term installation phasing options	Department, Division	
▪ Continue to evaluate new solar PV opportunities in context of City's broader energy efficiency and renewable energy development goals to minimize total installed capacity needed to achieve clean electricity goals	Department, Division	
Performance Indicator	**Year**	**Tracking Mechanisms**
▪ City maintains existing 4.8 MW of solar PV facilities and installs additional 7.5 MW of capacity to generate 21.2 million kWh/yr of electricity	2020	Collect installation data from renewable energy project contracts (or meters) and analyze to gauge progress toward goals: Examples: What was the total installed generation capacity (in kW or MW) for the photovoltaic systems? How many kWh/yr of electricity are generated from the photovoltaic systems (empirical data to be collected from utility accounts)?

Plan Evaluation and Evolution

The CAP represents the City's first plan to reduce GHG emissions from local government operations in alignment with adopted short- and long-term absolute 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 reduction targets.

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 will provide the best indication of CAP effectiveness. Conducting these inventories periodically will enable direct comparison to the 2010 baseline inventories and measurement of progress toward meeting the City's adopted reduction targets.

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 important data that are related to the performance indicators shown in the measure tables. While much of the data is already available from existing reports or processes, some improvements in data collection will be needed. It is therefore important that the lead Department staff and key staff from relevant departments establish methods of data collection in a consistent, simplified, and ideally, centralized way. The implementation tables from Chapter 3 have been expanded and collected in Appendix D as the basis for a CAP Implementation Tracking Framework. Table 4.1 (included above) presents a sample from this appendix to show 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 the Strategy, Actions, and Implementation Steps. It also provides a space to designate responsibiltiy for individual implementation steps, establish phasing timelines, and track important 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 should be evaluated regularly to ensure each measure is on track to achieve its stated emissions reductions. 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 should be an iterative process to reflect future changes in technology, available budget, and staff resources. City staff will use the Implementation Tracking Framework from Appendix D to develop a performance tracking system that covers each CAP measure and action and fits within existing City procedures.

Environmental Services staff will collaborate with staff from responsible departments to evaluate measure performance on a regular, defined basis. Environmental Services staff will also prepare a periodic summary report that outlines progress toward CAP measures and actions. The report could cover areas such as estimated GHG emissions reductions to date, progress toward the next reduction target, progress toward implementation of the actions, achievement of strategy 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 the City get back on track toward meeting its GHG reduction targets. Similarly, the City may find that as more severe impacts are observed from climate change, it may become necessary to accelerate efforts described in this CAP or incorporate adaptation measures that respond to the observed or newly anticipated challenges.

Following the 2020 CAP target year, the City should also begin to define the priority measures and implementation action steps that it will pursue to help achieve the 2035 reduction target. This process should begin with preparation of a 2020 emissions inventory that can be used to compare progress made since the baseline 2010 inventory. The updated inventory will also be helpful in identifying priorities for new City actions. The City can refer to the 2035 and 2050 target achievement discussion at the end of Chapter 3 for guidance on the types of strategies that should be included in future CAP revisions. However, it will be important to consider 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.

Inventory Updates

As mentioned throughout this document, the City's ability to track implementation success is best achieved through regular emissions inventory updates (e.g., every 3-5 years). These

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 part of the future inventorying process, the City should 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 constantly being 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 Local Government Operations Protocol and ICLEI have developed guidance on how local governments 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 should continue to develop its institutional knowledge in the area of emissions generation sources, reduction opportunities, and emissions inventory variables. Whether through a strong leadership role in preparing its own updates (possibly using ICLEI's online resources) or through a partnership with other area jurisdictions, the City should remain engaged in the inventorying process so that City staff can provide a level of consistency from one update period to the next. Additionally, Appendix B provides the inventory methodology used to prepare the LGO inventory and forecasts presented in this CAP. This appendix should serve as a reference for future inventory updates to provide as much consistency as possible from one inventory year to the next.

Endnotes

[i] US Environmental Protection Agency. Climate Change Basics. Accessed December 4, 2012. Available at: http://www.epa.gov/climatechange/basics/.

[ii] Ibid.

[iii] US Environmental Protection Agency. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2010. April 15, 2012. Accessed December 4, 2012. Available at: http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html.

[iv] California Climate Change Center. Our Changing Climate – Assessing the Risks to California: A Summary Report from the California Climate Change Center. August 2006. Accessed December 4, 2012. Available at: http://www.energy.ca.gov/publications/displayOneReport.php?pubNum=CEC-500-2006-077.

[v] California Climate Change Center. Our Changing Climate 2012: Vulnerability & Adaptation to the Increasing Risks from Climate Change in California. July 2012. Accessed December 4, 2012. Available at: http://www.energy.ca.gov/2012publications/CEC-500-2012-007/CEC-500-2012-007.pdf.

[vi] California Environmental Protection Agency, Air Resources Board. Local Government Operations Protocol for Greenhouse Gas Assessments. Available: www.arb.ca.gov/cc/protocols/localgov/localgov.htm. Accessed February 27, 2014.

[vii] International Panel on Climate Change. *Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, 2007*. Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. Available at: <http://www.ipcc.ch/publications_and_data/ar4/wg1/en/ch2s2-10-2.html.>

[viii] This figure varies from the 2010 Green Vision Report since the LGO CAP inventory protocol (i.e., operational control) does not include electricity usage from City-owned but third-party managed facilities.

[ix] Federal Energy Management Program, 2012 (download May 2012 http://www1.eere.energy.gov/femp/program/om_preventive.html)