BURBANK2035

Greenhouse Gas Reduction Plan

Adopted February 19, 2013

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ACKNOWLEDGEMENTS

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Adopted February 19, 2013

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ACRONYMNS AND ABBREVIATIONS

AB – Assembly Bill
ARB – Air Resources Board
ARRA – American Reinvestment and Recovery Act
BAU – Business-as-usual
BWP – Burbank Water and Power
CEQA – California Environmental Quality Act
CFL – Compact fluorescent light
CH_4 - Methane
CO_2 – Carbon dioxide
CSI – California Solar Initiative
DOT – Department of Transportation
EIR – Environmental Impact Report
EO – Executive Order
EPA – US Environmental Protection Agency
GGRP – Greenhouse Gas Reduction Plan
GHG – Greenhouse gas
GVWR – Gross vehicle weight rating
HERS – Home Energy Rating System
HVAC – Heating, ventilation, air conditioning
IPCC – International Panel on Climate Change
ITS – Intelligent transportation system
kW - kilowatt
kWh – kilowatt hour
LCFS – Low Carbon Fuel Standard
LED – Light emitting diode
LID – Low impact development
LTO – Landing and takeoffs
MSW – Municipal solid waste
MT CO_2e/yr – Metric tons carbon dioxide equivalent emissions per year
MW - Megawatt
MWh – Megawatt hour
N_2O – Nitrous oxide
PSI – Pounds per square inch
PV – Photovoltaic
RPS – Renewable Portfolio Standard
RWCAP – Recycled Water Conversion Assistance Program
SB – Senate Bill
SCAG – Southern California Association of Governments

Scoping Plan – Air Resources Board *Climate Change Scoping Plan*
SP – Service population
sq ft – Square feet
SRTS – Safe Routes to School
SWH – Solar water heater
TDM – Transportation demand management
TMO – Burbank Transportation Management Organization
UWMP – Urban Water Management Plan
VMT – Vehicle miles traveled

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1 Introduction

Greenhouse gas (GHG) emissions and resulting climate change impacts are considered a major global challenge for the 21st century. In California, these impacts range from reduced snow pack in the Sierra Nevada affecting water supplies, to higher sea levels threatening coastal cities and infrastructure, to decreased air quality that harms public health. Both at the global and local levels, we are starting to experience shifts in climate patterns and increased frequency of extreme weather events.

BACKGROUND

In preparing this Greenhouse Gas Reduction Plan (GGRP), the City of Burbank is contributing to efforts across California to reduce GHG emissions by taking actions in its own operations and community. The GGRP is designed to implement *Burbank2035,* the City's General Plan, and comply with recent revisions to the State California Environmental Quality Act (CEQA) Guidelines. In doing so, the GGRP enables development streamlining opportunities for future discretionary projects under CEQA.

PLANNING CONTEXT

A GGRP is a tool that many cities in California are using to quantify their share of statewide GHG emissions and establish action steps toward achieving a local emissions reduction target. GGRPs typically address emissions targets through reduced dependency on fossil fuels and nonrenewable energy sources.

In Burbank, most GHG emissions come from energy used in buildings and gasoline burned in motor vehicles, with water- and waste- related emissions contributing relatively smaller proportions. Burbank's GGRP examines communitywide activities that result in GHG emissions and establishes strategies that help reduce those emissions in future and existing development through both voluntary and mandatory actions.

GGRPs do much more than reduce GHG emissions. Many of the strategies included in this document will also help make Burbank a more attractive place to live - through bike and pedestrian facility improvements, better air quality, lower energy and water bills through conservation, and reduced waste to extend the lifetime of the Burbank Landfill.

Scope and Content of the GGRP

The GGRP consists of five chapters and two supporting appendices, the contents of which are briefly described below:

- **Chapter 1 – Introduction,** describes the need for GHG reduction planning in California, an overview of the topics covered in the GGRP, and state actions to combat climate change.

- **Chapter 2 – Relationship to *Burbank2035* and the California Environmental Quality Act**, identifies how *Burbank2035* sets a broad framework for the GGRP emission reduction strategies, and how the GGRP is intended to implement the General Plan. This chapter also describes the GGRP's relationship to the *Burbank2035* Environmental Impact Report (EIR), and its ability to enable a CEQA tool known as "tiering" to allow consistent future discretionary development projects to skip certain steps in the traditional CEQA process.

- **Chapter 3 – The Planning Process**, outlines key steps taken to develop the GGRP, including establishing a 2010 baseline GHG inventory, projecting future emissions in 2020 and 2035, and calculating local reductions attributable to implementation of statewide climate change policy. The chapter also sets a communitywide GHG reduction target for 2020 and a reduction goal for 2035, and describes the emissions gap between the reduction target and statewide reductions.

- **Chapter 4 – Measures and Reductions,** addresses six main reduction strategies: energy, transportation, water, solid waste, green infrastructure, and City government. The GGRP identifies the following for each reduction strategy: specific measures, actions, and responsible departments for implementation; progress indicators and metrics against which to measure success; and estimated GHG reductions in 2020 (Assembly Bill [AB] 32 target year) and 2035 (the *Burbank2035* horizon year).

- **Chapter 5 – Plan Realization**, discusses measure implementation, GGRP evolution, and monitoring. It also describes the relationship between the GGRP and the State CEQA guidelines, and establishes criteria City staff can use when determining if a proposed discretionary project is consistent with the GGRP.

Appendices accompany this document, providing additional detail describing the assumptions and methodologies used to prepare the GGRP:

- **Appendix A** describes technical methods used to prepare the 2010 emissions inventory and 2020 and 2035 projections.

- **Appendix B** describes assumptions used to estimate GHG emissions reductions associated with the GGRP measures.

- **Appendix C** provides economic analysis of proposed GHG emission reduction measures. *This appendix will be prepared for a future draft of the GGRP if directed by the City Council.*

- **Appendix D** summarizes public outreach efforts accompanying preparation of the GGRP and summarizes public comments received on the plan. *This appendix will be prepared for a future draft of the GGRP.*

CLIMATE CHANGE SCIENCE

Climate change is a reality, and human activity is its primary cause. Atmospheric concentrations of carbon dioxide (CO_2), the principal human-caused GHG, are at a level unequaled for at least the last

800,000 years, due largely to the combustion of fossil fuels. GHGs from human activities, such as burning fossil fuels for use in buildings and transportation, and methane produced from agricultural practices, are trapping more of the sun's heat in the earth's atmosphere and warming the earth (see Figure 1-1). Over the last century, average global temperatures have risen by more than 1°F, and some regions have warmed by as much as 4°F, with predictions for continued temperature increases in the coming years.

Trend projections indicate that atmospheric concentrations of GHG emissions will continue to increase throughout this century. If these projections become reality, climate change will threaten our economic well-being, public health, and environment.

In its 4th assessment of climate change, the United Nations International Panel on Climate Change (IPCC) provides a comprehensive overview of the impacts of climate change, as agreed upon by the largest global consensus scientists have ever assembled. This report describes potential global emission scenarios for the coming century. The scenarios vary from a best-case scenario characterized by low population growth, clean technologies, and low GHG emissions; to a worst-case scenario where high population and fossil-fuel dependence result in extreme levels of GHG emissions. While some degree of climate change is inevitable, most climate scientists agree that to avoid serious climate change effects, atmospheric GHG concentrations need to be stabilized quickly.

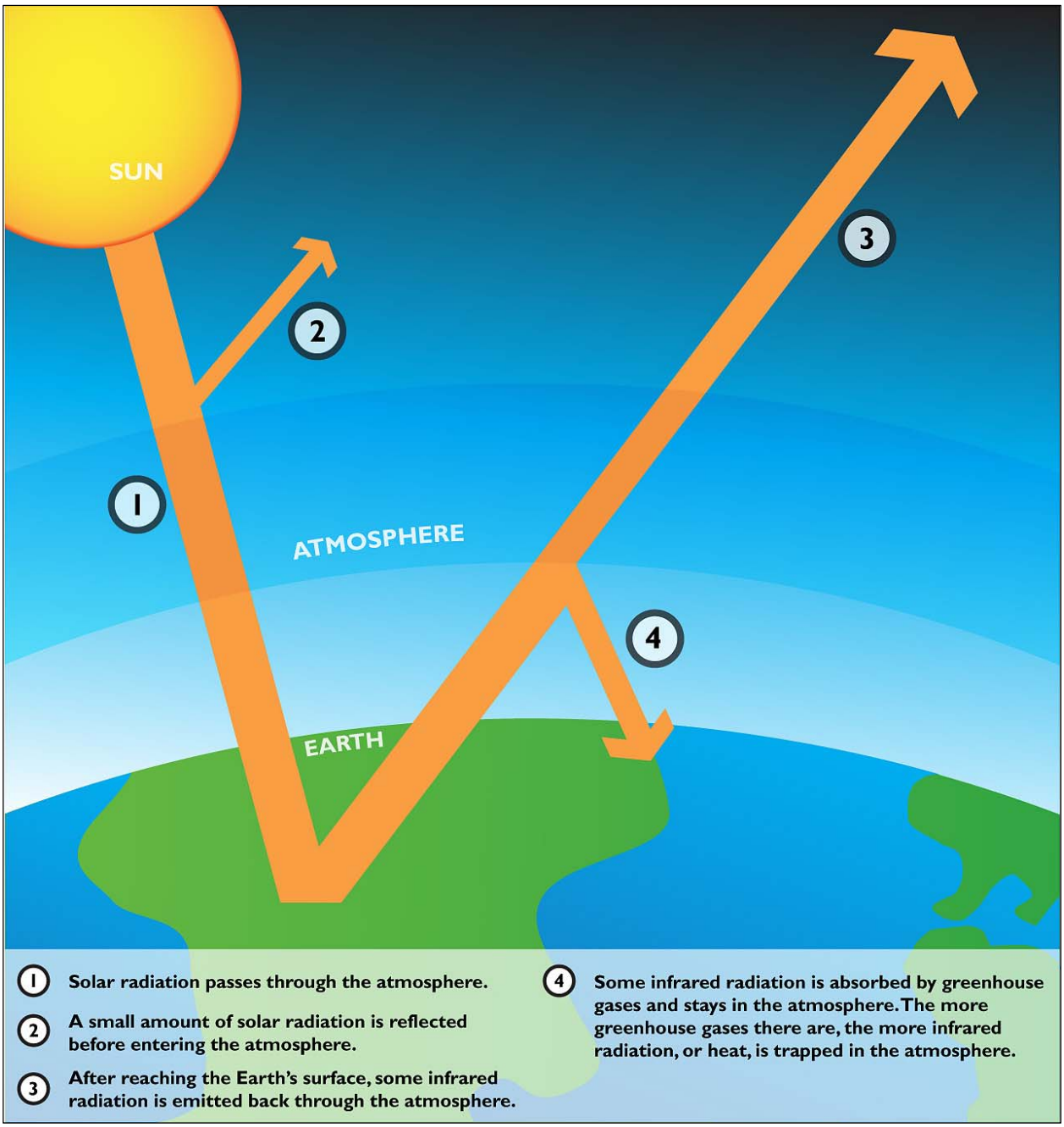
CALIFORNIA CLIMATE CHANGE ACTIONS

Burbank's climate change mitigation strategy must be set within the context of the Los Angeles basin and the state, where much of the momentum for local action in the United States originates.

California has long been a sustainability leader, as illustrated by Governor Schwarzenegger signing Executive Order (EO) S-3-05 in 2005. EO S-3-05 recognizes California's vulnerability to reduced snowpack, exacerbation of air quality problems, and potential sea-level rise due to a changing climate. To address these concerns, the governor established targets to reduce statewide GHG emissions to 2000 levels by 2010, to 1990 levels by 2020, and to 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. This law codifies the EO S-3-05 requirement to reduce statewide emissions to 1990 levels by 2020. AB 32 resulted in the 2008 adoption by the California Air Resources Board (ARB) of a *Climate Change Scoping Plan* (Scoping Plan), outlining the State's plan to achieve emission reductions through a mixture of direct regulations, alternative compliance mechanisms, various incentives, voluntary actions, market-based mechanisms, and funding. The Scoping Plan identifies local governments as "essential partners" in the State's efforts to reduce GHG emissions. It addresses similar areas to those contained in Burbank's GGRP, including transportation, building energy efficiency, water conservation, waste reduction, and green infrastructure.

Figure 1-1 – Greenhouse Effect



Source: AECOM 2012

AB 32 engendered several companion laws that can assist Burbank in reducing communitywide GHG emissions, including, but not limited to:

- AB 1493 establishing emission performance standards for motor vehicles.
- EO-S-1-07 establishing performance standards for the carbon intensity of transportation fuels.
- Senate Bill (SB) 1078 establishing emission performance standards for electric utilities.
- AB 1109 establishing efficiency standards for residential and commercial lighting products.

Additional descriptions of these and other legislative actions are provided below. At the time of GGRP preparation, the City estimated the GHG emission reductions associated with AB 1493, EO-S-1-07, the Renewable Portfolio Standard (RPS), AB 1109, and other discrete vehicle efficiency programs (see Chapter 3 for GHG emission reductions associated with these programs). In the future, as the regulatory framework surrounding AB 32 grows, it may be possible to evaluate a wider range of statewide reductions.

AB 1493 (Pavley I and II)

Assembly Bill (AB) 1493, also referred to as Pavley I, signed in 2002, required that ARB develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks and other vehicles determined by ARB to be vehicles whose primary use is noncommercial personal transportation in the state."

In 2004, ARB adopted standards requiring automobile manufacturers to meet fleet-average GHG emissions limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty passenger vehicle weight classes (i.e., any medium-duty vehicle with a gross vehicle weight rating less than 10,000 pounds that is designed primarily for the transportation of persons) beginning with the 2009 model year. For passenger cars and light-duty trucks, the GHG emissions limits for the 2016 model year are approximately 37% lower than the limits for the first year of the regulations, the 2009 model year.

In April 2010, the Department of Transit (DOT) and US Environmental Protection Agency (EPA) established GHG emissions and fuel economy standards for model year 2012–2016 light-duty cars and trucks. In the fall of 2010, California accepted compliance with these federal GHG standards as meeting similar state standards adopted in 2004, resulting in the first coordinated national program. In 2011, the DOT, EPA, and the State of California announced that they will be making a coordinated effort to setting higher fuel efficiency standards for model year 2017–2025 cars and light-duty trucks. These standards will increase fuel efficiency in passenger vehicles and light trucks to 53 and 39 miles per gallon, respectively, by 2025.

EO-S-1-07 – Low Carbon Fuel Standard

EO-S-01-07, known as the Low Carbon Fuel Standard (LCFS), reduces the carbon intensity of California's transportation fuels by at least 10% by 2020. The LCFS is a performance standard with flexible compliance mechanisms that incentivize the development of a diverse set of clean, low-carbon transportation fuel options to reduce GHG emissions. Based on current available data, LCFS standards

are projected to reduce overall statewide GHG emissions attributable to vehicle fuels by approximately 10%.

SB 1078 – Renewable Portfolio Standard

SB 1078, SB 107, EO-S-14-08, and SB X1-2 have established increasingly stringent RPS requirements for California utilities. RPS-eligible energy sources include wind, solar, geothermal, biomass, and small-scale hydro.

- SB 1078 required investor-owned utilities to provide at least 20% of their electricity from renewable resources by 2020.
- SB 107 accelerated the SB 1078 timeframe to take effect in 2010.
- EO-S-14-08 increased the RPS further to 33% by 2020. Burbank Water and Power (BWP), Burbank's electricity provider, delivered approximately 10% of its electricity from renewable sources in 2010.
- SB X1-2 codified the 33% RPS by 2020 requirement established by EO-S-14-08, and extended the requirements to all electricity retailers in the state, including publicly-owned utilities (including BWP), investor-owned utilities, electricity service providers, and community choice aggregators.

AB 1109 – Lighting Efficiency

AB 1109, known as the Lighting Efficiency and Toxics Reduction Act, established requirements for reducing lighting energy usage in indoor residences and state facilities by no less than 50% by 2018, and a 25% reduction in commercial facilities by the same date. To achieve these efficiency levels, the California Energy Commission would apply its existing appliance efficiency standards to include lighting products, as well as require minimum lumen/watt standards for different categories of lighting products. The bill expands existing incentives for energy efficient lighting. The bill also requires manufactures to reduce the levels of toxins in lighting products, such as mercury in fluorescent and lead in incandescent bulbs.

Vehicle Efficiency Regulations

ARB has adopted several regulations to reduce emissions through improved vehicle efficiency that will have local GHG emission reduction benefits in Burbank. The following two regulations were quantified and included in the GGRP calculations.

Tire Inflation Regulation

On September 1, 2010, ARB's Tire Pressure Regulation took effect. The purpose of this regulation is to reduce GHG emissions from vehicles operating with under-inflated tires by inflating them to the recommended tire pressure rating. The regulation applies to vehicles with a gross vehicle weight rating

(GVWR) of 10,000 pounds or less. Under this regulation, automotive service providers must meet the following requirements:

- Check and inflate each vehicle's tires to the recommended tire pressure rating, with air or nitrogen, as appropriate, at the time of performing any automotive maintenance or repair service.
- Indicate on the vehicle service invoice that a tire inflation service was completed and the tire pressure measurements after the service were performed.
- Perform the tire pressure service using a tire pressure gauge with a total permissible error no greater than + two (2) pounds per square inch (psi).
- Have access to a tire inflation reference that is current within three years of publication.
- Keep a copy of the service invoice for a minimum of three years, and make the vehicle service invoice available to the ARB, or its authorized representative upon request.

Heavy-Duty Vehicle GHG Emission Reduction (Aerodynamic Efficiency)

In December 2008, ARB adopted a new regulation to reduce GHG emissions by improving the fuel efficiency of heavy-duty tractors that pull 53-foot or longer box-type trailers. Fuel efficiency is increased through improvements in tractor and trailer aerodynamics and the use of low rolling resistance tires. The regulation is expected to reduce approximately 1 million metric tons of carbon dioxide-equivalent emissions statewide by 2020. Over the 11 years between 2010, when the rule went into effect, and the end of 2020, it is estimated that truckers and trucking companies will save about $8.6 billion by reducing diesel fuel consumption by as much as 750 million gallons in California, and 5 billion gallons across the nation. The tractors and trailers subject to this regulation must use U.S. Environmental Protection Agency SmartWay-certified tractors and trailers, or retrofit their existing fleet with SmartWay-verified technologies. These requirements apply to both California-registered trucks and out-of-state registered trucks that travel to California.

2 Relationship to *Burbank2035* and the California Environmental Quality Act

This chapter establishes the relationship of the GGRP to *Burbank2035* and provisions of the California Environmental Quality Act (CEQA) statute and guidelines.

One consideration for developing a GGRP is to enable a CEQA tool known as tiering. Tiering allows future development projects that are consistent with *Burbank2035* and incorporate GHG emission reduction measures described in the GGRP within their project designs to skip certain steps in the CEQA process, reducing project costs and streamlining City permit processes. This chapter describes how the GGRP meets standards for a plan for the reduction of greenhouse gas emissions under the State CEQA Guidelines, which in turn affords future project applicants the ability to tier from the City's GGRP and the *Burbank2035* Program EIR.

RELATIONSHIP TO *BURBANK2035*

Burbank2035 sets a broad framework for the emissions reduction strategies, measures, and actions in the GGRP. The GGRP implements the following goal and policies from the *Burbank2035* Air Quality and Climate Change Element:

Goal 3 Reduction of Greenhouse Gas Emissions: *Burbank seeks a sustainable, energy-efficient future and complies with statewide greenhouse gas reduction goals.*

Policy 3.1*: Develop and adopt a binding, enforceable reduction target and mitigation measures and actions to reduce communitywide greenhouse gas emissions within Burbank by at least 15% from current levels by 2020.*

Policy 3.2*: Establish a goal and strategies to reduce communitywide greenhouse gas emissions by at least 30% from current levels by 2035.*

Policy 3.1 establishes a binding, enforceable target for 2020; whereas Policy 3.2 establishes a goal the City should strive to achieve for 2035. This target and goal are consistent with statewide efforts established in the Scoping Plan to reduce statewide GHG emissions to 1990 levels by 2020 and 80% below 1990 levels by 2050.

Concepts of smart growth and climate change-conscious policies and actions are prominent throughout *Burbank2035*. The City's policy commitment to encouraging pedestrian-friendly infill development, a more balanced jobs-to-housing ratio, energy-efficient construction and retrofits, and continued water conservation through expansion of existing BWP programs reinforces emission reduction strategies described throughout the GGRP.

Burbank2035 includes specific goals and policies that guide the City's approach to reducing GHG emissions, including reduction targets, guidelines for preparing inventories or plans, and general reduction strategies. Since GHG emissions are a cross-cutting issue addressed by many *Burbank2035* elements, the GGRP as a whole is considered an implementation measure for *Burbank2035*. This structure allows the City to update the GGRP on an ongoing, as-needed basis, as opposed to requiring a General Plan amendment. This ensures that Burbank's communitywide climate protection efforts reflect both current legislation and emerging best practices.

RELATIONSHIP TO THE CALIFORNIA ENVIRONMENTAL QUALITY ACT

The City's approach to addressing GHG emission reductions within *Burbank2035* is parallel to the climate change planning process being followed by more than 75 other California jurisdictions. This process includes:

- completing a baseline emissions inventory and projecting future emissions;
- identifying a communitywide reduction target;
- preparing a plan to identify strategies and measures to meet the reduction target;
- identifying targets and reduction strategies in the General Plan and evaluating the environmental impacts of the emissions reduction plan in the General Plan EIR;
- monitoring effectiveness of reduction measures and adapting the plan to changing conditions; and
- adopting the emissions reduction plan in a public process following environmental review.

This approach is consistent with State CEQA Guidelines Section 15183.5, which allows jurisdictions to analyze and mitigate the significant effects of GHGs at a programmatic level, by adopting a plan for the reduction of GHG emissions. Later, as individual projects are proposed, project-specific environmental documents may tier from and/or incorporate by reference that existing programmatic review in their cumulative impacts analysis. Project-specific environmental documents prepared for projects consistent with *Burbank2035* and the GGRP may rely on the programmatic analysis of GHGs contained in the EIR certified for *Burbank2035* and the GGRP. Chapter 5 provides a discussion of the criteria and process the City will use to determine if a future discretionary project is consistent with the GGRP.

A project-specific environmental document that relies on this GGRP for its cumulative impacts analysis must identify specific GGRP measures applicable to the project, and how the project incorporates the measures. If the measures are not otherwise binding and enforceable, they must be incorporated as mitigation measures applicable to the project. If substantial evidence indicates that the GHG emissions of a proposed project may be cumulatively considerable, notwithstanding the project's compliance with specific measures in this GGRP, an EIR must be prepared for the project.

3 The Planning Process

The City of Burbank has prepared this GGRP to identify long-term strategies to mitigate its contribution to GHG emissions. This chapter describes a 2010 baseline GHG emissions inventory for the community and 2020 and 2035 business-as-usual emissions projections. The role of anticipated state actions to reduce GHG emissions is also discussed and compared to emission reduction targets and goals.

Appendix A describes the methodology and information sources used to prepare the GHG emissions inventory.

GREENHOUSE GAS INVENTORIES AND PROJECTIONS

2010 Baseline Emissions Inventory

The purpose of the 2010 GHG emissions inventory is to establish an emissions baseline for the City's GGRP, which will assist policy makers and planners to identify current emission sources, relative source contributions, and the overall magnitude of communitywide GHG emissions. An accurate inventory is necessary to understand which sectors comprise the largest portion of the GHG inventory, have the greatest reduction potential, and can be effectively influenced by City policies and actions. All GHG emissions are presented in units of metric tons of carbon dioxide (CO_2) equivalent emissions per year (MT CO_2e/yr), which allows emissions of other GHGs, such as CH_4 (methane), N_2O (nitrous oxide), and high-global warming potential GHGs (e.g., hydroflourocarbons), to be normalized to a single unit of measure.

The City's baseline inventory is organized by emission sectors, some of which also contain subsectors that describe the source of emissions more specifically (e.g., 'mobile sources' is a subsector of transportation emissions). The 2010 GHG emissions inventory is divided into the following sectors: electricity consumption; natural gas consumption; transportation (on-road mobile sources and aviation); solid waste management; wastewater treatment; and water use (water pumping-related emissions).

As shown in Table 3-1, Burbank generated an estimated 1,992,162 MT CO_2e in 2010. The transportation and energy sectors accounted for 97% of those emissions (61% and 36%, respectively). Solid waste, wastewater, and water comprised the remaining 3%. Figure 3-1 illustrates the relative scale of contributions from each emissions sector in the baseline inventory.

Table 3-1
2010 Total Baseline Emissions Inventory

Sectors and Subsectors	2010	
	MT CO_2e/yr	% of Total
Energy- Electricity	564,719	28%
Residential	*137,581*	*7%*
Commercial	*160,612*	*8%*
Industrial	*266,526*	*13%*
Energy- Natural Gas	164,146	8%
Residential	*88,690*	*4%*
Nonresidential	*74,147*	*4%*
Municipal	*1,308*	*<1%*
Transportation	1,206,090	61%
Mobile Sources	*896,421*	*45%*
Airport (LTO only)	*309,668*	*16%*
Solid Waste	24,021	1%
Wastewater	13,307	1%
Water	19,880	1%
TOTAL	**1,992,162**	**100%**
Service Population	198,272	
Emissions per SP	10.0	

Notes: CO_2e = carbon dioxide equivalent; MT = metric tons; LTO = landing and takeoffs; SP = service population
Source: Data compiled by AECOM 2012

Jurisdictional Emissions

As shown in Table 3-1, the Bob Hope Airport contributed 309,688 MT CO_2e through aircraft landing and takeoff (LTO) operations, representing 16% of total communitywide emissions. However, the City has no authority to enforce GGRP measures within the airport's jurisdiction. Therefore, the GGRP removes emissions associated with airport LTO from the baseline inventory and all calculations related to the City's emissions reduction target and goal. A revised 2010 baseline of 1,682,494 MT CO_2e is used throughout the remainder of this GGRP to more accurately reflect communitywide emissions over which the City has jurisdictional control (see Table 3-2). Figure 3-2 illustrates the relative scale of contributions from each emissions sector in the jurisdictional inventory.

Figure 3-1 – 2010 Total Greenhouse Gas Emissions Inventory by Sector

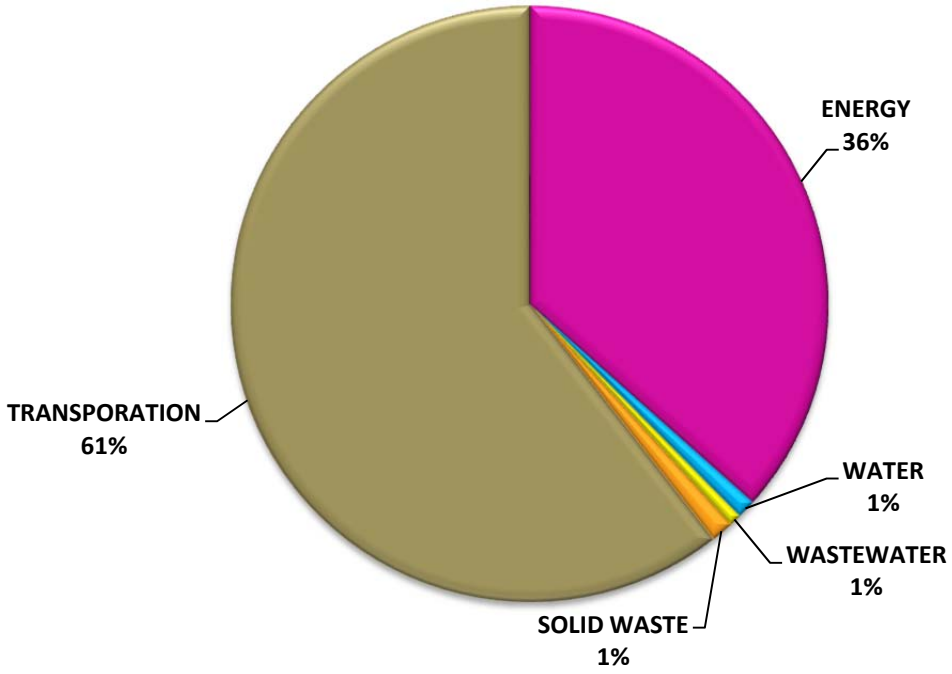


Figure 3-2 – 2010 Jurisdictional Greenhouse Gas Emissions Inventory by Sector

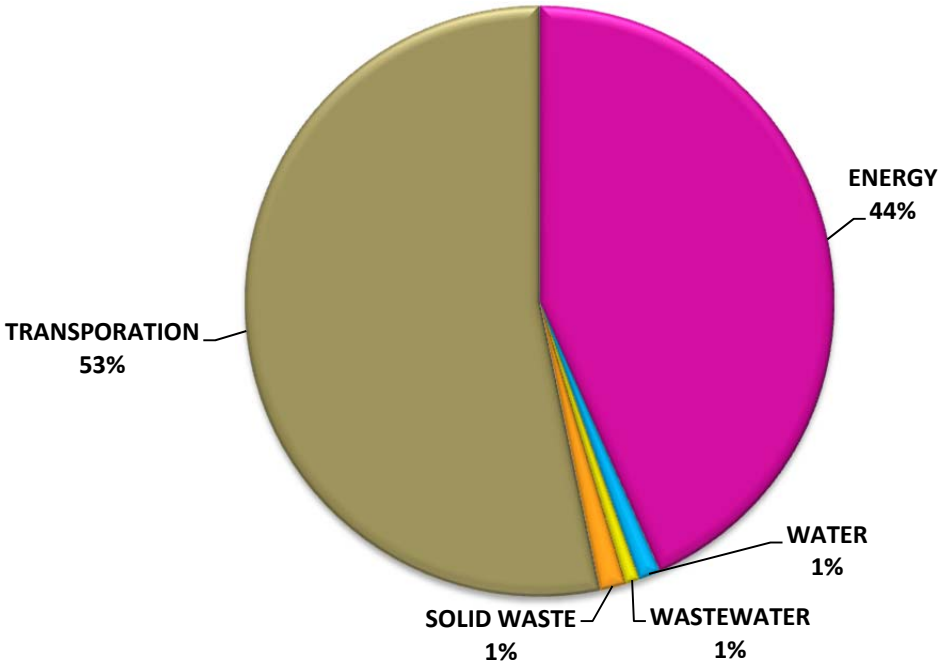


Table 3-2
2010 Jurisdictional Baseline Emissions Inventory

Sectors and Subsectors	2010	
	MT CO_2e/yr	% of Total
Energy- Electricity	564,719	34%
Residential	*137,581*	*8%*
Commercial	*160,612*	*10%*
Industrial	*266,526*	*16%*
Energy- Natural Gas	164,146	10%
Residential	*88,690*	*5%*
Nonresidential	*74,147*	*4%*
Municipal	*1,308*	*<1%*
Transportation	896,421	53%
Mobile Sources	*896,421*	*53%*
Solid Waste	24,021	1%
Wastewater	13,307	1%
Water	19,880	1%
TOTAL	**1,682,494**	**100%**
Service Population	198,272	
Emissions per SP	8.5	

Notes: CO_2e = carbon dioxide equivalent; MT = metric tons; LTO = landing and takeoffs; SP = service population
Source: Data compiled by AECOM 2012

Business-As-Usual Projections

The baseline inventory was then used to project the communitywide GHG emissions in 2020 and 2035 under a business-as-usual scenario. Emission projections estimate future emissions levels and provide insight regarding the scale of reductions necessary to achieve an emissions target or goal. GHG reduction measures developed for the GGRP are applied to the 2020 and 2035 emissions levels to determine if the City will achieve its GHG reduction targets. The business-as-usual scenarios assume that historical and current GHG-generating practices and trends for energy consumption, transportation, solid waste, wastewater, and water consumption will continue through 2035. The business-as-usual projections do not include locally-realized GHG reductions from implementation of statewide GHG reduction programs described later in this chapter, or local GGRP measures described in Chapter 4.

The business-as-usual projections use applicable and appropriate indicators for each sector and population growth assumptions established by Burbank2035. The 2020 projection aligns with the AB 32 target year, while the 2035 projection aligns with the *Burbank2035* planning horizon. These projections have been developed for planning purposes, and due to the complexity of each emissions sector, are

subject to change. As 2020 approaches, the City will reevaluate its emissions projections and reduction targets and goals to incorporate progress toward long-term GHG reductions, and will repeat this process as 2035 approaches as well.

As shown in Table 3-3, Burbank's 2020 business-as-usual projected emissions are anticipated to be 1,859,899 MT CO_2e, which represents an 11% increase over 2010 emissions levels. Under this scenario, GHG emissions would increase across all sectors from 2010 to 2020.

Table 3-3 also shows 2035 business-as-usual projected emissions, which are expected to total 2,127,500 MT CO_2e, representing a 26% increase over 2010 levels. Under this scenario, GHG emissions would increase across all sectors between 2010 and 2035.

Table 3-3
2010 Jurisdictional Baseline Emissions Inventory and
2020 and 2035 Business-as-Usual Emissions Projections

Sectors and Subsectors	2010		2020		2035	
	MT CO_2e/yr	% of Total	MT CO_2e/yr	% Change from 2010	MT CO_2e/yr	% Change from 2010
Energy- Electricity	564,719	34%	619,634	+10%	710,592	+26%
Residential	*137,581*	*8%*	*151,090*	*+10%*	173,270	*+26%*
Commercial	*160,612*	*10%*	*176,181*	*+10%*	*202,043*	*+26%*
Industrial	*266,526*	*16%*	*292,364*	*+10%*	*335,279*	*+26%*
Energy- Natural Gas	164,146	10%	182,853	+11%	203,561	+24%
Residential	*88,690*	*5%*	*98,827*	*+11%*	*110,049*	*+24%*
Nonresidential	*74,147*	*4%*	*82,621*	*+11%*	*92,003*	*+24%*
Municipal	*1,308*	*<1%*	*1,405*	*+7%*	*1,509*	*+15%*
Transportation	896,421	53%	995,517	+11%	1,143,229	+28%
Mobile Sources	*896,421*	*53%*	*995,517*	*+11%*	*1,143,229*	*+28%*
Solid Waste	24,021	1%	26,766	+11%	29,806	+24%
Wastewater	13,307	1%	14,853	+12%	17,859	+34%
Water	19,880	1%	20,275	+2%	22,453	+13%
TOTAL	**1,682,494**	**100%**	**1,859,899**	**+11%**	**2,127,500**	**+26%**
Service Population	198,272		220,932		246,020	
Emissions per SP	8.5		8.4		8.6	

Notes: CO_2e = carbon dioxide equivalent; MT = metric tons; LTO = landing and takeoffs; SP = service population

STATEWIDE REDUCTIONS

Most of Burbank's anticipated emission reductions will come from statewide reductions. This GGRP assumes that emissions within the energy and transportation sectors will be reduced through statewide efforts described in Chapter 1. This includes regulations addressing the use of renewable energy sources, energy efficiency, and GHG emissions from passenger cars and trucks. These actions provide important reductions that are applied toward Burbank's communitywide emissions reduction targets, reducing the total amount of emissions to be addressed locally through community actions. The City will monitor the effectiveness of state legislation to ensure that the anticipated level of local reductions is achieved, and to ensure that all applicable statewide reductions are accounted for in the GGRP.

2020 and 2035 Reductions

The City considers locally-realized emissions reductions from SB 1078, AB 1493, EO-S-1-07, AB 1109, and vehicle efficiency regulations a vital part of its GHG emissions reduction strategy. Including only these statewide initiatives towards the GHG reduction targets is considered a conservative approach because the Scoping Plan describes numerous other actions that will result in statewide emissions reductions that will benefit Burbank. The actions included herein represent those for which a methodology is available to calculate Burbank's likely share of these reductions. Other actions will provide statewide benefits, but cannot be accurately attributed to Burbank.

The following statewide actions and their anticipated emissions reductions in Burbank are identified in Table 3-4.

SB 1078 (Renewable Portfolio Standard)

The Renewable Portfolio Standard requirement that electricity retailers need to secure 33% of their electricity from renewable sources by 2020 will result in emissions reductions in Burbank's energy sector of 142,291 MT CO_2e/yr in 2020 and 163,178 MT CO_2e/yr in 2035.

AB 1109 (Lighting Efficiency)

This new legislation would require reductions in energy usage for lighting, encourage the use of more efficient lighting technologies, and increase recycling opportunities. This would reduce energy-related emissions in Burbank by 22,996 MT CO_2e/yr in 2020 and 23,599 MT CO_2e/yr in 2035.

AB 1493 (Pavley I and II)

Together, AB 1493 requirements to increase the fuel efficiency of vehicles starting with model year 2012 and ending with model year 2025 can reduce Burbank's transportation emissions by 135,276 MT CO_2e/yr in 2020, and 241,169 MT CO_2e/yr in 2035.

EO-S-1-07 (Low Carbon Fuel Standard)

The Low Carbon Fuel Standard will decrease the carbon intensity of transportation fuels by 10% by 2020. This would reduce GHG emissions in Burbank's transportation sector by 59,963 MT CO_2e/yr in 2020, and 58,412 MT CO_2e/yr in 2035.

Table 3-4
2020 and 2035 Communitywide Emissions with Statewide Reductions

Sectors and Subsectors	2020		2035	
	MT CO_2e/yr	% of Total	MT CO_2e/yr	% of Total
Energy- Electricity	454,347	30%	523,815	32%
Residential	*151,090*	*10%*	*173,270*	*11%*
Commercial	*176,181*	*12%*	*202,043*	*12%*
Industrial	*292,364*	*20%*	*335,279*	*21%*
Renewable Portfolio Standard	*-142,291*	*-10%*	*-163,178*	*-10%*
Lighting Efficiency	*-22,996*	*-2%*	*-23,599*	*-1%*
Energy- Natural Gas	182,853	12%	203,561	13%
Residential	*98,827*	*7%*	*110,049*	*7%*
Nonresidential	*82,621*	*6%*	*92,003*	*6%*
Municipal	*1,405*	*<1%*	*1,509*	*<1%*
Transportation	792,134	53%	835,063	51%
Mobile Sources	*995,517*	*67%*	*1,143,229*	*70%*
Pavley I	*-115,769*	*-8%*	*-220,605*	*-14%*
Pavley II	*-19,507*	*-1%*	*-20,564*	*-1%*
Low Carbon Fuel Standard Reduction	*-59,963*	*-4%*	*-58,412*	*-4%*
Tire Inflation Regulation	*-3,609*	*-<1%*	*-3,804*	*-<1%*
Heavy-Duty Vehicle Efficiency Improvement Program	*-4,535*	*-<1%*	*-4,781*	*-<1%*
Waste	26,766	2%	29,806	2%
Wastewater	14,853	1%	17,859	1%
Water	20,275	1%	22,453	1%
ADJUSTED EMISSIONS LEVEL	**1,491,229**	**100%**	**1,632,557**	**100%**
STATEWIDE REDUCTIONS TOTAL	**368,670**	***-25%***	**494,944**	***-30%***
Service Population	220,932		246,020	
Emissions per SP with Statewide Reductions	6.7		6.6	

Notes: CO_2e = carbon dioxide equivalent; MT = metric tons; SP = service population; Columns may not total the sum of their parts due to rounding
Source: Data compiled by AECOM 2012

Tire Inflation Regulation

This requirement for automotive service providers to check and inflate each vehicle's tires to the recommended tire pressure rating at the time of performing any automotive maintenance or repair service will result in GHG emission reductions of 3,609 MT CO_2e/yr in 2020 and 3,804 MT CO_2e/yr in 2035.

Heavy-Duty Vehicle Efficiency Improvement Program (Aerodynamic Efficiency)

The requirement for shipping companies to use U.S. Environmental Protection Agency SmartWay-certified tractors and trailers or retrofit their existing fleet with SmartWay-verified technologies to increase vehicle aerodynamics and fuel efficiency will result in GHG reductions of 4,535 MT CO_2e/yr in 2020 and 4,781 MT CO_2e/yr in 2035.

GREENHOUSE GAS REDUCTION TARGET AND GOAL

As described in Chapter 2, the *Burbank2035* Air Quality and Climate Change Element policies direct the City to establish a 2020 reduction target of 15% below current levels, and a 2035 reduction goal of 30% below current levels. Figure 3-3 compares the emissions projections, adjusted emissions levels including statewide reductions, and the City's 2020 reduction target and 2035 goal.

2020 Emissions Reduction Target

Based on the 2010 jurisdictional emissions inventory (Table 3-2) and projections (Table 3-3) presented in this chapter, the 2020 communitywide emissions reduction target is 1,430,120 MT CO_2e/yr (i.e., 15% below 2010 jurisdictional emissions levels). As shown in Table 3-5, reductions totaling 429,779 MT CO_2e/yr are required to achieve this target. The statewide reductions identified in Table 3-4 would contribute emissions reductions of 368,670 MT CO_2e/yr. Local actions must address an emissions gap of 61,109 MT CO_2e/yr by 2020.

2035 Emissions Reduction Goal

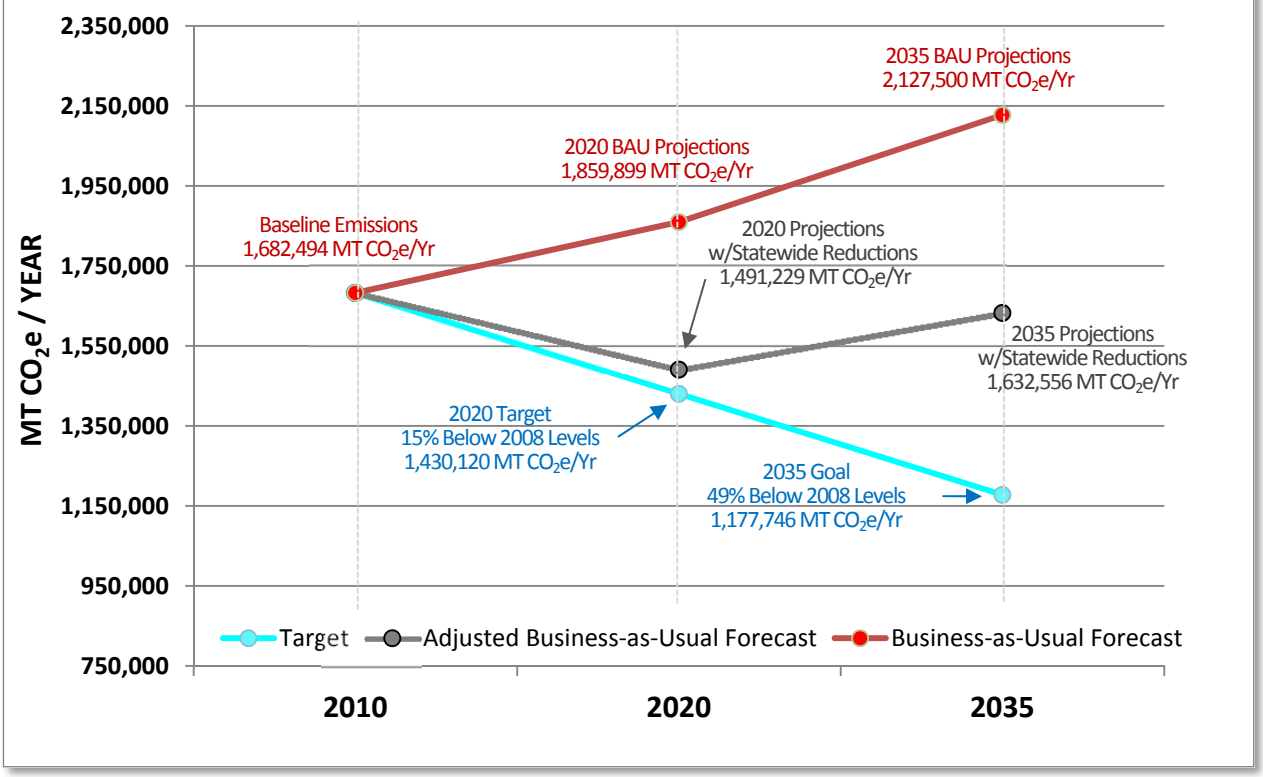
Achieving the 2035 communitywide emissions reduction goal of 1,177,746 MT CO_2e/yr (i.e., 30% below 2010 jurisdictional levels) would require reductions totaling 949,754 MT CO_2e/yr (Table 3-5). Statewide reductions identified in Table 3-4 would contribute 494,944 MT CO_2e/yr. Local actions should address an emissions gap of 454,810 MT CO_2e/yr by 2035.

Chapter 4 presents proposed local actions, associated emission reductions, and progress toward the 2020 reduction target and 2035 reduction goal.

Table 3-5
2020 Emissions Reduction Target and 2035 Emissions Reduction Goal

	2010 (MT CO_2e/yr)	2020 (MT CO_2e/yr)	2035 (MT CO_2e/yr)
Jurisdictional Inventory and Projections	1,682,494	1,859,899	2,127,500
Reduction Target (2020) and Goal (2035)		1,430,120	1,177,746
Reductions Needed to Achieve Target and Goal		429,779	949,754
Assumed Statewide Reductions		-368,670	-494,944
Local Action Reductions Needed to Achieve Target and Goal		**61,109**	**454,810**

Figure 3-3 –Emissions Trends, Targets, and Goals



4 Measures and Reductions

This chapter presents local emissions reduction measures and actions designed to fill the gap between the City's reduction targets and the estimated statewide reductions described in Chapter 3. Measures are organized by strategy areas (e.g., energy, transportation), and are designed to achieve quantifiable GHG reductions. The direct emissions reduction benefits of other measures cannot be accurately quantified. These have been included in the GGRP as supporting measures.

To ensure implementation, each measure includes a description providing policy background and implementation details that articulate necessary actions; City departments and government agencies with primary responsibility; and performance metrics to track results. The City will evaluate effectiveness of GGRP measures and actions every three years and propose program modifications if necessary toward achieving reduction goals.

MEASURE DEVELOPMENT

The measures included in this chapter affect issues within the City's direct influence. Measures were developed by (a) evaluating existing community conditions, (b) identifying emission reduction opportunities within the community, (c) reviewing best practices from other jurisdictions and organizations, and (d) incorporating State and regional laws, guidelines, and recommendations.

In formulating the GGRP, the City has considered a wide range of emission reduction measures from a variety of reputable sources, including the Attorney General's office recommendations, General Plan policy recommendations published by the California Air Pollution Control Officers Association, and best practices employed by other California local jurisdictions preparing General Plan updates and Climate Action Plans. The City has charted an emissions reduction strategy that focuses on maximizing the local benefits of statewide reduction strategies advocated in the ARB Climate Change Scoping Plan, combined with targeted, but largely voluntary, local emission reduction measures and actions. In preparing the GGRP, the City has selected those measures and actions it considers feasible, in light of the built-out character of development in Burbank. As these measures are implemented by way of ordinances and resolutions, opportunities will be developed for projects to demonstrate emissions reductions using equally effective alternative methods.

Measure Structure

This chapter is organized by strategy areas that represent the primary ways to reduce communitywide GHG emissions in Burbank. The five strategy areas are as follows:

Buildings and Energy recommends ways to increase energy efficiency in existing buildings, enhance energy performance in new construction, and increase renewable energy use.

Transportation encourages public transit, carpooling, walking, and bicycling as viable transportation modes to decrease the need to drive.

Water Conservation promotes the efficient use and conservation of water in buildings and landscapes.

Waste Reduction increases solid waste diversion and recycling, reducing consumption of materials that otherwise end up in landfills.

Municipal measures identify additional supporting steps the City can take to implement the GGRP and promote communitywide sustainability concepts.

Each section begins with an introduction linking that particular strategy to GHG emission generation and potential reductions. Individual reduction measures are in measure tables that include the following information:

- **Background information** explains the local context of the measure, including current City programs and possible funding sources.
- **Measure text** defines programs, policies, and projects that the City will undertake to accomplish its GHG emissions reduction goals.
- **Action steps** identify explicit actions necessary to implement a measure.
- **Performance metrics** are measure-specific progress indicators that enable staff, the City Council, and the public to track measure implementation and monitor overall progress. Performance metrics are provided for 2020 and 2035.
- **Quantified reductions** are the estimated GHG emissions reductions attributed to the specific actions identified in a measure. Reductions are based on participation rates, efficiencies of technologies to be implemented, the extent of new infrastructure to be constructed, and other factors. Methodology and assumptions used to calculate measure reductions are included in Appendix B.
- **Responsible departments** are named for each measure to identify who is responsible for implementation.

REDUCTIONS SUMMARY

Table 4-1 summarizes GHG emissions reductions anticipated from implementation of the local measures and actions presented in this chapter.

Progress toward Reduction Target and Goal

Local measures and actions described in this chapter contribute GHG emission reductions of 45,677 MT CO_2e/yr in 2020, which together with statewide reductions outlined in Chapter 3 would bring total reductions to 414,347 MT CO_2e/yr, a 14.1% reduction from 2010 levels. This leaves a gap of 15,432 MT CO_2e/yr to achieve the City's 2020 reduction target.

In 2035, local actions would contribute reductions totaling 77,348 MT CO_2e/yr, which together with statewide reductions outlined in Chapter 3 would bring total reductions to 572,292 MT CO_2e/yr, a 7.6% reduction from 2010 levels. This falls short of the City's 2035 reduction goal by 377,462 MT CO_2e/yr. As 2035 approaches, additional statewide programs aimed at increasing energy and transportation efficiencies are expected to help bridge this reductions gap, but it is uncertain, at present, whether additional statewide measures will be sufficient or whether additional local measures may be necessary. New technologies and additional legislation will likely be developed between now and 2035 to assist the City in filling this gap. Future updates to the GGRP should assess new state legislation and regulations, and quantify estimated reductions where possible.

The challenge in closing the gap between the emissions target and the estimated reductions that can be achieved by this GGRP is discussed in more detail at the end of this chapter.

Table 4-1
Greenhouse Gas Reduction Plan Measures and Reductions for 2020 and 2035

Action Areas and Measures		2020 (MT CO_2e/yr)	2035 (MT CO_2e/yr)
Buildings and Energy		**14,358**	**28,794**
E-1.1	Energy Efficiency in New Construction	702	2,806
E-1.2	Energy Efficiency Retrofits	1,932	5,992
E-1.3	ENERGY STAR Appliances	735	1,601
E-1.4	Smart Grid Integration	1,027	2,382
E-1.5	Cool Roofs	261	852
E-1.6	BWP Energy Conservation Programs	2,291	2,291
E-1.7	Building Shade Trees	671	2,548
E-2.1	Renewable Energy Requirements	3,422	5,583
E-2.2	Solar Photovoltaic Systems	3,317	4,739
Transportation		**17,233**	**23,550**
T-1.1	Pedestrian Enhancements	191	381
T-1.4	Bicycle Infrastructure Expansion	355	1,080
T-2.1	Transportation Management Organization Expansion	16,687	22,089
Water Conservation		**198**	**198**
W-1.1	Water Conservation Programs	20	20
W-1.2	Recycled Water Use Master Plan	178	178
Waste Reduction		**13,888**	**24,806**
SW-1.1	Food Scrap and Compostable Paper Diversion Ordinance	2,032	6,773
SW-1.2	Yard Waste Diversion Ordinance	244	813
SW-1.3	Lumber Diversion Ordinance	1,012	3,372
SW-2.1	Enhanced Methane Recovery	10,600	13,848
Subtotal GGRP Measures		***45,677***	***77,348***
Subtotal Statewide Reductions		***368,670***	***494,944***
TOTAL REDUCTIONS		**414,347**	**572,292**
Emissions with Implementation of GGRP Measures and Statewide Reductions		1,445,552	1,555,208
Percent Reduction from 2010 Jurisdictional Emission Levels		**-14.1%**	**-7.6%**
Service Population		220,932	246,020
Emissions per Service Population		6.5	6.3

Notes: CO_2e = carbon dioxide equivalent; MT = metric tons; Columns may not total the sum of their parts due to rounding
Source: Data compiled by AECOM 2012

BUILDINGS AND ENERGY MEASURES

The consumption of electricity and natural gas for appliances, lighting, heating and cooling, cooking, and other processes within residential, commercial, and industrial buildings generated 44% of Burbank's communitywide GHG emissions in 2010. Improvements in energy efficiency, renewable energy generation, and street and area lighting can reduce these emissions.

In Burbank, approximately 75% of the housing stock was constructed prior to adoption of the State's energy efficient building code requirements. Consequently, this portion of the building stock offers an opportunity for cost-effective energy efficiency retrofits to decrease the use of both electricity and natural gas. Building energy efficiency measures aim to achieve energy efficiency improvements in both existing and new buildings through a combination of building code amendments, public outreach campaigns, and incentive programs.

Renewable energy measures are also proposed to increase local renewable energy generation beyond what it is already required under the Renewable Portfolio Standard described in Chapter 1. Burbank homes and businesses could benefit from existing incentive programs for the installation of solar photovoltaic systems and solar hot water heaters.

Street and area lighting measures advance the use of high-efficiency lighting technologies in parking lots, street lights, and exterior building applications.

The total GHG emissions reduction potential of the energy strategy area is 14,358 MT CO_2e/yr in 2020 and 28,794 MT CO_2e/yr in 2035. These reductions represent approximately 31% of GGRP measure reductions.

E-1 ENERGY EFFICIENCY

E-1.1 ENERGY EFFICIENCY IN NEW CONSTRUCTION

2020 Reductions: 702 MT CO_2e/yr **2035 Reductions:** 2,806 MT CO_2e/yr

While the overwhelming majority of buildings that will exist in Burbank in 2035 already exist as of the 2010 baseline year, incorporating energy efficient design and technologies into new construction can also provide meaningful reductions. With implementation of Burbank2035, an additional 12 million square feet of non-residential construction is anticipated. If these buildings were required to meet higher performance standards, the City would realize substantial reductions.

Measure

The City will require new commercial projects to be constructed to Title 24 Tier 1 levels (e.g., exceed current efficiency standards by 15%) beginning in January 2015.

Actions

A Adopt an ordinance requiring new commercial construction to exceed the California Green Building Standards Code energy efficiency baseline by 15% starting in 2015

Performance Metrics

1 **2020:** 2.1 million square feet of new non-residential construction exceeds baseline energy code by 15%
2035: 8.4 million square feet of new non-residential construction exceeds baseline energy code by 15%

Responsible Department

Community Development

E-1.2 ENERGY EFFICIENCY RETROFITS

2020 Reductions: 1,932 MT CO_2e/yr **2035 Reductions:** 5,992 MT CO_2e/yr

The California Energy Commission developed the Statewide Home Energy Rating System (HERS) program to allow comparisons of the efficiency levels between California homes. The HERS ratings provide an overall indication of building efficiency, but do not provide specific recommendations for efficiency improvements.

Building energy audits can also help identify and prioritize energy efficiency improvements within a home by providing an evaluation of the cost-effectiveness of energy efficiency improvement options. Energy audits can identify gaps in the building envelope through which heating and cooling escape. Energy audits can also help homeowners and building owners to prioritize retrofit investments to maximize their financial returns.

Approximately 75% of houses in Burbank were built before 1980, and therefore prior to adoption of California's Title 24 energy efficiency requirements. In addition, approximately 95% of housing units and 89% of non-residential square footage that is projected to exist in Burbank in 2020 has already been constructed. Energy efficiency retrofits can help residents and businesses reduce their utility bills and building-related emissions.

BWP currently offers rebates for various home energy efficiency improvements, including installation of low E glass windows and doors, attic insulation, central air conditioners, solar attic fans, wall insulation, and whole house fans. BWP also offers a Business Bucks program to help small- and medium-sized businesses improve building energy efficiency and reduce utility bills. As part of this program, BWP provides a free building energy survey, which includes recommended efficiency retrofits, the cost of improvements, and estimated annual energy savings with simple payback information. BWP will install the selected improvements and pay for the first $2,000 of recommended retrofits. BWP will partner with the Burbank Chamber of Commerce to target small, local businesses that would benefit from participation in the Business Bucks program.

In addition to BWP rebates, numerous programs funded by state agencies and local governments are available through the Energy Upgrade California program to Burbank residents. Whole-house packages

are available for Burbank homeowners that wish to address energy efficiency holistically on a first-come-first-served basis. The program offers up to $4,000 in rebates to homeowners who implement a package of required improvements.

Measure

The City will adopt an ordinance requiring point-of-sale energy performance ratings to be conducted by a HERS-certified contractor for all residential buildings (i.e., single-family and multi-family). Under this ordinance, residential building sellers would arrange to have the energy performance ratings completed, and would then be required to share the results with potential homebuyers or renters.

The City will also adopt a mandatory energy audit ordinance for all residential and commercial properties sold within the City. The audits must provide a list of recommended energy efficiency improvements and information on the simple payback period of recommended improvements. Adoption of recommended improvements is voluntary, and left to the discretion of the buyer.

The City will develop a comprehensive public outreach campaign to provide information on the benefits of energy efficiency improvements and available rebates. Targeted outreach will be conducted for certain building owners, including:

- single-family homeowners and neighborhood organizations in neighborhoods with older homes, who could benefit substantially from a whole-house energy efficiency upgrade
- management companies with multi-family properties in Burbank to advertise available rebates and incentives that would improve their buildings' HERS rating, such as ENERGY STAR appliances, low-flow water fixtures, and high-efficiency HVAC systems, windows, and doors
- small- and medium-sized businesses that would benefit from BWP's *Business Bucks* program. Outreach will include technical support for interested business owners during the *Business Bucks* application process to ensure program participation is maxed out each year

Actions

A Adopt an ordinance requiring HERS-certified energy performance ratings for all residential buildings sold within the City

B Adopt an ordinance requiring point-of-sale energy audits for all residential and commercial buildings sold within the City

C Develop a comprehensive energy efficiency upgrade outreach program

Performance Metrics

1 **2020:** 15% of existing single-family units install an advanced retrofit package (retrofit packages are described in Appendix B)
2035: 30% of existing single-family units install an advanced retrofit package

2 **2020:** 15% of existing multi-family units install an advanced retrofit package
2035: 30% of existing multi-family units install an advanced retrofit package

3 **2020:** 10% of existing commercial floor area installs medium retrofit package
2035: 40% of existing commercial floor area installs medium retrofit package

4 **2020:** 5% of existing commercial floor area installs advanced retrofit package
2035: 20% of existing commercial floor area installs advanced retrofit package

Responsible Department

Community Development, Burbank Water and Power

E-1.3 ENERGY STAR APPLIANCES

2020 Reductions: 735 MT CO_2e/yr **2035 Reductions:** 1,601 MT CO_2e/yr

As building shells and systems become increasingly efficient, addressing energy consumption from appliances and electronics will become more important in reducing building energy use and residents' utility bills. Installing ENERGY STAR appliances is one way to address this type of energy use. The ENERGY STAR rating is an internationally recognized standard for energy-efficient consumer products. According to the EPA, devices that have an ENERGY STAR certification, such as dishwashers, refrigerators, and washing machines, generally use 20% to 30% less energy than required by federal standards. In 2006, approximately 30% of refrigerators, 40% of clothes washers, and 90% of dishwashers sold nationwide were ENERGY STAR-certified appliances.

BWP currently offers rebates to customers who purchase ENERGY STAR appliances, including: dishwashers, clothes washers, refrigerators/freezers, ceiling fans, pool pumps, and room air conditioners. BWP offers higher rebates to customers who purchase their appliances from a local Burbank retailer.

Additional rebates for ENERGY STAR appliances in Los Angeles County can be found on the Energy Upgrade California website (www.energyupgradeca.org).

Measure

The City will encourage voluntary community participation to install ENERGY STAR appliances or other energy-efficient appliance models in both new and existing residential units. Successful implementation of this measure relies on leveraging existing BWP rebates and other rebates offered through Energy Upgrade California. The City will develop a multi-pronged public outreach campaign to increase community participation in these voluntary rebate programs, including:

- utility bill inserts to advertise existing rebate programs and the simple cost payback associated with replacing inefficient appliances,
- targeted outreach to builders and property managers with an informational brochure describing the financial benefits of including energy-efficient appliances in new construction when they apply for building permits,
- targeted outreach to local property managers to address appliance energy use in multi-family units, and

- informational booths at community events to advertise energy-efficiency rebates and local businesses that sell ENERGY STAR appliances; events could include the Downtown Burbank Farmer's Market, 12 Days of Holiday Cheer, and the Downtown Burbank ARTS's Festival

Actions

A Develop public outreach program to increase community participation in ENERGY STAR appliance installation

Performance Metrics

1 **2020:** 9,300 ENERGY STAR refrigerators are installed
2035: 20,200 ENERGY STAR refrigerators are installed

2 **2020:** 7,200 ENERGY STAR clothes washers are installed
2020: 14,300 ENERGY STAR clothes washers are installed

3 **2020:** 8,100 ENERGY STAR dishwashers are installed
2035: 10,800 ENERGY STAR dishwashers are installed

Responsible Department

Burbank Water and Power; Community Development

E-1.4 SMART GRID INTEGRATION

2020 Reductions: 1,027 MT CO_2e/yr **2035 Reductions:** 2,382 MT CO_2e/yr

The smart grid is an emerging energy management system, which combines information technology with renewable energy to improve how electricity is generated, delivered, and consumed. The smart grid will reduce energy demand, improve integration of distributed energy production (e.g., rooftop solar panels), and increase electricity transmission and distribution efficiency. These changes will help residents and businesses save energy, and can reduce GHG emissions associated with energy production. Beginning in the summer of 2011, BWP began installation of "smart meters" in all homes and businesses in Burbank. The value of the smart grid does not end at the meter, however; its full value is realized when it extends into technologies used in homes and businesses. Smart appliances can be programmed to run during off-peak hours to reduce loads on the utility grid.

BWP is rolling out time-of-use pricing, which offers lower utility rates to customers that switch discretionary energy use to off-peak times. Time-of-use pricing is mandatory for all large electricity load commercial customers, and will eventually be offered to residential customers as well. BWP has also joined OPower, a social media technology provider that helps customers using smart grid technology to compare their energy use with neighbors.

BWP has started incorporating smart grid technology into City operations through a demonstration program where a private company has installed 30 thermal energy storage systems at city-owned buildings. These systems are peak-shifting thermal energy storage units that work with air conditioners. Each unit is simply a tank containing water that is frozen during off-peak hours; the ice is then used to provide cooling during peak hours. By connecting to such a unit, the air conditioning unit's compressor

can be turned off for several hours without any loss of cooling to the building. The initial demonstration program installed units that provided about 210 kW of peak demand capacity reduction. BWP is developing a two-year implementation plan to install thermal energy storage systems with a total capacity of up to 2 MW at business customer locations.

Measure

The City will encourage voluntary adoption of smart grid technology in new and existing construction, promoting the use of smart appliances in homes and businesses and the use of OPower to track building energy use. The City will develop an outreach campaign highlighting the benefits of smart grid integration that can occur following smart meter installation. The outreach campaign should describe how energy management systems work inside a building, including internet-based displays that show how much energy is being used and smart appliances that can defer discretionary electricity use to off-peak hours. BWP will continue advancing time-of-use pricing to its residential customers, with full adoption completed by 2020. BWP will also continue implementation of its thermal energy storage system demonstration program to reduce peak electricity demand by 2 MW by 2015.

Actions

A Develop an outreach campaign for smart grid integration

B Expand the City's thermal energy storage system demonstration project

C Promote the demonstration project to familiarize local businesses with smart grid technology

Performance Metrics

1 **2020:** 5% of existing residential units and existing commercial floor area install smart grid-compatible technologies, such as smart appliances, programmable thermostats, and internet-based displays
2035: 10% of existing residential units and existing commercial floor area install smart grid-compatible technologies, such as smart appliances, programmable thermostats, and internet-based displays

2 **2020:** 15% of new residential units and new commercial floor area install smart grid-compatible technologies, such as smart appliances, programmable thermostats, and internet-based displays
2035: 20% of new residential units and new commercial floor area install smart grid-compatible technologies, such as smart appliances, programmable thermostats, and internet-based displays

Responsible Department

Burbank Water and Power

E-1.5 COOL ROOFS

2020 Reductions: 261 MT CO_2e/yr **2035 Reductions:** 852 MT CO_2e/yr

The urban heat island effect describes the phenomena in which urban areas are hotter than nearby rural areas. Urban heat islands can affect communities by increasing summertime peak energy demand, air conditioning costs, air pollution and GHG emissions, and heat-related illness and mortality. 'Cool roofs'

are made of materials with higher solar reflectivity, which mitigate the urban heat island effect and reduce cooling loads during hot days. In contrast, dark roofs absorb heat from the sun, which elevates urban temperatures and increases demand for air conditioning.

Through the City's Cool Roof Pilot Program, roofing permit fees are refunded for residential roofing projects that install qualifying cool roof technology. The City also provides expedited plan checks for program participants. The City has funding to extend the program through January 1, 2014. BWP also offers non-residential cool roof incentives to interested customers.

Measure

The City will extend its current Cool Roof Pilot Program, and will advertise BWP's non-residential cool roof incentives to building owners when they obtain permits for re-roofing.

Actions

A Secure funding to extend the City's Cool Roof Pilot Program

B Provide information about BWP's cool roof incentives to non-residential building owners

Performance Metrics

1 **2020:** 6 homes per year install a cool roof through 2020
2035: 6 homes per year install a cool roof through 2035

2 **2020:** 100,000 sq ft of non-residential buildings per year install cool roofs through 2020
2035: 100,000 sq ft of non-residential buildings per year install cool roofs through 2035

Responsible Department

Community Development

E-1.6 BWP ENERGY CONSERVATION PROGRAMS

2020 Reductions: 2,291 MT CO_2e/yr **2035 Reductions:** 2,291 MT CO_2e/yr

BWP provides a variety of energy conservation programs to its residential and business customers to help meet its goal of 1% annual reductions in projected energy loads. Several of these programs are described throughout the GGRP to highlight the City's current successes in emissions reductions. All of BWP's current energy conservation programs are described in *Energy Efficiency in California's Public Power Sector, March 2012,* an annual report summarizing publicly-owned utilities' progress toward implementing energy efficiency and demand reduction programs. In fiscal year 2010-2011, BWP spent nearly $3.0 million in Public Benefits Charge funds on energy efficiency programs, which resulted in net energy savings of 12,244 MWh.

BWP's current energy conservation programs include:

- Home energy use reports through OPower
- Green Home whole-house efficiency program

- ENERGY STAR appliance rebates
- Refrigerator Round-Up for second refrigerators
- Refrigerator exchange for low-income customers
- Compact Fluorescent Light (CFL) distribution
- Made in the Shade tree planting
- Home Energy Analyzer on-line energy audit
- LivingWise school education program
- Energy Solutions business customer rebates
- Business Bucks small business energy audits and upgrade rebates
- Air conditioning tune-ups
- Thermal energy storage unit demonstration project
- LEED certification incentives

Measure

BWP will continue to implement a variety of energy conservation programs in order to achieve its goal of 1% annual reductions in projected energy loads. BWP will also provide energy conservation updates to the City Council and staff to support future GGRP update efforts.

Actions

A Maintain funding sources for energy conservation programs

B Provide information to Community Development Department staff regarding progress toward annual conservation goals for incorporation into future GGRP updates

Performance Metrics

1 **2020:** Achieve net annual energy savings of 9,900 MWh
2035: Achieve net annual energy savings of 9,900 MWh

Responsible Department

Burbank Water and Power

E-1.7 BUILDING SHADE TREES

2020 Reductions: 671 MT CO_2e/yr **2035 Reductions:** 2,548 MT CO_2e/yr

Properly located trees can provide shading for residential and commercial buildings, and thereby reduce the need for air conditioning. The capacity of a tree to reduce GHG emissions is dependent on its age and species. As trees mature, their canopies increase in size and provide higher levels of shade and greater levels of building cooling in hot weather. Large, deciduous species are ideal for reducing building energy use as they provide shade in summer, but allow winter sunlight into buildings for passive solar

gain in cooler weather. Additionally, trees gain carbon-capturing biomass in their trunks and roots as they absorb carbon from the air to grow.

Through BWP's Made in the Shade program, residential customers can receive up to three, and commercial customers up to 20 shade trees, which are selected by customers and delivered free of charge. Installing the trees is the customer's responsibility, though the installation is verified by BWP's contracted arborist. In 2010, BWP provided about 340 trees to customers.

Measure

BWP will continue to administer the Made in the Shade Program. The City will also revise the Zoning Ordinance to require the planting of two building shade trees per parcel to accompany each new single-family residential unit. The City will update its Street Tree Plan and Urban Forestry program, with a focus on identifying streets that currently lack street trees, parking lots that could accommodate additional shade trees, and locations for new tree plantings in City parks and open space.

Actions

A Amend the Zoning Ordinance to require installation of two on-site shade trees for each new single-family residential unit

B Continue the BWP Made in the Shade Program

C Update the Street Tree Plan and Urban Forestry program

Performance Metrics

1 **2020:** Plant 5,250 shade trees
2035: Plant 12,775 shade trees

Responsible Department

Burbank Water and Power; Community Development; Park, Recreation, and Community Services

E-2 RENEWABLE ENERGY

E-2.1 RENEWABLE ENERGY REQUIREMENTS

2020 Reductions: 3,422 MT CO_2e/yr **2035 Reductions:** 5,583 MT CO_2e/yr

Increasing the use of distributed renewable energy systems (e.g., rooftop solar photovoltaic) prevents the combustion of fossil fuels to generate electricity, thereby reducing GHG emissions. Burbank's location and geography result in a high solar insolation rating, which makes it an excellent candidate for effective adoption of solar technologies. In addition to residential rooftops, commercial and industrial rooftops tend to have large, flat roofs that are often well-suited for solar photovoltaic (PV). Parking lots also provide excellent opportunities for additional solar energy generation. However, numerous barriers may prevent widespread adoption of solar PV technology, including City regulations, up-front costs, misinformation or lack of information.

The City recently reviewed and revised its zoning and building codes and other applicable ordinances to identify and remove regulatory barriers to solar PV installation on residential and non-residential properties. BWP also offers a Solar Photovoltaic Power program to residential and commercial customers, consistent with Senate Bill 1 (SB 1), which seeks to encourage the installation of 3,000 megawatts (MW) of solar PV energy statewide by December 31, 2016. BWP's prorated portion of that state goal is 15 MW. Per SB 1 requirements, BWP's solar rebate program offers incentives toward the purchase of qualifying solar PV systems. The level of incentives provided declines until it reaches $0 on January 1, 2017. BWP's incentives decline based on the capacity of solar installed in Burbank. The program is fully subscribed for 2012, and is expected to be fully subscribed again in 2013.

Measure

The City will require new single-family residential homes to include a 1.8 kWh solar photovoltaic system, and will require new multi-family and commercial construction to provide 10% of the building's modeled energy use from renewable sources (e.g., solar PV, geothermal heat pumps).

The City will require installation of solar water heaters in all new residential construction, to the fullest extent possible. The City will also require pre-wiring and pre-plumbing on new construction for residential solar PV and solar water heaters to provide for easier and less costly future installation.

Actions

A Adopt an ordinance requiring new single-family residential construction to include 1.8 kWh solar PV systems, and new multi-family residential and commercial construction to meet 10% of its expected energy needs from on-site renewable sources

B Adopt an ordinance requiring solar water heaters to be installed in all new residential construction

C Update the building code to require pre-wiring and pre-plumbing for solar PV and solar hot water systems in all new construction

Performance Metrics

1 **2020:** 925 single-family residential units install a 1.8 kWh solar PV system
2035: 2,150 single-family residential units install a 1.8 kWh solar PV system

2 **2020:** New multi-family residential units and commercial buildings install 2.0 MW combined of solar PV
2035: New multi-family residential units and commercial buildings install 3.0 MW combined of solar PV

3 **2020:** 925 single-family residential units install a solar hot water system
2035: 2,150 single-family residential units install a solar hot water system

4 **2020:** 1,150 multi-family residential units install a solar hot water system
2035: 2,650 multi-family residential units install a solar hot water system

Responsible Department

Community Development

E-2.2 SOLAR PHOTOVOLTAIC SYSTEMS

2020 Reductions: 3,317 MT CO_2e/yr **2035 Reductions:** 4,739 MT CO_2e/yr

Increasing the use of distributed renewable energy systems (e.g., rooftop solar photovoltaic) prevents the combustion of fossil fuels to generate electricity, thereby reducing GHG emissions. Burbank's location and geography result in a high solar insolation rating, which makes it an excellent candidate for effective adoption of solar technologies. In addition to residential rooftops, commercial and industrial rooftops tend to have large, flat roofs that are often well-suited for solar photovoltaic (PV). Parking lots also provide excellent opportunities for additional solar energy generation. However, numerous barriers may prevent widespread adoption of solar PV technology, including City regulations, up-front costs, misinformation or lack of information.

The City recently reviewed and revised its zoning and building codes and other applicable ordinances to identify and remove regulatory barriers to solar PV installation on residential and non-residential properties. BWP also offers a Solar Photovoltaic Power program to residential and commercial customers, consistent with Senate Bill 1 (SB 1), which seeks to encourage the installation of 3,000 megawatts (MW) of solar PV energy statewide by December 31, 2016. BWP's prorated portion of that state goal is 15 MW. Per SB 1 requirements, BWP's solar rebate program offers incentives toward the purchase of qualifying solar PV systems. The level of incentives provided declines until it reaches $0 on January 1, 2017. BWP's incentives decline based on the capacity of solar installed in Burbank. The program is fully subscribed for 2012, and is expected to be fully subscribed again in 2013.

Measure

The City will actively promote development of building-scale solar energy. The City will develop an outreach campaign to ensure BWP's Solar Photovoltaic Power program is fully subscribed between 2013 and 2016 to meet its solar goal.

The City will also reduce or remove its third-party electrical review for non-residential solar PV permits through January 1, 2017 to further encourage full participation in the program.

Actions

A Develop an aggressive outreach campaign for the BWP Solar Photovoltaic Power program

B Reduce or remove third-party electrical review fee associated with non-residential solar PV installations through January 1, 2017

Performance Metrics

1 **2020:** Install 3.5 MW of solar PV on residential and commercial buildings, in addition to requirements discussed in Measure E-2.1
2035: Install 5.0 MW of solar PV on residential and commercial buildings, in addition to requirements discussed in Measure E-2.1

Responsible Department

Burbank Water and Power

E-2.3 SOLAR WATER HEATER SYSTEMS

Supporting Measure – Not Quantified

The effectiveness of a solar installation is described, in part, by its solar savings fraction (solar fraction). This measurement describes the percentage of a building's total energy demand that can be met through installation of a solar energy system. A 0% solar fraction indicates that no solar energy utilization is possible, while 100% would indicate full utilization of solar energy to meet building energy demand. Burbank has a 74% solar fraction for low-rise buildings (i.e., 1-2 stories) and a 69% solar fraction for high-rise structures (i.e., 3 or more stories), indicating strong potential for solar PV application.

Studies show that solar water heaters (SWH) can reduce energy-related GHG emissions in residential and non-residential applications. Commercial-scale SWH systems are designed to provide large quantities of hot water to non-residential buildings using solar energy. A typical system includes roof- or wall-mounted solar collectors that work along with a pump, heat exchanger, and one or more large storage tanks. SWH systems can reduce the amount of natural gas or electricity used to heat water in conventional systems and thereby reduces GHG emissions. However, the high capital cost of water heater upgrades can pose a financial burden to building owners. To bridge this financing gap, BWP provides rebates of $1,500 for residential customers who purchase electric solar water heaters.

Burbank SoCalGas customers who use natural gas hot water heaters, can take advantage of the California Solar Initiative's (CSI) Thermal Program, which offers rebates to residential and non-residential customers who install certified SWH systems. The Thermal Program offers rebates up to $1,875 for single-family residential applications, and up to $500,000 to offset capital costs for multi-family residential and commercial applications. Incentive levels will decline in four stages as the solar thermal market grows, and actual incentive payments will be determined by the thermal output of the system. The Thermal Program also offers rebates for qualifying low-income single-family and multi-family residences.

Measure

The City will actively promote and facilitate the installation of SWH systems on existing residential buildings, including distribution of information about the benefits of solar water heaters and installation and maintenance assistance programs designed to maximize community participation.

The City will review its building code and zoning ordinance to identify and remove regulatory barriers to the installation of residential or commercial SWH systems.

The City will collaborate with non-profit organizations to identify additional local, State, or national financing options for residents and businesses to voluntarily replace inefficient water heating systems with SWH systems.

The City will also work with SoCalGas to identify residents and businesses that are eligible for the CSI-Thermal Program, and provide targeted outreach to advertise the incentives, explain the savings potential, and provide technical assistance in navigating the application process.

Actions

A Develop a public outreach campaign to advertise available SWH rebates and incentives offered through BWP and the CSI-Thermal Program

B Work with non-profit organizations to identify additional financing options for SWH installations

C Remove regulatory barriers to the installation of SWH systems

Responsible Department

Community Development, Burbank Water and Power

E-3 STREET AND AREA LIGHTING

E-3.1 LIGHT-EMITTING DIODE STREET LIGHTS

Supporting Measure – Not Quantified

High-pressure sodium bulbs, currently used in Burbank's streetlights, require more energy and have a shorter lifespan than new induction and/or light-emitting diode (LED) lights. Switching to new technology, such as when the City moved from low-pressure to high-pressure sodium bulbs, requires pilot testing to ensure that new bulbs maintain the City's existing lighting standards. The City is currently testing LED products for use in two residential neighborhoods before moving forward with widespread LED application.

Measure

Upon completion of the pilot testing, the City will install energy-efficient street lights throughout Burbank. The City will also update its Street Light Master Plan to include lighting efficiency requirements.

Actions

A Expand efficient lighting technology throughout the city

B Update the Street Light Master Plan

Responsible Department

Burbank Water and Power

TRANSPORTATION MEASURES

Transportation-related emissions make up more than half (53%) of the communitywide 2010 emissions inventory. These emissions are generated largely by the number of vehicle miles traveled (VMT) by residents and employees. Long vehicle trips and high numbers of trips create high emissions. Successfully reducing vehicle emissions relies on reducing or shortening vehicle trips, either by making alternative modes of transportation (such as transit, bicycling, or walking) truly viable, or by increasing proximity of diverse land uses. Technological advancements in vehicle fuel efficiency will also reduce vehicular GHG emissions and are accounted for in the statewide reductions.

Pedestrian and bicycle system measures aim to continue the City's existing efforts to improve sidewalks and bicycle lanes and connectivity within the City and encourage additional ridership.

The transportation demand management measure is designed to decrease VMT associated with employees that work within the City's Transportation Management Organization service area.

The intelligent transportation measure focuses on physical improvements to roadways that will result in more efficient vehicle trips within the Los Angeles basin.

The total GHG reduction capacity of the transportation strategy area is 16,687 MT CO_2e/yr in 2020, and 22,089 MT CO_2e/yr in 2035. This represents approximately 38% of total GGRP measure reductions.

T-1 PEDESTRIAN AND BICYCLE IMPROVEMENTS

T-1.1 PEDESTRIAN ENHANCEMENTS

2020 Reductions: 191 MT CO_2e/yr **2035 Reductions:** 381 MT CO_2e/yr

Attractive pedestrian environments encourage walking, which can lead to increased foot traffic for stores and restaurants and decreased automobile trips. Pedestrian enhancements typically include seating, wayfinding signs, informational kiosks, shading, and safe crosswalks. In particular, safe pedestrian paths that cross I-5 and the railroad tracks are important to connect the east and west sides of the city and offer access to regional rail systems.

Measure

The City will complete the City of Burbank Pedestrian Master Plan, which includes policies, programs, and design guidelines that will enable the City to foster a safer, more attractive, and usable pedestrian environment for residents and visitors. The Master Plan should identify priority improvements and available funding to support implementation. The City will also continue to include pedestrian enhancements as part of its infrastructure projects.

Actions

A Complete Pedestrian Master Plan

B Aggressively pursue grant funding to begin implementation of the Master Plan's priority improvements

Performance Metrics

1 **2020 and 2035:** 5% of existing street intersections are improved from medium ease of street crossing to high (a qualitative assessment)

Responsible Department

Community Development, Public Works

T-1.2 SAFE ROUTES TO SCHOOL

Supporting Measure – Not Quantified

Building safe pedestrian routes between homes and schools is essential to support walking and bicycling for children. Safe Routes to School (SRTS) programs typically address the provision of sidewalks, bicycle paths, and other pedestrian-friendly infrastructure that reduces driving speeds in school zones and residential neighborhoods. Providing pedestrian and bicycling safety education is an important part of any SRTS program. The City recently received funding for the Keystone Bicycle Boulevard – SRTS project, which identifies roadway reconfigurations and alterations that would support the development of a bicycle boulevard along Keystone Street between Pacific Avenue and Riverside Drive. When completed, the project will increase both safety and connectivity for bicycling and walking students.

Measure

The City will aggressively pursue grant funding to prepare a comprehensive SRTS plan. The City will also continue to pursue funding for additional SRTS projects.

Actions

A Secure funding to prepare a Safe Routes to School plan to prioritize safety improvements and investments for pedestrians and cyclists

B Identify funding sources for implementation of the Safe Routes to School plan

Responsible Department

Community Development, Public Works

T-1.3 BICYCLE EDUCATION PROGRAM

Supporting Measure – Not Quantified

Bicycle safety education is an important component to increasing bicycle safety within Burbank, and is the highest priority within the City's Bicycle Master Plan. The City currently has three bicycle safety programs underway.

Measure

The City will continue to include safety components in any bicycle infrastructure grant application that allows for it. The City will also partner with local bicycle advocacy groups to share bicycle safety information and solicit input on high-frequency accident locations.

Actions

A Partner with local bicycle advocacy groups and clubs and the Burbank Police Department to identify high-frequency accident locations

B Continue to pursue grant funding for implementation of the Bicycle Master Plan that also allows for bicycle safety components

Responsible Department

Community Development, Police

T-1.4 BICYCLE INFRASTRUCTURE EXPANSION

2020 Reductions: 355 MT CO_2e/yr **2035 Reductions:** 1,080 MT CO_2e/yr

The City has been implementing its adopted Bicycle Master Plan to improve the quality and safety of bicycle facilities within Burbank. According to the 2009 Bicycle Master Plan, the City has approximately 7.0 miles of Class I and II bicycle facilities. The Bicycle Master Plan identifies an additional 12.0 miles of Class I and Class II facilities as top priority projects. Approximately 5.0 miles of these top priority projects have already received funding and are currently in various states of development, including the South Channel Bikeway, the San Fernando Bikeway, extension of the Verdugo bike lanes, the Keystone Bicycle Boulevard project, and the Los Angeles River Bike Bridge project. Future bicycle lane expansion should focus on connecting high-visitation sites (e.g., dense residential areas, commercial and employment centers, transit hubs, parks and recreation areas) with Class I and II facilities to encourage a travel mode shift from cars to bicycles, especially for non commute trips. The City also completed the Burbank BikeStop at the Downtown Metrolink Station, and implemented the citywide bicycle parking program, which included citywide installation of 250 inverted U-racks, primarily concentrated along commercial corridors, including Burbank Boulevard, Magnolia Boulevard, Olive Avenue, and Riverside Drive.

Measure

The City will continue to expand bicycle infrastructure within public rights-of-way, including on-street bicycle lanes and routes, bicycle parking, and directional signage.

The City will identify north-south roads that can accommodate bicycle boulevard facilities to connect the Chandler bicycle path with the new bicycle parking installed along Burbank and Magnolia Boulevards.

The City will work with local bicycle advocacy groups to evaluate designated Class III bike routes for bike comfort and safety, re-evaluate Class III routes periodically, and identify Class III routes that are frequently used by cyclists and should be considered for improvement to a Class II facility.

The City will continue to assess the need for additional bicycle parking, particularly in the Burbank Center and Media District plan areas as reuse and development activity increases in this area.

As a catalyst project to implement this measure, BWP has committed to providing bicycles for shared use by all City employees. Facilities to accommodate the shared bicycles would be located at both the BWP campus and at the Burbank Civic Center. Should this program prove successful, the City could expand it to accommodate public use in Downtown Burbank, the Media District, and the Golden State area as part of expanding the TDM program, as described in Measure T-2.1.

Actions

A Implement bicycle network expansions that have already received funding

B Adopt the draft bicycle parking ordinance by December 31, 2012

C Pursue funding to implement other Top Priority Projects identified in Table 5.2 in the 2009 Bicycle Master Plan, with a focus on implementing Class I and II facilities

D Identify north-south roads that can accommodate bicycle boulevard facilities to connect the Chandler bicycle path with Burbank and Magnolia Boulevards

E Evaluate safety on popular Class III routes and identify potential candidates for upgrades to Class II facilities

F Provide bicycles for shared use by all City employees and amenities at the BWP campus and in the Burbank Civic Center to accommodate the shared bicycles

G Consider expanding the shared bicycle program to accommodate public use in Downtown Burbank, the Media District, and the Golden State area

Performance Metrics

1 **2020:** Construct 12.0 miles of Class I and II facilities
2035: Construct 20.0 miles of Class I and II facilities

Responsible Department

Community Development, Burbank Water and Power

T-1.5 BICYCLE ACCOMMODATION ORDINANCE

Supporting Measure – Not Quantified

The City has drafted a bicycle accommodation ordinance requiring the provision of bicycle parking areas in instances when off-street parking is required. The ordinance describes the quantity, type, design requirements, and location of bicycle parking to be provided throughout the city.

Measure

The City will adopt its draft bicycle accommodation ordinance by June 2013. The City will also provide technical assistance to developers during the building permit phase, including best practice examples, to ensure successful implementation.

Actions

A Adopt draft bicycle accommodation ordinance by June 30, 2013

B Provide technical assistance to developers seeking to comply with the ordinance

Responsible Department

Community Development

T-2 TRANSPORTATION DEMAND MANAGEMENT

T-2.1 TRANSPORTATION MANAGEMENT ORGANIZATION EXPANSION

2020 Reductions: 16,687 MT CO_2e/yr **2035 Reductions:** 22,089 MT CO_2e/yr

Transportation demand management (TDM) programs are a collection of policies and incentives that focus on changing or reducing travel congestion, particularly at peak commute hours, instead of increasing roadway supply or width.

The Burbank Transportation Management Organization (TMO) collaborates with agencies, businesses, and individuals to provide services that reduce the total number of vehicle miles traveled within the City. The TMO currently offers direct transit options, education and training, data collection and analysis, employer/employee incentives, community incentives, marketing/promotional programs, new technology integration, public policy discussion and advocacy to integrate land use, transportation, air quality, and energy policies.

Measure

The City will work with the TMO to expand the geographic reach of its programs and the extent of services it currently provides; first expanding into the Golden State and Empire areas (by 2020), and

then expanding citywide at a later date. In each case, the City will require that all new businesses with 25 or more employees located within the TMO boundary become TMO members and fulfill reporting requirements.

TMO expansion to existing businesses will include an aggressive outreach campaign to advertise the full range of services provided through the TMO. To that end, the City will work with the TMO to update the TMO webpage, so that interested employers can research current programs, incentives, membership opportunities, and requirements. The TMO will work with partners to expand its ridesharing program through adoption of current technologies that make participation easier for members. The TMO will develop and/or upgrade its ride-matching systems to use current technologies (e.g., cell phone-enabled ride-match applications), and develop a ride-match social networking website and online electronic payment options. The City will evaluate its guaranteed ride home policy to ensure it is applicable to small businesses. The City will also evaluate its existing carpool parking preference requirements, and study the impacts of lowering the thresholds to apply to more businesses.

Actions

A Update the TMO website to provide program information to current and potential members

B Develop a TMO business outreach strategy to increase membership and active participation in TMO programs

C Expand geographic boundary of TMO into Golden State and Empire areas by 2020 and citywide by 2035

D Require all new businesses with 25 employees or more within the TMO boundary to join the TMO and fulfill required reporting procedures

E Expand the carpool/rideshare program through adoption of current technologies

F Evaluate the City's guaranteed ride home policy to ensure its applicability to small businesses

G Evaluate the City's carpool parking preference requirements

Performance Metrics

1 **2020:** 46% of total employees working within Burbank participate in a voluntary TDM program that offers rideshare promotion, telecommuting/alternative schedules, and parking cash-out options

2035: 52% of total employees working within Burbank participate in a voluntary TDM program that offers rideshare promotion, telecommuting/alternative schedules, and parking cash-out options

Responsible Department

Community Development

T-3 INTELLIGENT TRANSPORTATION SYSTEM

T-3.1 TRAFFIC SIGNAL COORDINATION

Supporting Measure – Not Quantified

Building an effective intelligent transportation system (ITS) can improve traffic flow and reduce transportation-related emissions. Reducing frequent "stop-and-go" traffic situations can reduce emissions caused by vehicle idling. Synchronized traffic signals can be made more effective by installing ITS equipment that enables the City to divert and re-route vehicles during peak hours to reduce traffic congestion. Significant Measure R funding has been earmarked for making traffic signal coordination improvements throughout Los Angeles County, including the City of Burbank.

Measure

The City will implement signal synchronization along major roadways as a first choice when seeking to expand roadway capacity. Priority roadways for signal synchronization include Burbank Boulevard, Magnolia Boulevard, Olive Avenue, Glenoaks Boulevard, Hollywood Way, Buena Vista Street, Alameda Avenue, and Victory Boulevard.

As synchronized traffic signals can lead to higher traffic speeds and less attentive drivers, the City will consider the location of high pedestrian traffic areas when identifying priority circulation routes; additional pedestrian-safety enhancements may become necessary, including bulb outs, crosswalk islands, and flashing crosswalk signs.

The City will also coordinate ITS improvements with the Southern California Association of Governments (SCAG) ITS Regional Architecture to ensure improvements in Burbank do not negatively impact regional traffic flows.

Actions

A Continue to identify priority circulation routes within Burbank and synchronize traffic signals

B Continue to secure Measure R funding to implement traffic signal synchronization

C Coordinate ITS improvements with the SCAG ITS Regional Architecture

D Develop additional timing plans to cover different day-of-week and time-of-day periods

E Expand traffic signal synchronization monitoring to reduce incident delay due to accidents

F Expand communication system to improve/prevent redundancy

G Deploy adaptive control along major corridors

Responsible Department

Community Development

WATER CONSERVATION MEASURES

Water-related GHG emissions are mainly caused by energy used to pump, transport, heat, cool, and treat potable water. Emissions associated with this energy use accounted for approximately 2% of the communitywide GHG inventory (i.e., water and wastewater sectors combined).

With water supplies expected to continue declining into the future, water conservation strategies have the added benefits of aligning demand with future water availability, improving public health, and saving consumers dollars. BWP is already a regional leader in water conservation efforts. The measures included in this section quantify the benefits of conservation programs that are already underway in the city.

The total GHG emissions reduction potential of the water focus area is 198 MT CO_2e/yr in 2020 and 2035.

W-1 WATER EFFICIENCY

W-1.1 WATER CONSERVATION PROGRAMS

2020 Reductions: 20 MT CO_2e/yr **2035 Reductions:** 20 MT CO_2e/yr

The City relies on local groundwater for nearly half of its water resource needs. By conserving water, BWP also conserves energy used to transport water to the city. BWP has already met its obligations under SB 7-X to reduce water consumption by 20% by 2020, and has set an annual goal to reduce water consumption by an additional 1% annually, or about 110 million gallons.

Measure

The City will implement water conservation programs described in the Urban Water Management Plan (UWMP) in support of BWP's goal to reduce water consumption by 1% annually.

Actions

A Implement UWMP water conservation programs

Performance Metrics

1 Reduce water use by 110 million gallons annually

Responsible Department

Burbank Water and Power

W-1.2 RECYCLED WATER USE MASTER PLAN

2020 Reductions: 178 MT CO_2e/yr **2035 Reductions:** 178 MT CO_2e/yr

Increasing recycled water use in Burbank reduces GHG emissions associated with pumping groundwater and importing water from outside the Los Angeles basin. BWP is rapidly expanding its recycled water system, as outlined in the Recycled Water Use Master Plan. The use of recycled water will top 1 billion gallons per year when the system is completed in 2013. City policy also requires use of recycled water for targeted large irrigated landscaped areas. This will rapidly increase the use of recycled water, helping make water availability in Burbank more sustainable. The Recycled Water Conversion Assistance Program (RWCAP) offers a rebate to assist BWP customers converting to recycled water.

Measure

The City will complete the recycled water system expansion outlined in the Recycled Water Use Master Plan and implement recycled water requirements for large irrigation users.

Actions

A Expand recycled water system

B Increase number of targeted large irrigation customers required to use recycled water

Performance Metrics

1 **2020:** Use 1.0 billion gallons of recycled water
2035: Use 1.0 billion gallons of recycled water

Responsible Department

Burbank Water and Power

W-1.3 STORMWATER MANAGEMENT PLAN

Supporting Measure – Not Quantified

While Burbank is largely built out, some of the City's largest vacant parcels adjoin sensitive natural areas. The City recognizes the need to balance growth with the conservation and enhancement of the area's natural resources. The City promotes a low impact development (LID) approach to balance the needs of land development and stormwater management. This is especially important in areas in close proximity to sensitive habitats, which may potentially be polluted by runoff from developed areas. Low impact development uses various stormwater best management practices such as vegetated swales, biofilters, and constructed wetlands and climate-appropriate plantings to reduce water use and landscape irrigation runoff. Typically, the first flush after a storm event flows over polluted land and carries the pollution to the drainage system. LID measures ensure that the first flush gets cleaned by natural process of vegetation filters or at least delays the runoff by retention and infiltration methods before running into drainage systems. LID measures can also reduce the amount of stormwater entering the stormwater system, and therefore reduce the amount of water pumped to and processed at the water treatment facility. Reduced stormwater treatment system flow results in lower GHG emissions in the wastewater sector.

Measure

The City will prepare a Stormwater Management Plan that seeks to apply best management practices, including LID features, into future system upgrades or extensions.

Actions

A Prepare and adopt a Stormwater Management Plan

Responsible Department

Public Works

WASTE REDUCTION MEASURES

Waste disposal creates emissions when organic waste (e.g., food scraps, yard clippings, paper and wood products) is buried in landfills and anaerobic digestion takes place, emitting methane. Additionally, extracting and processing raw materials for consumer products, distributing them to consumers, and disposing of them creates GHG emissions. In Burbank, about 1% of GHG emissions are associated with solid waste generation and disposal in landfills.

Organic waste diversion measures seek to divert organic waste from landfills, reusing construction materials when possible, and increasing communitywide recycling rates. The landfill methane recovery measure reduces emissions through installation of landfill gas capture systems.

The total GHG emission reduction potential of the waste strategy is 13,181 MT CO_2e/yr in 2020, and 24,806 MT CO_2e/yr in 2035. Waste reductions represent approximately 30% of total GGRP measure reductions in 2020.

SW-1 ORGANIC WASTE DIVERSION

SW-1.1 FOOD SCRAP AND COMPOSTABLE PAPER DIVERSION ORDINANCE

2020 Reductions: 2,032 MT CO_2e/yr **2035 Reductions:** 6,773 MT CO_2e/yr

Food scraps are unwanted cooking preparation and table scraps, such as banana peels, apple cores, vegetable trimmings, bones, egg shells, meat, and pizza crusts. Compostable paper, sometimes called food-soiled paper, usually comes from the kitchen and is not appropriate for paper recycling due to contamination. Materials such as stained pizza boxes, uncoated paper cups and plates, used coffee filters, paper food cartons, napkins and paper towels are all compostable paper. Diverting these organic

items from the landfill helps to reduce methane gas generation from anaerobic decomposition, and helps to prolong the operable life of a landfill.

Measure

The City will adopt a food scraps and compostable paper diversion ordinance, requiring all food waste and compostable paper to be diverted from the waste stream to composting facilities. As part of this ordinance, the City will update its yard waste collection program to allow customers to include food scraps and compostable paper in their yard waste bins. The program will allow collection of:

- all food products: fruits, vegetables, breads, cereals, dairy, meat and fish (including bones);
- coffee grounds, filters, and tea bags; and
- food soiled paper: paper towels, plates, napkins, and pizza boxes

The City will develop an outreach campaign to inform solid waste customers about the change to the yard waste collection program, identify what can and cannot be included in the yard waste bins, and provide helpful tips to minimize pest and odor problems. The City will also perform spot checks on multi-family and commercial properties to ensure compliance with the ordinance.

Actions

A Adopt a food scrap and compostable paper diversion ordinance

B Revise yard waste collection program to allow co-mingling of yard waste, food scraps, and compostable paper

Performance Metrics

1 100% of residential units divert 75% of food scraps and compostable paper
2 100% of commercial businesses divert 90% of food scraps and compostable paper

Responsible Department

Public Works

SW-1.2 YARD WASTE DIVERSION ORDINANCE

2020 Reductions: 244 MT CO_2e/yr **2035 Reductions:** 813 MT CO_2e/yr

Yard waste includes leaves, grass clippings, and downed branches, and can easily be mulched in either backyard composting or through Burbank's citywide yard waste collection program. The City provides yard waste collection bins at no extra cost to its solid waste customers. Yard waste diversion helps avoid methane generation at landfills, and extends their operable lifetime.

Measure

The City will adopt an ordinance banning disposal of yard waste in trash bins. Multi-family residential and non-residential properties that are not currently served by the City's solid waste collection program would need to contract with a yard waste collection service provider.

Actions

A Adopt a yard waste diversion ordinance banning the disposal of yard waste in trash bins or dumpsters

Performance Metrics

1 100% of residential units divert yard waste from landfills
2 100% of commercial businesses divert yard waste from landfills

Responsible Department

Public Works

SW-1.3 LUMBER DIVERSION ORDINANCE

2020 Reductions: 1,012 MT CO_2e/yr **2035 Reductions:** 3,372 MT CO_2e/yr

Lumber is an organic material, and therefore generates methane emissions through anaerobic decomposition in a landfill. As with food scraps, compostable paper, and yard waste, lumber waste can easily be diverted from landfills and either recycled or composted. The City currently has a Construction and Debris Diversion Ordinance that requires the diversion of 50% of a project's waste from the landfill, including scrap lumber.

Measure

The City will amend its existing ordinance to explicitly require the diversion of 75% of waste from construction and demolition debris generated by new construction and renovations, including scrap lumber.

Actions

A Modify Construction and Debris Diversion Ordinance to include requirements for 75% diversion

Performance Metrics

1 **2020 and 2035:** 75% of all construction and demolition lumber waste is diverted from landfills

Responsible Department

Community Development, Public Works

SW-1.4 REUSABLE BAGS

Supporting Measure – Not Quantified

Reusable shopping bags can help offset the use of single-use plastic and paper bags. The City has distributed 2,000 reusable *Burbank2035* Chico bags in the community to promote resource conservation and reduce the occurrence of plastic bag pollution in the community.

Measure

The City will continue to promote reusable shopping bags through free bag giveaways at community events and by posting information about their environmental benefits on the City's sustainability website.

Actions

A Promote the environmental benefits of reusable shopping bags on the City website

Responsible Department

Community Development

SW-1.5 RECYCLING ORDINANCE

Supporting Measure – Not Quantified

Recycling helps to remove recyclable paper and cardboard from the waste stream, where it would ultimately contribute to landfill methane emissions. The City currently provides recycling bins to all of its solid waste collection customers, which includes all single-family residential homes and some multi-family residential and commercial properties.

Measure

The City will adopt an ordinance requiring the provision of recycling bins and/or recycling areas in all residential and non-residential buildings. Multi-family residential and non-residential properties that are not currently served by the City's solid waste collection program would need to contract with a recycling collection service provider. The City will perform random spot-checks of multi-family residential and commercial buildings to ensure provision of recycling bins.

Actions

A Adopt an ordinance requiring recycling bins or recycling areas in all buildings

Responsible Department

Public Works

SW-2 LANDFILL METHANE RECOVERY

SW-2.1 ENHANCED METHANE RECOVERY

2020 Reductions: 10,600 MT CO_2e/yr **2035 Reductions:** 13,848 MT CO_2e/yr

The ARB approved a regulation that reduces emissions of methane from municipal solid waste (MSW) landfills. The regulation, which became effective June 17, 2010, is a discrete early action GHG emission reduction measure described in the AB 32 *Climate Change Scoping Plan*. The regulation primarily

requires owners and operators of certain uncontrolled MSW landfills to install gas collection and control systems, and requires existing and newly installed gas and control systems to operate in an optimal manner.

The City owns the Burbank Landfill and ships a portion of citywide MSW there for disposal. Numerous trash-hauling contractors also operate within the city, and dispose of their collected waste at a wide variety of landfills within the greater Los Angeles area. The City only has jurisdictional control over the Burbank Landfill, and therefore can only ensure compliance with the ARB regulation at this facility, which is one of many landfills that receive MSW from Burbank residents and businesses.

Measure

The City will comply with all applicable ARB regulations regarding the installation or upgrading of methane capture systems at the Burbank Landfill.

Actions

A Ensure that methane capture systems at Burbank Landfill meet ARB requirements

Performance Metrics

1 **2020 and 2035:** Burbank Landfill methane capture system operates with a 75% methane capture rate

Responsible Department

Public Works

MUNICIPAL MEASURES

Several City actions related to implementation of the GGRP do not fit into the previous strategy areas. The municipal measures include hiring a City sustainability coordinator to oversee GGRP implementation, preparing a sustainability element for *Burbank2035* to further embed sustainability issues into the City's policies and programs.

CG-1 CITY GOVERNMENT ACTIONS

CG 1.1 SUSTAINABILITY COORDINATOR

Supporting Measure – Not Quantified

In recent years, several local governments have been able to sponsor a full-time sustainability coordinator position through American Reinvestment and Recovery Act (ARRA) grant funding or similar

programs. *Burbank2035* Implementation Program OSC-12 directs the City to identify an internal resource person with dedicated job-hours to carry out the GGRP and Sustainability Element. The sustainability coordinator acts as a liaison between City government and residents and businesses in the community to implement and track progress of GGRP measures and actions.

Measure

The City will establish a sustainability coordinator position to oversee and monitor implementation of the GGRP. Roles and responsibilities would include:

- Updating the communitywide emissions inventory every 3-5 years,
- Maintaining contact with BWP to ensure energy and water consumption data is readily available for future inventory updates,
- Identifying new statewide efficiency legislation or regulations that can be quantified for inclusion in future GGPR updates, and
- Promoting sustainability messaging throughout all City departments.

Actions

A Identify funding sources to support full-time sustainability coordinator position

Responsible Department

Community Development; Public Works Department; City Manager's Office

CG 1.2 SUSTAINABILITY ELEMENT

Supporting Measure – Not Quantified

Increasingly, state legislation has been proposed that would require the City to consider sustainability in the context of the general plan. *Burbank2035* Implementation Program OSC-12 directs the City to prepare a General Plan Sustainability Element to provide comprehensive direction regarding how best to incorporate sustainability and public health in all City policies and operations, and to establish a framework to address sustainable, healthy, and resource-efficient development in discretionary land use decisions.

Measure

The City will prepare a Sustainability Element for adoption as an amendment to *Burbank2035*. The element will present policy language supported by justification from state legislation and public input, together with illustrative diagrams, photos, and maps. It will consist of the following sections:

- Introduction
- Relationship to other Burbank2035 elements and the GGRP
- Citywide goals and policies
- Sustainability plan
- Healthy community plan

- Program summary

In addition, the Element will:

- describe what sustainability means in the context of Burbank,
- establish GHG reduction targets, and
- provide policies and programs to promote communitywide sustainability, primarily through voluntary participation.

Actions

A Prepare Sustainability Element for *Burbank2035*

Responsible Department

Community Development

COMMUNITY CHALLENGE

As previously stated, the strategies described in this chapter, combined with the statewide reductions described in Chapter 3, fall short of the City's 2020 reduction target. However, the estimates of participation in voluntary GGRP measures are consistent with past participation in similar programs and the City's policies. Therefore, this GGRP represents a realistic assessment of what can be achieved in Burbank.

The Community Challenge calls upon residents, businesses, employees, and City staff to mobilize and achieve the remaining 15,432 MT CO_2e/yr of GHG reductions. This can be achieved through higher levels of community participation in the proposed measures than anticipated in this GGRP, or through other individual reduction actions. Community involvement and City leadership will be critical to achieve these remaining reductions.

Specific participation levels were used to calculate the GHG reduction capacity of the GGRP measures. High levels of voluntary participation will be essential to achieving the City's 2020 target. If additional households and businesses voluntarily participate, then the community's reductions could be larger than estimated in the GGRP.

While increased participation in all measures would be beneficial, certain actions will have a greater influence than others. Increasing the number of homes and businesses that conduct voluntary building energy efficiency improvements or install smart grid appliances and technologies could contribute substantially to closing the remaining reduction gap. Similarly, increasing resident and employee participation in Transportation Demand Management (TDM) programs could reduce a considerable amount of transportation-related emissions.

As an example of how higher participation could affect GHG reductions, Table 4-2 describes the reduction potential of five measures comparing the participation rates assumed in the GGRP with increased levels of participation. If community participation could be increased to these higher levels, then the remaining gap could be eliminated, and the City would achieve its 2020 target.

Table 4-2
Effect of Increased Participation on GHG Emissions in 2020

Measures	GGRP Measure Assumed Participation Rates	GHG Reduction Potential (MT CO_2e/yr)	Participation Rates Required to Meet Reductions Gap	GHG Reduction Potential (MT CO_2e/yr)
E-1.2 Energy Efficiency Retrofits	15% of residential units and 10% commercial buildings install medium retrofit package; 5% of commercial buildings installs advanced retrofit package	1,932	30% of residential units and 30% commercial buildings install medium retrofit package; 15% of commercial floor area installs advanced retrofit package	4,928
E-1.4 Smart Grid Integration	5% of existing development; 15% of new construction	1,027	15% of existing development; 25% of new construction	2,782
E-2.2 Solar Photovoltaic Systems	Install 3.5 MW	3,317	Install 9.0 MW	8,529
T-2.1 Transportation Management Organization Expansion	46% of City employees participate in TMO programs	16,687	50% of City employees participate in TMO programs	18,138
SW-2.1 Enhanced Methane Recovery	75% methane capture rate at Burbank Landfill	10,600	90% methane capture rate at Burbank Landfill	14,840
Total Reductions		**33,563**		**49,217**
Difference Between Assumed And Increased Rates				**+15,654**
ACHIEVED EMISSIONS LEVEL (% BELOW 2010)				**15.0%**

Notes: CO_2e = carbon dioxide equivalent; MT = metric tons
Source: Data compiled by AECOM 2012

5 Plan Realization

This GGRP implements the City's GHG reduction efforts as articulated in *Burbank2035*. This chapter describes how the City will implement GGRP emissions reduction measures and actions in the following three sections:

- **Implementation and Monitoring:** Describes how City staff will implement GGRP measures and related actions, and track the performance metrics identified for each measure.
- **Program Evaluation and Evolution:** Discusses the need to evaluate, update, and amend the GGRP over time, so the plan remains effective and current.
- **Relationship to CEQA:** Describes the relationship between the GGRP and CEQA, and establishes criteria for City staff to use when determining if a project is consistent with the GGRP.

IMPLEMENTATION AND MONITORING

Ensuring that the GGRP measures translate from policy language into on-the-ground results is critical to the success of the plan. To facilitate this, each measure described in Chapter 4 contains a table that identifies specific actions the City will carry out and the departments responsible for each action. The table also provides performance metrics to enable City staff, the City Council, and the public to track measure implementation and monitor overall GGRP progress.

The tables provide both interim (2020) and final (2035) performance metrics. Interim performance metrics are especially important, as they provide checkpoints to evaluate if a measure is on the right path to achieving its GHG reductions.

The performance metrics are directly related to the estimated GHG emissions reductions. Therefore, they are written to provide a quantifiable measurement to accurately track progress toward the reduction target. For example, Measure E-1.1 requires new commercial construction to exceed current building efficiency standards by 15% starting in 2015. The measure's estimated GHG emissions reductions are based on numerous assumptions, including the amount of new commercial construction that will take place between 2015 and the 2020 target year. The performance metric assumes that 2.9 million square feet of new commercial building space will exceed the current building efficiency standards by 15% in order to fully achieve the measure's estimated reduction. If more than 2.9 million square feet exceeds the efficiency standards, then additional emissions reductions will occur. Likewise, if less than 2.9 million square feet exceeds the efficiency standards, this measure will achieve less than its estimated reductions.

Upon adoption of the GGRP, the City departments identified for each measure in Chapter 4 will become responsible for implementing assigned actions. Key staff in each department will facilitate and oversee this work, working in tandem with the proposed Sustainability Coordinator. To assess the status of City efforts, GGRP plan realization meetings should take place several times a year. Some actions will require inter-departmental or inter-agency cooperation, and appropriate partnerships will need to be established.

PROGRAM EVALUATION AND EVOLUTION

The GGRP represents the City's initial attempt to create an organized, communitywide plan to reduce GHG emissions. Staff will need to evaluate the program's performance over time and be ready to alter or amend the plan if it is not achieving its reduction target.

Program Evaluation

Two types of performance evaluation are important: (a) evaluation of the community's overall ability to reduce GHG emissions, and (b) evaluation of the performance of individual GGRP measures. Communitywide GHG emission inventories will provide the best indication of GGRP effectiveness. It will be important to reconcile actual growth in the City versus the growth projected when the GGRP was developed. Conducting these inventories periodically will enable direct comparison to the 2010 baseline inventory and will demonstrate the GGRP's ability to achieve the adopted reduction target. The Community Development Department will prepare communitywide inventories every three to five years following adoption of the GGRP to assess progress toward the GHG emissions reduction target.

While communitywide inventories provide information about overall emission reductions, it will also be important to understand the effectiveness of each measure. Evaluation of the emissions reduction capacity of individual measures will improve staff and decision makers' ability to manage and implement the GGRP. The City can reinforce successful measures and reevaluate or replace under-performing ones. Evaluating measure performance will require data regarding actual community participation.

The proposed Sustainability Coordinator, Community Development Department, and Burbank Water and Power will evaluate measure performance on the same schedule as the communitywide inventories following adoption of the GGRP, and summarize progress toward the GHG reduction target in a report that describes estimated annual GHG reductions in 2020, achievement of performance metrics, participation rates (where applicable), and remaining barriers to implementation.

The proposed Sustainability Coordinator (or Community Development Department staff) will report progress on the GGRP action items to decision-makers on an annual basis. Staff will deliver this report in conjunction with the State-required annual report to the City Council regarding implementation of *Burbank2035*. The progress report will include a cursory assessment of progress and implementation of individual GGRP measures, including how new development projects have incorporated relevant measures. The progress report will identify measure gaps and recommend corrections on a more regular basis, through the addition of new GGRP measures.

Program Evolution

To remain relevant, the City must be prepared to adapt and transform the GGRP over time. It is likely that new information about climate change science and risk will emerge, new GHG reduction

technologies and innovative municipal strategies will be developed, new financing will be available, and State and federal legislation will change. It is also possible that future inventories will indicate that the community is not achieving its adopted target. As part of the evaluations identified above, the City will assess the implications of new scientific findings and technology, explore new opportunities for GHG reduction, respond to changes in climate policy, and incorporate these changes in future updates to the GGRP to ensure an effective and efficient program.

REQUIREMENTS FOR CALIFORNIA ENVIRONMENTAL QUALITY ACT TIERING

State CEQA Guidelines Section 15183.5 describes the requirements for a GHG reduction plan to provide tiering and streamlining benefits to future development projects. Section 15183.5(b)(1)(D) specifically states that the plan must contain measures, that if implemented on a project-by-project basis, would collectively achieve the plan's established emissions reduction target. This guidance essentially means that each future project seeking to use CEQA tiering for GHG emissions will need to demonstrate compliance with the GGRP.

Project Consistency with the GGRP

The GGRP identifies both mandatory and voluntary GHG reduction measures that would apply to different types of future projects.

Mandatory Measures

For each of the following mandatory measures, the GGRP either reinforces the implementation of current codes and ordinances, or directs changes to the City's codes and ordinances that would result in GHG reductions:

- **Measure E-1.1:** Energy Efficiency in New Construction
- **Measure E-1.2:** Energy Efficiency Retrofits
- **Measure E-1.7:** Building Shade Trees
- **Measure E-2.1:** Renewable Energy Requirements
- **Measure T-2.1:** Transportation Management Organization Expansion
- **Measure SW-1.1:** Food Scrap and Compostable Paper Diversion Ordinance
- **Measure SW-1.2**: Yard Waste Diversion Ordinance
- **Measure SW-1.3**: Lumber Diversion Ordinance

All new projects would be required to comply with these codes and ordinances, as applicable. Adoption of these measures would make these actions and measures binding and enforceable, within the meaning established by State CEQA Guidelines Section 15183.5(b)(2). The proposed project would

describe how each measure would be integrated into the project in its application materials and environmental documentation (e.g., a CEQA Initial Study).

Voluntary Measures

The remaining measures are essentially voluntary, relying on assumed levels of community participation to create communitywide GHG reductions. These measures will be tracked to ensure participation rates are reached and that the voluntary measures are being adequately applied to new and existing projects. If not, then additional, more aggressive actions will be necessary to correct shortfalls.

To use these measures to enable CEQA streamlining, the City must incorporate them as mitigation measures on future discretionary projects found to be consistent with *Burbank2035*.

To facilitate this process, within eight months of adoption of the GGRP, the City will develop a checklist of potential mitigation measures based on voluntary GGRP measures. The City will use this checklist to evaluate applications for discretionary entitlements and identify binding and enforceable mitigation measures for future projects seeking to use CEQA tiering provisions, in accordance with CEQA Guidelines Section 15183.5(b)(2). Such mitigation measures may be identified in a Mitigated Negative Declaration (MND) or Environmental Impact Report (EIR) prepared for the subsequent project, and incorporated as conditions of approval. The project may then rely on consistency with the GGRP to identify a less-than-significant impact to GHG emissions in that environmental document.

If substantial evidence indicates that the GHG emissions of a proposed project may be cumulatively considerable, notwithstanding the project's compliance with specific mandatory or voluntary measures in this GGRP, an EIR must be prepared for the project. This provision would also apply to any and all projects seeking to amend *Burbank2035*.

A Inventory and Projections Methodology

This appendix describes the methods used to develop the baseline year 2010 greenhouse gas (GHG) emissions inventory and to project the planning horizon year 2020 and 2035 emissions. The first section describes the methods used for each emissions sector to quantify the City's baseline emissions. The second section describes the indicators used to project the City's business-as-usual emissions out to years 2020 and 2035. The second section also includes the methods used to apply statewide reduction measures to the business-as-usual emissions.

Greenhouse Gas Emissions Inventory

No agency-mandated protocol currently exists for preparing communitywide GHG emissions inventories; however, general guidance for local governments to prepare municipal inventories has been made available by the California Air Resources Board (ARB) (ARB 2010a).

The field of practice and available tools and methods continue to evolve, and any local GHG inventory is ultimately specific to a particular area of interest. This affords the City considerable flexibility in establishing a defensible approach to estimating GHG emissions that reflects local conditions and priorities. The GHG data presented in this section represent the emissions baseline for the community that will be relied on during development of GHG-reduction policies and programs, which will influence the development of Burbank2035 and the GGRP. Table A-1 presents activity data and emission factors used to complete the communitywide inventory. Tables A-12 and A-13 present the total and jurisdictional baseline (year 2010) emissions inventory and horizon year emissions projections (years 2020 and 2035).

Residential and Nonresidential Energy

Data on residential, commercial, and industrial/municipal/other electricity use were obtained from Burbank Water and Power (BWP). Natural gas use data were obtained from Sempra via the City. Electricity-related GHG emissions were calculated using a bottom-up approach utilizing electricity emission factors from California Climate Action Registry (CCAR)[1] (adjusted for Burbank's electricity portfolio), along with 2010 electricity consumption from BWP. The City's natural gas consumption data were used with CCAR emission factors to estimate baseline GHG emissions.

[1] CCAR accepted its last emissions inventory reports December 2010 and has been transitioning its members to The Climate Registry at www.theclimateregistry.org. The California Registry will continue to maintain archived data on its website.

On-Road Mobile Sources

On-road mobile-source GHG emissions were calculated using a bottom-up method based on vehicle miles traveled (VMT) and vehicle trip data obtained from the City of Burbank Travel Demand Model for 2010 conditions. Vehicle trips and associated VMT were categorized according to three types of trips: Internal–Internal (I-I) trips, which begin and end in Burbank; Internal–External (I-X) trips, which begin in Burbank and end outside Burbank; and External–Internal (X-I) trips, which begin outside Burbank and end inside Burbank.

The methodology used to calculate VMT associated with vehicular activity in the region assigns 100% responsibility for all I-I trips and 50% I-X and X-I trips to the city. This methodology is consistent with the recommendations of the Regional Targets Advisory Committee, which is the body charged with making recommendations to ARB on implementation of Senate Bill (SB) 375. On-road mobile-source GHG emissions were estimated using EFs from ARB's EMFAC2007 and employing VMT by speed bin.

The on-road mobile-source GHG emissions estimates account for VMT generated on local streets, ramps, and freeways, as well as regional highways, freeways, and ramps, and exclude trips that originate *and* terminate outside of Burbank (pass-through trips).

Table A-1
Burbank 2010 Greenhouse Gas Emission Factors, Activity Levels, and Emissions

	2010 Emission Inventory Parameters			
Community Sector	**EF**	**GWP [1]**	**Activity**	**Emissions (MT CO_2e/yr)**
Electricity – Residential			277,000 MWh	137,581
CO_2 Emissions	1,095.00 (lb/MWh)	1		
CH_4 Emissions	0.007 (lb/MWh)	23		
N_2O Emissions	0.004 (lb/MWh)	296		
Electricity – Commercial	See Residential		323,000 MWh	160,612
Electricity – Industrial	See Residential		536,000 MWh	266,526
Natural Gas – Residential			16,669,699 therms	88,690
CO_2 Emissions	53.06 (kg/MMBtu)	1		
CH_4 Emissions	0.005 (kg/MMBtu)	23		
N_2O Emissions	0.0001 (kg/MMBtu)	296		
Natural Gas – Non-Residential	See Residential		13,936,235 therms	74,147
Natural Gas – Municipal	See Residential		245,866 therms	1,308
Transportation – On-Road			4,399,628 DVMT [2]	875,317

Table A-1
Burbank 2010 Greenhouse Gas Emission Factors, Activity Levels, and Emissions

Community Sector	2010 Emission Inventory Parameters			
	EF	**GWP [1]**	**Activity**	**Emissions (MT CO_2e/yr)**
CO_2 Emissions [3]	548.1 g/mile	1		857,733
CH_4 Emissions [4]	0.037 g/mile	23		1,350
N_2O Emissions [4]	0.034 g/mile	296		16,234
Transportation – Vehicle Starts [5]	121.25 g CO_2/trip		476,859 trips/day	21,104
Wastewater	0.12 kg CH_4/kg BOD	23	BOD: 275 mg/L Throughput: 12.69MGD	13,307
Water				
Groundwater	594 kWh/af/yr	See Electricity EFs and GWPs	8,796 af	2,599
Water Distribution	4,138 kWh/af/yr	See Electricity EFs and GWPs	8,796 af	17,281
Waste	WARM Model	Various	141,239 tons disposed	24,021

Notes: EF= emission factor; GWP = global warming potential; MT CO_2e/yr = metric tons carbon dioxide equivalent year; MWh = megawatt-hour; CO_2 = carbon dioxide; lb/MWh = pounds per megawatt-hour; CH_4 = methane; N_2O = nitrous oxide; kg/MMBtu = kilograms per million British thermal unit; DVMT = daily vehicle miles traveled; g/mile = grams per mile; g/trip = grams per trip; kg CH_4/kg BOD = kilogram of methane per kilogram of biological oxygen demand; mg/L = milligrams per liter; MGD = million gallons per day; kWh/af/yr = kilowatt-hours per acre-feet per year.

[1] GWP values are 100-year warming potentials from IPCC's Third Assessment Report (IPCC 2001).

[2] Daily VMT data were obtained from the City of Burbank Travel Demand Model.

[3] On-Road CO_2 emission factor represents the average emission factor for all speed bins.

[4] On-Road CH_4 and N_2O emission factors represent the average emission factor for the communitywide fleet.

[5] Vehicle Starts CO_2 emission factor represents the average emission factor for all soak times.

Source: Data compiled by AECOM 2012.

Aviation (Bob Hope Airport)

Aviation emissions were estimated using landing and take-off (LTO) data and associated aircraft models/types from Bob Hope Airport, combined with emissions factors from IPCC (IPCC 2000:96–97). Although the aviation emissions sector consists of more than just LTO emissions, cruise emissions occur across various geographies and states and therefore it would be difficult for actions taken by the City to affect those emissions. However, the airport has some operational control over the number of planes

that land and take off from the airport. For these reasons, only LTO emissions have been included in the inventory as operationally controllable aviation emissions.

In 2007, the Bob Hope Airport provided facilities for approximately 123,521 LTOs, which include aircrafts utilizing both jet fuel and aviation gasoline. However, jet fuel accounts for approximately 99.6% of total fuel used for LTOs (and 0.4% is aviation gasoline). A weighted-average based on the amount of fuel used in an LTO cycle (i.e., kilograms/LTO) for various aircrafts and their respective frequencies visiting Bob Hope Airport was used to estimate total fuel use associated with LTOs. In 2035, the Bob Hope Airport is projected to service approximately 175,860 LTOs per year. For baseline year 2010, LTOs were interpolated between years 2007 and projected 2035 LTOs assuming linear growth and similar fuel consumption practices to those in 2007. Table A-2 lists the types of aircraft that visit Bob Hope Airport.

Table A-2
Bob Hope Airport Aircraft Types

Airbus A310	Single Engine Piston
Airbus A320	Multi Engine Business Jet
Airbus A330 300 LR	Multi Engine Turboprop
Boeing 737 (100-200)	Multi Engine Piston
Boeing 737 (400)	Multi Engine Very Light Jet
Boeing 757	Helicopter
McDonall Douglas MD82-88	Military Aircraft
Single Engine Turboprop	

High Global Warming Potential Greenhouse Gases

High-global warming potential (GWP) GHGs are associated with industrial processes, refrigerants, semi-conductor manufacturing, and electrical transmission. ARB's Facility Search database and US Environmental Protection Agency's (EPA) Envirofacts database were queried by Standard Industrial Classification code for point sources (e.g., commercial and industrial refrigeration, cold storage, freezing facilities) of high-GWP GHGs. Because facilities are not required to report high-GWP GHG use to state or federal agencies, most sources do not appear in the ARB and EPA databases. Under South Coast Air Quality Management District (SCAQMD) Rule 1415, facilities containing more than 50 pounds of CFC refrigerant are required to report annual use, but these data are not publicly available.

In the absence of industrial sources, the largest emitters of high-GWP GHGs are expected to be commercial and industrial building chillers and supermarkets. There is no way to quantify the amounts of high-GWP GHGs used in commercial or industrial buildings.

Solid Waste

GHG emissions from solid waste disposal were calculated using a bottom-up method that relied on empirical City 2007 waste generation data projected to baseline year 2010, 1999 Cal-Recycle waste characterization data, and emission factors from EPA's WARM model (EPA 2012).

Wastewater Emissions

Domestic wastewater treatment emissions were calculated using a bottom-up calculation method for GHG emissions generated by the BWP Water Reclamation Plant. Wastewater is treated at the plant using secondary treatment processes, which result in methane (CH_4) formation. Emission factors for potential CH_4 production published by Intergovernmental Panel on Climate Change (IPCC) for wastewater treatment and discharge were used (IPCC 2006:6.13), along with facility-specific information on average annual flow and influent biological oxygen demand obtained from BWP.

Water Consumption Emissions

GHG emissions associated with water use (i.e., conveyance and distribution) were calculated using a bottom-up method based on City water supply data from the 2010 Urban Water Management Plan, California Energy Commission (CEC) electricity demand factors associated with water pumping (CEC 2005:11, Table 1-3), and CCAR GHG EFs (CCAR 2009:95, Table C.2).

Greenhouse Gas Emissions Projections

This section describes the indicators and assumptions used to project business-as-usual communitywide and municipal emissions for planning horizon years 2020 and 2035. In addition, the statewide reductions that would affect business-as-usual emissions and how those reductions were applied to the projections are described. Lastly, the final projections for 2020 and 2035 are presented.

Projection Indicators

Projecting GHG emissions resulting from communitywide land uses is an imprecise science. A single formula cannot precisely capture the number of factors affecting how residents, businesses, and industries consume resources in the future. In some cases, planning documents for a resource (e.g., urban water management plan, solid waste plan) will project consumption or activity levels in a future year in order to provide sufficient services. These documents typically involve a thorough evaluation of historical and current trends as they relate to the resource. Because of the more in-depth information and understanding of a particular resource that these planning documents include, they provide the most accurate method to project the City's future consumption activities and subsequent GHG emissions. Therefore, planning documents and resources specific to the emissions sector were used to project emissions, when available. Projection indicators (e.g., population, jobs) from planning documents were used to project communitywide emissions.

In other cases where a resource-specific planning document is not available, numerous indicators can be used to illustrate the growth of GHG emissions and resource consumption within a community. Indicators most directly linked to residential, commercial, and industrial resource consumption are communitywide population and employment. Increases in population or employment are typically associated with growth in households, dwelling units, or non-residential square footage, all of which lead to increased energy consumption, transportation, water use, solid waste generation, and other GHG-generating activities. Furthermore, population and employment added together yields a key GHG indicator known as "service population" (SP). South Coast Air Quality Management District (SCAQMD), Bay Area Air Quality Management District (BAAQMD), and the California Air Pollution Control Officers Association (CAPCOA) among other regulatory agencies use service population to describe the GHG efficiency (i.e., GHG emissions per SP) of a project, city, or county. In light of the common use of service population as an indicator of GHG efficiency and its relationship to GHG-generating activities, AECOM used the increases in population and employment (i.e., service population) anticipated in Burbank2035 for the preparation of emissions projections.

Because the planning horizon years include both 2020 and 2035 and population and employment growth rates would vary between 2010-2020 and 2020-2035, AECOM used the annual average increase in the City's service population from 2010-2020 to project baseline 2010 emissions to year 2020. Similarly, AECOM used the annual average increase in service population from 2020-2035 to project business-as-usual emissions from 2020-2035. Table A-3 presents the City's service population and annual average growth for the two horizon years.

Table A-3
City of Burbank Population and Employment Growth (Service Population) [1]

Indicator	Baseline	Projections	
	2010	**2020**	**2035**
Population	103,340	113,789	120,559
Employment	94,932	107,144	125,461
Service Population	198,272	220,932	246,020
Annual Average Growth – Service Population [1]	-	1.14%	0.76%

Notes: Totals may not appear to add exactly due to rounding.

[1] Annual average growth for year 2020 represents the growth from 2010 to 2020. The annual average growth for year 2035 represents the growth from 2020 to 2035.

Source: City of Burbank 2012

The City's emissions sectors and the indicator used to project emissions are described below:

- **Electricity:** Burbank Water and Power (BWP) electricity sales forecast from 2011 to 2030 for residential, commercial, other categories. Annual average electricity sales growth from 2011 to 2020 was used to project City's electricity emissions from 2010 to 2020. Annual average electricity sales growth from 2020 to 2030 was used to project the City's electricity emissions from 2020 to 2035. Table A-4 presents the projected BWP electricity sales for residential, commercial, and other (i.e., industrial) land uses from 2011 to 2030 as well as the annual average growth used for projections.

Table A-4
Burbank Water and Power Electricity Sales Projections

Calendar Year	Projected Electricity Sales (MWh/yr)		
	Residential	Commercial	Other
2011	294,840	889,946	37,915
2012	297,698	898,572	38,283
2013	300,556	907,199	38,650
2014	303,414	915,826	39,018
2015	306,272	924,453	39,385
2016	309,130	933,080	39,753
2017	311,988	941,707	40,120
2018	314,846	950,333	40,488
2019	317,704	958,960	40,855
2020	320,562	967,587	41,223
2021	323,421	976,214	41,591
2022	326,279	984,841	41,958
2023	329,137	993,467	42,326
2024	331,995	1,002,094	42,693
2025	334,853	1,010,721	43,061
2026	338,201	1,020,828	43,491
2027	341,583	1,031,037	43,926
2028	344,999	1,041,347	44,365
2029	348,449	1,051,760	44,809
2030	351,934	1,062,278	45,257
Annual Average Growth (2011-2020)	**0.97%**	**0.97%**	**0.97%**
Annual Average Growth (2020-2030)	**0.98%**	**0.98%**	**0.98%**

Notes: MWh/yr = megawatt-hours per year

Source: BWP 2011

- **Natural Gas:** Service population. Annual average service population growth from 2010 to 2020 was used to project the City's natural gas emissions from 2010 to 2020. Annual average service population growth from 2020 to 2030 was used to project the City's natural gas emissions from 2020 to 2035.

- **Transportation:** Fehr and Peers' Technical Memorandum City of Burbank 2035 General Plan: LOS, VMT, and VT Results for all Alternatives. The technical memorandum calculated daily vehicle miles

traveled and vehicle trips in 2020 and 2035. Table A-5 presents the daily vehicle miles traveled and vehicle trips during year 2020 and 2035.

Table A-5
City of Burbank Vehicle Miles Traveled and Trips

Indicator	Baseline	Projections	
	2010	2020 [1]	2035
Vehicle Miles Traveled (miles/days)	4,339,628	4,764,282	5,311,263
Vehicle Trips (trips/day)	476,859	509,139	562,938

Notes:

[1] Fehr and Peers provided vehicle miles traveled and vehicle trips for years 2010 and 2035. Values for year 2020 were interpolated assuming linear growth.

Source: Fehr and Peers 2012.

- **Airport:** City of Burbank Bob Hope Airport staff projections. Airport staff provided the projected landing and take-offs in year 2035. Year 2020 landing and take-offs were interpolated assuming linear growth. Table A-6 presents the landing and take-offs provided by the airport staff and interpolated for inventory and projection purposes.

Table A-6
City of Burbank Bob Hope Airport Landing and Take-Offs

Calendar Year	Landing and Take-Offs
2007 [1]	123,521
2010 [2]	129,129
2020 [2]	147,821
2035 [1]	175,860

Notes:

[1] Landing and take-offs data provided by the airport staff.

[2] Landing and take-offs data interpolated from data provided by airport staff.

Sources: City of Burbank 2011.

- **Solid Waste:** Service population. Annual average service population growth from 2010 to 2020 was used to project the City's solid waste disposal emissions from 2010 to 2020. Annual average service population growth from 2020-2030 was used to project the City's solid waste disposal emissions from 2020 to 2035.

- **Potable Water:** Burbank Water and Power 2010 Urban Water Management Plan (2010 UWMP). The 2010 UWMP estimated year 2010, 2020, and 2035 water consumption. Table A-7 presents the annual water consumption estimated in the 2010 UWMP.

Table A-7
City of Burbank Existing and Projected Water Consumption and Wastewater Generation

Calendar Year	Water Consumption (AF/yr)	Wastewater Generation (MGD)
2006	na	12.1 [1]
2010	17,591	12.7 [2]
2020	17,927	14.2 [2]
2035	19,778	17.0 [1]

Notes: AF/yr = acre-feet of water per year, MGD = million gallons daily, na = not available

[1] Data provided by 2006 SSMP.

[2] Data interpolated from provided data.

Sources: BWP 2011, City of Burbank 2006

- **Wastewater:** City of Burbank 2006 Sewer System Management Plan (2006 SSMP). The 2006 SSMP estimated 2006, 2025, and 2035 wastewater generation data. Estimates for year 2010 and 2020 were interpolated assuming linear growth. Table A-7 presents the daily wastewater generation estimated in the 2006 SSMP and interpolated for the emission projections.

Statewide Reductions

For climate action planning purposes, baseline GHG emissions are projected under a business-as-usual scenario to a future year, assuming that conditions and consumption rates occurring in the baseline year would continue. However, even without local climate action planning, statewide measures and regulations would affect future business-as-usual GHG emissions.

Estimates of the local effect of statewide reduction measures should be conservative to avoid overestimating GHG reductions. In many cases, the regulation may not have the same effectiveness at a particular local level as it does on a statewide level. Furthermore, some regulations that affect certain industries or practices may occur more frequently in one jurisdiction than another and therefore various levels of statewide reductions would be anticipated in each jurisdiction. Therefore, AECOM has selected the following statewide energy-related reduction measures that would create reasonably foreseeable emissions reductions attributable to Burbank at a local level.

Renewable Portfolio Standard

Executive Order S-21-09 established a statewide renewable energy portfolio target of 33% by year 2020. Therefore, California utilities, including BWP, will increase their renewable portfolio standard (RPS) to at least 33% by year 2020. The GHG reductions associated with the RPS were estimated by evaluating BWP's RPS increase from baseline year 2010 to year 2020 and 2035. BWP's year 2010 baseline RPS was determined to be 10%. Therefore, the anticipated change from baseline year 2010 to year 2020 is a 23% increase in RPS sources. Although it is likely that BWP would add additional RPS sources between 2020 and 2035, or that new regulations would require an increase in RPS sources, the projections consider the 33% RPS as a constant between 2020 and 2035. Table A-8 presents calculations used to estimate GHG emission reductions associated with the RPS.

Table A-8
City of Burbank Communitywide Renewable Portfolio Standard Calculations

Parameter	2020	2035
Total Business-As-Usual Electricity Emissions (MT CO_2e/yr)	619,634	710,592
Business-As-Usual RPS [1]	10%	10%
Target RPS	33%	33%
Additional RPS Percent Increase	23%	23%
Total Electricity Emissions with RPS Target (MT CO_2e/yr) (Electricity BAU × (1-Additional RPS))	477,344	547,414
Emission Reduction (MT CO_2e/yr)	142,291	163,178

Notes: MT CO_2e/yr = metric tons of carbon dioxide equivalent per year; BAU = business as usual; RPS = renewable portfolio standard

[1] Business-as-usual renewable portfolio standard (year 2010) was obtained from Burbank Water and Power.

Source: AECOM 2012

AB 1109 Lighting Efficiency

Assembly Bill (AB) 1109 requires a reduction in lighting-related energy use in residential and commercial buildings. The reductions mandated by AB 1109 translate into a decrease in total electricity consumption of 11 percent in residential buildings and 8.6 percent in commercial buildings by 2018. AECOM estimated residential electricity reductions associated with this legislation for both existing and new residential buildings. Commercial electricity reductions were only calculated for existing commercial buildings to avoid double counting with lighting savings estimated in Measure E-1.1: Energy Efficiency in New Construction, which is based on Title 24 Tier 1 standards. Table A-9 presents calculations used to estimate GHG emission reductions associated with AB 1109.

Table A-9
AB 1109 Lighting Efficiency Calculations

Sector	kWh/Year [1]	% Savings of Total Sector Electricity [2]	Electricity Emission Factor MT CO_2e/kWh	Emission Reductions MT CO_2e/Year [3]
2020 Residential Electricity	303,850,700	11%	0.000497	12,712
2035 Residential Electricity	348,455,500	11%	0.000497	13,315
2010 Commercial Electricity	323,000,000	8.60%	0.000497	10,284
2020 Total				**22,996**
2035 Total				**23,599**

Notes: MT CO_2e/yr = metric tons of carbon dioxide equivalents per year.

[1] AECOM 2012

[2] CEC 2011

[3] These calculations factor in reductions associated with the RPS, as described in Table A-8, to avoid double counting emissions reduction programs.

Source: AECOM 2012

Scoping Plan Transportation Measures

The AB 32 Climate Change Scoping Plan (Scoping Plan) has established several statewide measures that will contribute to California achieving its GHG reduction goal. Several statewide measures would affect the transportation-related business-as-usual emissions. In order to account for GHG reductions associated with Pavley I and the Low Carbon Fuel Standard (LCFS), the ARB-approved Pavley I and Low Carbon Fuel Standard Postprocessor Version 1.0 was used to estimate reductions from EMFAC2007 outputs (ARB 2010b). Table A-10 presents GHG emission reductions associated with Pavley I and the LCFS transportation measures.

The AB 32 Scoping Plan includes other transportation measures that would reduce motor vehicle emissions on a statewide level, which are not estimated in any ARB-approved models. AECOM has selected Heavy-Duty Vehicle Aerodynamic Efficiency, Light-Duty Vehicle Tire Pressure, and Pavley II as measures that can be reasonably assumed to be implemented and affect transportation emissions within the City. To estimate the local effect of these reductions, AECOM divided the anticipated transportation emission reductions associated with the Scoping Plan transportation measures by the ARB-projected 2020 transportation emissions to estimate the percent reduction in transportation emissions attributed to implementation of the Scoping Plan. The percent reduction achieved by these measures from the state's total transportation sector was applied to the City's business-as-usual transportation emissions. This method assumes that the City will achieve the same relative level of transportation emission reductions associated with transportation measures as the Scoping Plan assumes at the statewide level. Table A-11 presents calculations used to estimate GHG emission reductions associated with the Heavy-Duty Vehicle Aerodynamic Efficiency, Light-Duty Vehicle Tire Pressure, and Pavley II transportation measures.

Table A-10
City of Burbank Pavley I and Low Carbon Fuel Standard Emission Reductions

Transportation Measure	Preferred Project (MT CO_2e/yr)	
	2020	**2035**
Pavley I	115,769	220,605
Low Carbon Fuel Standard	59,963	58,412
Total	175,732	279,017

Notes: MT CO_2e/yr = metric tons of carbon dioxide equivalents per year.

Source: AECOM 2012, ARB 2010b

Table A-11
City of Burbank Communitywide Scoping Plan Measures Calculations

Energy Source and Year	Statewide Total Emissions (MMT CO_2e/yr) [1]	AB 32 Scoping Plan Reductions (MMT CO_2e/yr) [2]	Percent Reduction	Burbank Total Emissions (MT CO_2e/yr)	Burbank Total Emissions with Reduction Measure (MT CO_2e/yr)	Emission Reductions (MT CO_2e/yr)
Heavy Duty Vehicles Aerodynamic Efficiency						
2020	168.10	0.93	0.6%	819,785	815,250	4,535
2035 [3]	168.10	0.93	0.6%	864,212	859,430	4,781
Light Duty Vehicles Tire Pressure						
2020	168.10	0.74	0.4%	819,785	816,177	3,609
2035 [3]	168.10	0.74	0.4%	864,212	860,407	3,804
Pavley II						
2020	168.10	4.0	2.4%	819,785	800,278	19,507
2035 [3]	168.10	4.0	2.4%	864,212	843,647	20,564
Total Reductions						
2020	-	-	-	-	-	203,383 [4]
2035 [3]	-	-	-	-	-	308,166 [4]

Notes: MMT CO_2e/yr = million metric tons of carbon dioxide equivalent per year; MT CO_2e/yr = metric tons of carbon dioxide equivalent per year.

[1] Obtained from the ARB's 2020 projected inventory.

[2] Obtained from ARB's updated AB 32 Scoping Plan implementation schedule.

[3] ARB has not projected California statewide emissions or emission reductions associated with the AB 32 Scoping Plan out to year 2035. It is anticipated that additional efficiency could increase the measures reductions; however, the same level of reductions was assumed for both 2020 and 2035.

[4] Total reductions equal the sum of emissions reductions from Pavley I and Low Carbon Fuel Standard (see Table A-9) and the transportation measures described and present above.

Source: AECOM 2012, ARB 2010c, ARB 2011.

Projections

This section presents the communitywide business-as-usual emission projections. Table A-12 presents the total communitywide emissions and projections, and Table A-13 presents the jurisdictional communitywide emissions and projections. Total emissions include all emissions from the emissions inventory, while the jurisdictional inventory includes all emissions except for the Burbank Bob Hope Airport, which is not within the jurisdiction of the City.

Table A-12
City of Burbank Total Emissions:
Business-As-Usual Baseline (2010) and Projections (2020 and 2035)

	Communitywide Emissions (MT CO_2e/yr)					
Emissions Source	**Baseline Year 2010**	**Percent Contribution**	**2020 Business-As-Usual**	**Percent Contribution**	**2035 Business-As-Usual**	**Percent Contribution**
Energy	728,865	37%	802,488	47%	914,153	53%
Electricity – Subtotal	564,719	28%	619,634	28%	710,592	28%
Residential	137,581	7%	151,090	7%	173,270	7%
Commercial	160,612	8%	176,181	8%	202,043	8%
Industrial	266,526	13%	292,364	13%	335,279	13%
Natural Gas – Subtotal	164,146	8%	182,853	8%	203,561	8%
Residential	88,690	4%	98,827	4%	110,049	4%
Non-Residential [1]	74,147	4%	82,621	4%	92,003	4%
Municipal [2]	1,308	0%	1,405	0%	1,509	0%
Transportation	1,206,090	61%	1,348,510	61%	1,561,209	61%
On-Road Mobile	896,421	45%	995,517	45%	1,143,229	45%
Airport (LTO)	309,668	16%	352,993	16%	417,980	16%
Potable Water	19,880	1%	20,275	1%	22,453	1%
Solid Waste	24,021	1%	26,766	1%	29,806	1%
Wastewater	13,307	1%	14,853	1%	17,859	1%
Total	**1,992,162**	**100%**	**2,212,892**	**100%**	**2,545,480**	**100%**

Notes: MT CO2e = metric tons of carbon dioxide equivalent emissions per year; LTO = landing and take-offs

[1] The industrial and commercial natural gas consumption was aggregated as one "non-residential" unit as a result of the 15/15 Rule. The 15/15 Rule requires utilities to aggregate commercial and industrial energy consumption data if a single user accounts for 15% of the total energy consumption or if there are less than 15 total consumers in the jurisdiction.

[2] Specific municipal energy consumption was provided for natural gas consumption. However, for electricity, municipal electricity consumption was aggregated with commercial land uses.

Source: AECOM 2012.

Table A-13
City of Burbank Jurisdictional Emissions:
Business-As-Usual Baseline (2010) and Projections (2020 and 2035)

	Communitywide Emissions (MT CO_2e/yr)					
Emissions Source	**Baseline Year 2010**	**Percent Contribution**	**2020 Business-As-Usual**	**Percent Contribution**	**2035 Business-As-Usual**	**Percent Contribution**
Energy	728,865	43%	802,488	47%	914,153	53%
Electricity – Subtotal	564,719	34%	619,634	33%	710,592	33%
Residential	137,581	8%	151,090	8%	173,270	8%
Commercial	160,612	10%	176,181	9%	202,043	9%
Industrial	266,526	16%	292,364	16%	335,279	16%
Natural Gas – Subtotal	164,146	10%	182,853	10%	203,561	10%
Residential	88,690	5%	98,827	5%	110,049	5%
Non-Residential [1]	74,147	4%	82,621	4%	92,003	4%
Municipal [2]	1,308	0%	1,405	0%	1,509	0%
Transportation [3]	896,421	53%	995,517	54%	1,143,229	54%
Potable Water	19,880	1%	20,275	1%	22,453	1%
Solid Waste	24,021	1%	26,766	1%	29,806	1%
Wastewater	13,307	1%	14,853	1%	17,859	1%
Total	**1,682,494**	**100%**	**1,859,899**	**100%**	**2,127,500**	**100%**

Notes: MT CO_2e = metric tons of carbon dioxide equivalent emissions per year

[1] The industrial and commercial natural gas consumption was aggregated as one "non-residential" unit as a result of the 15/15 Rule. The 15/15 Rule requires utilities to aggregate commercial and industrial energy consumption data if a single user accounts for 15% of the total energy consumption or if there are less than 15 total consumers in the jurisdiction.

[2] Specific municipal energy consumption was provided for natural gas consumption. However, for electricity, municipal electricity consumption was aggregated with commercial land uses.

[3] Transportation sector includes on-road mobile source emissions.

Source: AECOM 2012.

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B Reduction Quantification Methodology

This appendix summarizes the methodology for quantifying greenhouse gas (GHG) reductions resulting from implementing the Greenhouse Gas Reduction Plan (GGRP) measures. In most instances, calculations and/or background information are only shown for horizon year 2020, unless the methodology used to calculate horizon year 2035 differed substantially. Energy emissions factors based on an RPS-compliant energy source mix were used to quantify emissions reductions for all measures resulting in electricity savings to avoid double counting.

E-1.1: Energy Efficiency in New Construction

This measure estimates the reduction in electricity-related emissions resulting from requiring all new commercial construction to achieve Title 24 Tier 1 (e.g., exceed current efficiency standards by 15%) beginning January 1, 2015. The commercial building inventory used within this measure was projected using baseline year square footage data from CoStar and service population growth (see Table B-1). The new commercial building projections were then adjusted to reflect the measure's application to new buildings beginning in January 2015. The business-as-usual (BAU) energy use was calculated for buildings subject to this measure, including electricity and natural gas use. The BAU was multiplied by a conversion factor to estimate energy reductions that would result in exceeding Title 24 by 15%, shown in Table B-2 as the mitigated scenario. Energy savings were multiplied by utility-specific emissions factors to calculate total emissions reductions.

Year	Performance Metrics	GHG Reduction (MT CO_2e/yr)	Sources
2020	2.1 million square feet of new non-residential construction exceeds baseline energy code by 15%	702MT CO_2e/yr in 2020	*Building inventory baseline data: CoStar*
2035	8.4 million square feet of new non-residential construction exceeds baseline energy code by 15%	2,806 MT CO_2e/yr in 2035	

Table B-1
Commercial Building Inventory

		2020		2035	
Land Use	**2010 SQFT**	**Total Projected SQFT**	**New SQFT (2020-2010)**	**Total Projected SQFT**	**New SQFT (2035-2010)**
Office	12,615,775	14,238,661	1,622,886	16,672,858	4,057,083
Warehouse	12,554,458	14,169,457	1,614,999	16,591,822	4,037,364
Retail	7,505,505	8,471,009	965,504	9,919,186	2,413,681
Total	**32,675,738**	**36,879,127**	**4,203,389**	**43,183,866**	**10,508,128**

Table B-2
Commercial Building Energy Savings

	SQFT Subject to Measure (built after 01/2015)	BAU Electricity Use (kWh/yr)	Mitigated Electricity Use (kWh/yr)	BAU Natural Gas Use (kBTU/yr)	Mitigated Natural Gas Use (kBTU/yr)
2020	2,101,694	25,986,516	24,745,509	11,258,930	9,671,40
2035	8,406,502	103,942,658	98,978,795	45,034,243	38,683,292

E-I.2: Energy Efficiency Retrofits

This measure estimates the reduction in energy-related emissions (i.e., electricity and natural gas) resulting from retrofitting existing residential units and commercial properties. The measure includes retrofitting both single- and multi-family units based on a pre-defined package of energy efficiency retrofits (i.e., low, medium and advanced). This measure relies on installation of the medium and advanced retrofit packages. The medium retrofit package includes installation of programmable thermostats, gas water heater upgrades, and installation of high-efficiency light bulbs. The advanced retrofit package includes all medium retrofit measures plus gas furnace upgrades, duct sealing, foundation insulation, and building envelope sealing/weatherization.

Baseline electricity and natural gas consumption levels per unit type were identified using CEC's Residential Appliance Saturation Survey data for Forecast Climate Zone 9. Mitigated energy savings estimates were based on outputs from Lawrence Berkeley Laboratory's Home energy Saver ^{TM} building energy modeling software. The model-derived energy savings estimates were downscaled in order to be conservative in emissions reduction calculations. Total energy savings were calculated by subtracting the mitigated electricity and natural gas consumption levels from baseline levels. See Tables B-3 and B-4 for data used to calculate emissions reductions.

Year	Performance Metrics	GHG Reduction (MT CO_2e/yr)	Sources
2020	15% of existing single-family units install an advanced retrofit package 15% of existing multi-family units install an advanced retrofit package 10% of existing commercial floor area installs medium retrofit package 5% of existing commercial floor area installs advanced retrofit package	1,932 MT CO_2e/yr in 2020	*Baseline Energy Consumption: Commercial End Use Survey, CEC, 2006* *Energy Savings from Retrofit Packages: AECOM SSIME^{TM} Building Energy Analysis* *Baseline Energy Consumption: Residential Appliance Saturation Survey, CEC, 2010* *Energy Savings from Retrofit Packages: Home Energy Saver ^{TM}, Lawrence Berkeley Laboratory, Berkeley, CA* *Participation Rates: City of Burbank, 2012*
2035	30% of existing single-family units install an advanced retrofit package 30% of existing multi-family units install an advanced retrofit package 40% of existing commercial floor area installs medium retrofit package 20% of existing commercial floor area installs advanced retrofit package	5,992 MT CO_2e/yr in 2035	

Table B-3
Residential Retrofits

Baseline Energy Consumption

	Total Units	Participation Rate	kWh/unit/year	therms/unit/year	Total kWhr/year	Total therms/year
Single Family	19,438	15%	7,138	501	20,812,267	1,460,766
Townhome	3,349	15%	4,575	291	2,298,251	146,184
2-4 unit apartment	3,127	15%	3,802	272	1,783,328	127,582
5+ unit apartment	17,400	15%	4,076	177	10,638,360	461,970
Mobile Home	132	0%	na	na	na	na
Total	**43,446**				**35,532,206**	**2,196,501**

Mitigated Energy Consumption

	Total Units	Participation Rate	kWh/unit/year	therms/unit/year	Total kWhr/year	Total therms/year
Single Family	19,438	15%	7,138	461	20,812,267	1,343,419
Townhome	3,349	15%	4,569	271	2,295,209	136,353
2-4 unit apartment	3,127	15%	3,797	251	1,780,925	117,833
5+ unit apartment	17,400	15%	4,071	168	10,624,442	437,649
Mobile Home	132	0%	na	na	na	na
Total	**43,446**				**35,512,842**	**2,035,255**
Energy Savings					**19,364**	**161,246**

Table B-4
Commercial Retrofits

Baseline Energy Consumption - Medium Retrofit Package

	SQFT	Participation Rates	kWh/sqft/year	KBTU/sqft/year	Total kWh/year	Total KBTU/year
Office	12,615,775	10%	15.9	12.8	20,083,752	16,115,898
Warehouse	12,554,458	10%	6.2	0.0	7,745,473	0
Retail	7,505,505	10%	16.8	1.9	12,572,870	1,388,732
Total	**32,675,738**				**40,402,095**	**17,504,630**

Mitigated Energy Consumption - Medium Retrofit Package

	SQFT	Participation Rates	kWh/sqft/year	KBTU/sqft/year	Total kWh/year	Total KBTU/year
Office	12,615,775	10%	14.5	11.6	18,274,331	14,615,147
Warehouse	12,554,458	10%	5.9	0.0	7,467,159	0
Retail	7,505,505	10%	15.0	1.8	11,292,760	1,369,915
Total	**32,675,738**				**37,034,250**	**15,985,062**
Energy Savings - Medium Retrofit Package					**3,367,845**	**1,519,568**

Baseline Energy Consumption - Advanced Retrofit Package

	SQFT	Participation Rates	kWh/sqft/year	KBTU/sqft/year	Total kWh/year	Total KBTU/year
Office	12,615,775	5%	15.9	12.8	10,041,876	8,057,949
Warehouse	12,554,458	5%	6.2	0.0	3,872,737	0
Retail	7,505,505	5%	16.8	1.9	6,286,435	694,366
Total	**32,675,738**				**20,201,047**	**8,752,315**

Mitigated Energy Consumption - Advanced Retrofit Package

	SQFT	Participation Rates	kWh/sqft/year	KBTU/sqft/year	Total kWh/year	Total KBTU/year
Office	12,615,775	5%	14.0	11.0	8,838,834	6,925,243
Warehouse	12,554,458	5%	5.9	0.0	3,685,072	0
Retail	7,505,505	5%	14.5	1.8	5,430,822	680,164
Total	**32,675,738**				**17,954,727**	**7,605,407**
Energy Savings - Advanced Retrofit Package					**2,246,320**	**1,146,908**
Energy Savings - Total					**5,614,166**	**2,666,475**

E-1.3: ENERGY STAR Appliances

This measure focuses on installation of energy-efficient refrigerators, clothes washers, and dishwashers. The CAPCOA report "*Quantifying Greenhouse Gas Mitigation Measures*" provides a methodology for calculating the electricity reductions associated with the installation of energy efficient refrigerators, clothes washers, and dishwashers. Baseline market share values from a *Northwestern Energy Efficiency Alliance* study indicate that approximately 42% of consumers purchase Energy Star refrigerators, 97% purchase Energy Star dishwashers, and 61% purchase Energy Star clothes washers. The study shows a strong trend of increasing Energy Star Appliance market share over the past decade. These numbers were revised downward for use in the GGRP to provide a more conservative estimate of appliance absorption: 30% for refrigerators, 40% for clothes washers, and 90% for dishwashers. The measure assumes adoption of energy-efficient appliances in new construction at these revised levels. For existing residential units, the measure assumes replacement of appliances at the same rates used for new units. It also assumes a replacement cycle of 14 years for refrigerators and 12 years for dishwashers and clothes washers. Adjustments were made to avoid double counting that would result from ENERGY STAR appliances replacing previously installed ENERGY STAR appliances. It was assumed that once a household purchases an ENERGY STAR unit, they will continue to purchase ENERGY STAR replacements as necessary. The calculations also assume that 100% of residential units have one refrigerator; 50% have clothes washers; and 25% have dishwashers.

Year	Performance Metrics	GHG Reduction (MT CO_2e/yr)	Sources
2020	9,300 ENERGY STAR refrigerators are installed 7,200 ENERGY STAR clothes washers are installed 8,100 ENERGY STAR dishwashers are installed	735MT CO_2e/yr in 2020	*Quantification Methodology: Energy Efficient Appliance Reduction: CAPCOA. 2010 (August). Quantifying Greenhouse Gas Mitigation Measures. Available: <http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf>.* *Participation Rates: ENERGY STAR Consumer Products Program: Market Progress Evaluation Report. Prepared by KEMA, Inc. July 24, 2007. Prepared for Northwestern Energy Efficiency Alliance.*
2035	20,200 ENERGY STAR refrigerators are installed 14,300 ENERGY STAR clothes washers are installed 10,800 ENERGY STAR dishwashers are installed	1,601MT CO_2e/yr in 2035	

E-I.4: Smart Grid Integration

This measure estimates the reduction in electricity-related emissions resulting from integration of Smart Grid technologies in new and existing residential and commercial land uses. Literature indicates that integration of Smart Grid technologies reduces electricity use by more than 5% in existing residential and commercial buildings and 6% in new residential and commercial buildings. For 2020, the measure assumes that 15% of all new residential and commercial buildings and 5% of existing residential and commercial buildings will integrate Smart Grid technologies. For 2035, the measure assumes that 20% of all new residential and commercial buildings and 10% of existing residential and commercial buildings will integrate Smart Grid technologies.

Year	Performance Metrics	GHG Reduction (MT CO_2e/yr)	Sources
2020	5% of existing residential units and existing commercial floor area install smart grid-compatible technologies, such as smart appliances, programmable thermostats, and internet-based displays 15% of new residential units and new commercial floor area install smart grid-compatible technologies, such as smart appliances, programmable thermostats, and internet-based displays	1,027 MT CO_2e/yr in 2020	*Smart Grid Reduction: SMART 2020: Enabling the low carbon economy in the information age, The Climate Group on behalf of the Global Sustainability Initiative (GeSI)* *Estimating the Benefits of the GridWise Initiative Phase I Report Walter S. Baer, Brent Fulton, Sergej Mahnovski TR-160-PNNL, May 2004 Prepared for the Pacific Northwest National Laboratory* *Participation Rates: Pacific Northwest National Laboratory , Estimating the Benefits of the GridWise Initiative Phase I Report Walter S. Baer, Brent Fulton, Sergej Mahnovski TR-160-PNNL, May 2004*
2035	10% of existing residential units and existing commercial floor area install smart grid-compatible technologies, such as smart appliances, programmable thermostats, and internet-based displays 20% of new residential units and new commercial floor area install smart grid-compatible technologies, such as smart appliances, programmable thermostats, and internet-based displays	2,382 MT CO_2e/yr in 2035	

E-1.5: Cool Roofs

This measure assumes reductions in building energy use according to application of the EPA's Cool Roofs Calculator online tool. Roofing variables entered into the EPA toolkit were based on an EPA urban heat island report that compares various warm roof and cool roof technologies. The measures assumes that baseline residential roofs are composed of black or dark brown asphalt shingles with conventional pigments, and the cool roof scenario would use medium gray or brown asphalt shingles with cool pigments. The measure assumes that baseline commercial roofs are composed of a built-up roof with smooth asphalt surface, and the cool roof scenario would use a built-up roof with gravel and cement coating. Participation rates were determined based on past participation in the City's Cool Roof Program.

Year	Performance Metrics	GHG Reduction (MT CO_2e/yr)	Sources
2020	6 homes per year install a cool roof through 2020 6 homes per year install a cool roof through 2035	261 MT CO_2e/yr in 2020	*EPA Cool Roofs Calculator. Available <http://www.ornl.gov/sci/roofs+walls/facts/CoolCalcEnergy.htm >* *Reducing Urban Heat Islands: Compendium of Strategies, US EPA Office of Atmospheric Programs, Climate Protection Partnership Division* *Participation rates: City of Burbank, 2012.*
2035	100,000 sq ft of non-residential buildings per year install cool roofs through 2020 100,000 sq ft of non-residential buildings per year install cool roofs through 2035	852 MT CO_2e/yr in 2035	

E-1.6: BWP Energy Conservation Programs

BWP reports its ongoing energy conservation programs in its *Integrated Resource Plan* (IRP). The 2012 version of this plan projects annual electricity savings in 2020 of approximately 9,900 MWh. This estimate includes electricity savings from programs already covered in other GGRP measures, including BWP's Shade Tree program, water conservation efforts, and Smart Grid reductions. Emissions reductions associated with saving 9,900 MWh were calculated, and then quantified reductions from overlapping measures were subtracted from that total to avoid double counting. The IRP does not project estimated electricity savings through 2035, so the 2020 annual savings were held constant for both horizon years.

Year	Performance Metrics	GHG Reduction (MT CO_2e/yr)	Sources
2020	Achieve net annual energy savings of 9,900 MWh	2,291 MT CO_2e/yr in 2020	*BWP Integrated Resource Plan 2012.*
2035	Achieve net annual energy savings of 9,900 MWh	2,291 MT CO_2e/yr in 2035	

E-1.7: Building Shade Trees

This measure is based on estimates of the energy savings associated with building shade trees planted next to single-family residential units. The measure assumes reductions from two implementation programs: continuation of BWP's Made in the Shade program and compliance with the new mandatory shade tree planting requirements for single-family residential units. The number of trees planted as part of the Made in the Shade program was based on BWP's self-reporting of energy efficiency program participation rates in their annual report to the California Municipal Utilities Association; BWP planted 340 shade trees in 2011 as part of the program. The numbers of trees planted as part of the mandatory shade tree requirements was calculated using the new single-family residential unit projections. BWP also provided the per-tree GHG emissions reductions used to quantify this measure. The measure assumes that each tree results in energy savings that total 0.13 MT CO_2e/yr. Table B-5 shows the calculations for estimating total shade trees planted as a result of this program.

BWP's Building Shade Tree Program was quantified separately from other electricity conservation programs (described in Measure E-1.6) so that it could be combined with the mandatory shade tree requirement.

Year	Performance Metrics	GHG Reduction (MT CO_2e/yr)	Sources
2020	Plant 5,250 shade trees	671 MT CO_2e/yr in 2020	*Participation Rates: California Municipal Utilities Association. Energy Efficiency in California's Public Power Sector: A Status Report. March 2012.* *Emissions reduction rate assumptions: BWP 2012.*
2035	Plant 12,775 shade trees	2,548 MT CO_2e/yr in 2035	

Table B-5
Shade Tree Programs

	Mandatory Shade Trees			Made in the Shade		Total Trees
	Single-Family Units	New Units	2 Shade Trees/unit	Trees/year	Total	Total
2010	19,438	-	-	-	-	-
2020	20,364	926	1,850	340	3,400	5,250
2035	21,576	2,138	4,275	340	8,500	12,775

E-2.1: Renewable Energy Requirements

This measure comprises both natural gas- and electricity-related emissions reductions resulting from the installation of solar hot water heaters in residential units and from installation of grid-connected photovoltaic (PV) systems in residential and commercial uses. Baseline water heating-related natural gas consumption levels per residential unit type were identified using CEC's Residential Appliance Saturation Survey data for Forecast Climate Zone 9. In addition, CEC data identifies the energy savings potential of solar hot water heaters for specific climates in California. The measure assumes that 69-74% of water-heating natural gas can be reduced through the use of solar hot water heaters. The measure assumes that 100% of new residential units (i.e., single family and multi-family) will install solar hot water heaters to meet their hot water demands. Care should be taken to avoid double-counting between a solar hot water heater installed to help new residential units achieve the building code-mandated energy efficiency performance and solar hot water heaters installed in excess of that requirement. Table B-6 provides the assumptions used to quantify reductions from the solar water heater portion of this measure.

The measure uses National Renewable Energy Laboratory solar insolation data specific to Burbank's geographic location and climate (5.6 kWh/m^2/year) to calculate electricity-related emissions reductions resulting from installation of grid-connected PV systems. The measure assumes an average PV system size of 1.8 kW for each single-family residential unit, based on conversations with BWP staff. It was assumed that 925 single-family units would install 1.8-kilowatt grid connected PV systems by 2020 and 2,150 single-family units would install similar systems by 2035. Multi-family and commercial PV installation was calculated together, based on the assumption that these land use types would install larger systems than single-family residential units. For 2020, it was assumed that multi-family and commercial buildings would cumulatively install 2 MW of PV capacity, increasing to 3 MW in 2035. Table B-7 provides the assumptions used to quantify reductions from the PV system installation portion of this measure.

Year	Performance Metrics	GHG Reduction (MT CO_2e/yr)	Sources
2020	925 single-family residential units install a 1.8 kWh solar PV system New multi-family residential units and commercial buildings install 2.0 MW combined of solar PV 925 single-family residential units install a solar hot water system 1,150 multi-family residential units install a solar hot water system	3,422 MT CO_2e/yr in 2020	*Baseline Hot Water Natural Gas Consumption: Residential Appliance Saturation Survey, CEC, 2010* *Solar Fraction: Solar Water Heating CEC 2013 Title 24 Pre-rulemaking Workshop, California Energy Commission, June 9, 2011* *Solar Insolation: National Renewable Energy Laboratory Renewable Resource Data Center, 2011* *PV Participation Rates: City of Burbank, 2012*
2035	2,150 single-family residential units install a 1.8 kWh solar PV system New multi-family residential units and commercial buildings install 3.0 MW combined of solar PV 2,150 single-family residential units install a solar hot water system 2,650 multi-family residential units install a solar hot water system	5,583 MT CO_2e/yr in 2035	

Table B-6
Solar Water Heaters – 2020

Residential Units

	Units (2020)	Hot Water Heater Energy per Unit (therms/year)	Solar Water Heater Effectiveness	Energy Savings per Unit (therms/year)	Participation Rate (% of units)	Total Savings (therms/year)
Single Family	20,364	230	74%	171	2%	69,459
Townhouse	3,509	200	74%	148	2%	10,385
2-4 unit apartment	3,276	158	69%	109	3%	10,747
5+ unit apartment	18,229	98	69%	68	3%	37,010
Total	**45,377**					**127,601**

Commercial Buildings

	SQFT (2020)	Hot Water Heater Energy per SQFT (kBTU/year)	Solar Water Heater Effectiveness	Energy Savings per SQFT (kBTU/year)	Participation Rate (% of sqft)	Total Savings (kBTU/year)
Office	14,238,661	2.44	30%	0.73	5%	521,654
Warehouse	14,169,457	-	30%	-	5%	-
Retail	8,471,009	0.57	30%	0.17	5%	72,195
Total	**36,879,127**					**593,849**

Table B-7
Mandatory PV Systems – 2020

Single-Family Residential

Photovoltaic System Size per Unit (kW)	Number of SFR Units	Generation Potential (kWh/sqft/year)	Electricity Generated (kWh/year)
1.8	925	189.8	1,637,794

Multi-Family Residential and Commercial

Total Photovoltaic System Capacity Installed (MW)	Area (sqft)	Generation Potential (kWh/sqft/Year)	Electricity Generated (kWh/Year)
2.0	133,333	189.8	3,811,440
Total Electricity Generated (kWh/Year)			**5,449,234**

E-2.2: Solar Photovoltaic Systems

This measure estimates reductions associated with BWP's Solar Photovoltaic Program, offered in accordance with SB-1. Per BWP's 2011 Integrated Resource Plan, the City expects to install 3.5 MW of additional PV capacity between 2011 and 2016, when the program ends. The measure uses National Renewable Energy Laboratory solar insolation data specific to Burbank's geographic location and climate (5.6 kWh/m2/year) to calculate electricity generation potential. Table B-8 provides the assumptions used to quantify reductions from the PV system installation.

Year	Performance Metrics	GHG Reduction (MT CO_2e/yr)	Sources
2020	Install 3.5 MW of solar PV on residential and commercial buildings, in addition to requirements discussed in Measure E-2.1	3,317 MT CO_2e/yr in 2020	*Solar Insolation: National Renewable Energy Laboratory Renewable Resource Data Center, 2011* *Participation rates: BWP Integrated Resource Plan 2012.*
2035	Install 5.0 MW of solar PV on residential and commercial buildings, in addition to requirements discussed in Measure E-2.1	4,739 MT CO_2e/yr in 2035	

Table B-8
Voluntary PV Systems – 2020

Total Photovoltaic System Capacity Installed (MW)	Area (sqft)	Generation Potential (kWh/sqft/Year)	Electricity Generated (kWh/Year)
3.5	233,333	189.8	6,670,020

T-1.1: Pedestrian Enhancements

This measure quantifies reductions resulting from pedestrian enhancements based on the EPA's Smart Growth INDEX (SGI) model, and uses a variety of indicators to measure changes in the pedestrian environment, including: sidewalk availability, ease of street crossing, connectivity of street/sidewalk system, terrain, and the pedestrian environment factor. Because Burbank is a built-out community with an extensive sidewalk network, this measure assumes that 5% of intersections within the city are improved to facilitate greater pedestrian crossing, through a variety of options that could include crosswalk striping, flashing lights, raised crosswalks, pedestrian islands, curb extensions, or other enhancements. The qualitative evaluation of existing street crossings was performed through a Google Earth survey of typical street conditions in a variety of Burbank neighborhoods and districts. Potential priority roadways were identified for enhancements and then quantified as a percentage of total city intersections. Emissions reductions come from VMT differences between a BAU scenario and a mitigated scenario. The SGI model was used to help develop VMT reduction assumptions based on the proposed changes in the measure. Table B-9 shows the VMT reductions calculated as a result of this measure.

Year	Performance Metrics	GHG Reduction (MT CO_2e/yr)	Sources
2020	5% of existing street intersections are improved from medium ease of street crossing to high (a qualitative assessment)	191 MT CO_2e/yr in 2020	*EPA Pedestrian Smart Growth INDEX model*
2035	5% of existing street intersections are improved from medium ease of street crossing to high (a qualitative assessment)	381 MT CO_2e/yr in 2035	

Table B-9
Communitywide VMT Reductions – Pedestrian Environment Improvements

BAU Vehicles Miles Traveled Scenario		
	Community Travel (miles)	Fuel Consumption (gallons)
Gasoline	1,565,066,637	81,940,662
Diesel	173,896,293	27,171,296
Total	1,738,962,930	109,111,957
Mitigated Vehicles Miles Traveled Scenario		
	Community Travel (miles)	Fuel Consumption (gallons)
Gasoline	1,559,197,637	81,633,384
Diesel	173,244,182	27,069,403
Total	1,732,441,819	108,702,788
Percent of Community Retrofitted		**5%**
BAU minus Mitigated Scenario		
	Community Travel (miles)	Fuel Consumption (gallons)
Gasoline	293,450	15,364
Diesel	32,606	5,095
Total	**326,056**	**20,458**

T-1.4: Bicycle Infrastructure Expansion

This measure quantifies reductions resulting from increasing Burbank's bicycle mode share through expansion of its bicycle infrastructure, primarily Class I and II bicycle facilities. Based on the City's Bicycle Master Plan, it was assumed that all 12.0 miles of planned new Class I and II facilities would be installed by 2020. It was also assumed that the City would identify additional bicycle infrastructure expansion projects in the future that would provide, at a minimum, 8.0 additional miles by 2035. Emissions reductions come from VMT differences between a BAU scenario and a mitigated scenario (see Table B-10). The CAPCOA methodology was used to help quantify VMT reductions based on the proposed bicycle infrastructure improvements. A mode share study conducted by Dill and Carr was used to help define assumptions regarding how additional bicycle lanes translate into increased bicycle mode share. The methodology assumes that the ratio of additional bicycle lane mileage per community area correlates to increased bicycle mode share, above levels reported in the 2010 US Census. To perform these calculations, the Verdugo Hills and the Bob Hope Airport were removed from calculations of total community area since bicycle lane expansion is unlikely to occur in these areas.

Year	Performance Metrics	GHG Reduction (MT CO_2e/yr)	Sources
2020	Construct 12.0 miles of Class I and II facilities	355 MT CO_2e/yr in 2020	*CAPCOA. Quantifying Greenhouse Gas Mitigation Measures: A Resource for Local Government to Assess Emissions Reductions from Greenhouse Gas Mitigation Measures. August, 2010.* *Dill, J and Carr, T. Bicycle Commuting and Facilities in Major U.S. Cities: If You Build Them, Commuters Will Use Them. 2003.* *Bicycle infrastructure expansion: City of Burbank Bicycle Master Plan. Adopted December 15, 2009.*
2035	Construct 20.0 miles of Class I and II facilities	1,080 MT CO_2e/yr in 2035	

Table B-10
Communitywide VMT Reductions – Bicycle Infrastructure Improvements

BAU Scenario – Vehicles Miles Traveled		
	Community Travel (miles)	Fuel Consumption (gallons)
Gasoline	1,565,066,637	81,940,662
Diesel	173,896,293	27,171,296
Total	1,738,962,930	109,111,957
Mitigated Scenario – Vehicles Miles Traveled		
	Community Travel (miles)	Fuel Consumption (gallons)
Gasoline	1,564,520,081	81,912,046
Diesel	173,835,565	27,161,807
Total	1,738,355,646	109,073,853
BAU minus Mitigated Scenario		
	Community Travel (miles)	Fuel Consumption (gallons)
Gasoline	546,556	28,615
Diesel	60,728	9,489
Total	**607,284**	**38,104**

T-2.1: Transportation Management Organization Expansion

Emissions reductions associated with this measure were calculated using VMT projections and assumed participation rates in the City's Transportation Management Organization (TMO). The City provided AECOM with assumptions regarding future participation in the Transportation Management Organization. It was assumed that following expansion of the TMO into additional geographic areas, 50% of employees in TMO areas would work for companies of 25 or more people, and would therefore be required to participate in the TMO. Based on this assumption, 46% of total employees in 2020 would be subject to the TMO, as would 52% of total employees in 2035. The measure assumes that through participation in the TMO, the BAU VMT would be reduced by 15%. Table B-11 shows calculations used to estimate emissions reductions for this measure. AECOM worked with a transportation planning subconsultant to develop VMT reduction assumptions for various transportation demand management (TDM) program, including rideshare promotion, telecommuting/alternative works schedules, subsidized transit passes, and parking cash-out options. Assumptions were also created to estimate the number of TMO participants that would participate in one or all of the TDM programs.

Year	Performance Metrics	GHG Reduction (MT CO_2e/yr)	Sources
2020	46% of total employees working within Burbank participate in a voluntary TDM program that offers rideshare promotion, telecommuting/alternative schedules, and parking cash-out options	16,687 MT CO_2e/yr in 2020	*VMT reduction assumptions: AECOM, 2012.* *Participation rates: City of Burbank, 2012*
2035	52% of total employees working within Burbank participate in a voluntary TDM program that offers rideshare promotion, telecommuting/alternative schedules, and parking cash-out options	22,089 MT CO_2e/yr in 2035	

Table B-11
Transportation Demand Management – 2020

BAU Scenario – Current Participation Rates	
Communitywide VMT Projection (miles)	1,738,962,930
Fuel Consumption (gallons)	109,111,957
Mitigated Scenario – Increased Participation Rates	
Communitywide VMT Projection	1,710,407,383
Fuel Consumption (gallons)	107,320,228
BAU minus Mitigated Scenario	
Communitywide VMT Reductions (miles)	28,555,547
Fuel Consumption Reductions (gallons)	1,791,730

W-1.1: Water Conservation Programs

BWP has voluntarily established water conservation goals in excess of those required by SB-7-X. Per the 2012 version of the *Energy Efficiency in California's Public Power Sector* report, BWP has set an annual goal to reduce water consumption by 110 million gallons annually. The report states that BWP estimates net energy savings of 0.36 kWh for every 748 gallons (i.e., 100 cubic feet) conserved. This results in electricity savings of approximately 53,000 kWh annually. When multiplied by the emissions factors calculated for BWP, this results in reductions of 20 MT CO_2e/yr. Since the water conservation goal is a static annual goal, emissions reductions are the same in 2020 as in 2035.

The report also states that in 2011 BWP saved approximately 107,000 kWh through this water conservation effort. However, since this represents nearly double the stated annual water conservation goal, AECOM decided to use the more conservative annual goal to calculate horizon year (i.e., 2020, 2035) GHG emissions reductions.

Year	Performance Metrics	GHG Reduction (MT CO_2e/yr)	Sources
2020	Reduce water use by 110 million gallons annually	20 MT CO_2e/yr in 2020	*Energy Efficiency in California's Public Power Sector: A Status Report. California Municipal Utilities Association, March 2012.*
2035	Reduce water use by 110 million gallons annually	20 MT CO_2e/yr in 2035	

W-1.2: Recycled Water Use Master Plan

BWP's *Recycled Water Use Master Plan* states that recycled water use will top 1 billion gallons annually by 2013. Consistent with the methodology used in W-1.1, the same net energy savings resulting from reduced water pumping were assumed (i.e., 0.36 kWh/100 cubic feet). Therefore, using 1 billion gallons of recycled water would save approximately 481,000 kWh/yr, resulting in emissions reductions of 178 MT CO_2e/yr.

Year	Performance Metrics	GHG Reduction (MT CO_2e/yr)	Sources
2020	Use 1.0 billion gallons of recycled water	178 MT CO_2e/yr in 2020	*Energy Efficiency in California's Public Power Sector: A Status Report. California Municipal Utilities Association, March 2012.*
2035	Use 1.0 billion gallons of recycled water	178 MT CO_2e/yr in 2035	

SW-1.1: Food Scrap and Compostable Paper Diversion Ordinance

An inventory of the community's organic waste was created using Cal Recycle waste volume and characterization data. Using the first-order decay methodology from the 2006 IPCC guidelines, fugitive methane emissions from the organic landfill waste were calculated for base-case and mitigated scenarios (see Tables B-12 and B-13). This measure assumes that residential and commercial uses will divert 75% and 90%, respectively, of food scraps and compostable paper from landfills by 2020 (highlighted in orange in Table B-12). This measure would apply to GHG emissions associated with new waste generated and would not apply to waste in place disposed prior to GGRP implementation.

Calculations for this measure factored in the advanced methane recovery rate described in Measure SW-2.1 to avoid double counting emissions reductions.

Year	Performance Metrics	GHG Reduction (MT CO_2e/yr)	Sources
2020	100% of residential units divert 75% of food scraps and compostable paper 100% of commercial businesses divert 90% of food scraps and compostable paper	2,032 MT CO_2e/yr in 2020	*CalRecycle Waste Characterization Data, 2011* *IPCC, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 5 Chapter 3.*
2035	100% of residential units divert 75% of food scraps and compostable paper 100% of commercial businesses divert 90% of food scraps and compostable paper	6.773 MT CO_2e/yr in 2035	

SW-1.2: Yard Waste Diversion Ordinance

An inventory of the community's organic waste was created using Cal Recycle waste volume and characterization data. Using the first-order decay methodology from the 2006 IPCC guidelines, fugitive methane emissions from the organic landfill waste were calculated for base-case and mitigated scenarios (see Tables B-12 and B-13). This measure assumes that 100% of residential and commercial uses will divert yard waste from landfills by 2020 (highlighted in green in Table B-12). This measure would apply to GHG emissions associated with new waste generated and would not apply to waste in place disposed prior to GGRP implementation.

Calculations for this measure factored in the advanced methane recovery rate described in Measure SW-2.1 to avoid double counting emissions reductions.

Year	Performance Metrics	GHG Reduction (MT CO_2e/yr)	Sources
2020	100% of residential units divert yard waste from landfills 100% of commercial businesses divert yard waste from landfills	244 MT CO_2e/yr in 2020	*CalRecycle Waste Characterization Data, 2011* *IPCC, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 5 Chapter 3.*
2035	100% of residential units divert yard waste from landfills 100% of commercial businesses divert yard waste from landfills	813 MT CO_2e/yr in 2035	

SW-1.3: Lumber Diversion Ordinance

An inventory of the community's organic waste was created using Cal Recycle waste volume and characterization data. Using the first-order decay methodology from the 2006 IPCC guidelines, fugitive methane emissions from the organic landfill waste were calculated for base-case and mitigated scenarios (see Tables B-12 and B-13). This measure assumes that 75% of all construction and demolition lumber waste will be diverted from landfills by 2020 (highlighted in blue in Table B-12). This measure would apply to GHG emissions associated with new waste generated and would not apply to waste in place disposed prior to GGRP implementation.

Calculations for this measure factored in the advanced methane recovery rate described in Measure SW-2.1 to avoid double counting emissions reductions.

Year	Performance Metrics	GHG Reduction (MT CO_2e/yr)	Sources
2020	75% of all construction and demolition lumber waste is diverted from landfills	1,012 MT CO_2e/yr in 2020	*CalRecycle Waste Characterization Data, 2011* *IPCC, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 5 Chapter 3.*
2035	75% of all construction and demolition lumber waste is diverted from landfills	3,372 MT CO_2e/yr in 2035	

Table B-12
Baseline Degradable Organic Carbon Disposed

Commercial Waste – Baseline Mass of Degradable Organic Carbon Disposed (DDOC mdt)

Year	Newspaper	Office Paper	Corrugated Boxes	Coated Paper	Food	Grass	Leaves	Branches	Lumber	Textiles	Diapers	Construction/ Demolition	Sludge/ Manure	Total
2010	70.5	549.5	1,023.1	561.6	1,315.1	55.3	216.1	208.3	1,546.0	518.7	273.2	114.9	0.0	**6,452.1**
2011	71.3	555.7	1,034.8	568.0	1,330.1	55.9	218.6	210.6	1,563.7	524.6	276.3	116.2	0.0	**6,525.8**
2012	72.1	562.1	1,046.6	574.5	1,345.3	56.5	221.1	213.0	1,581.5	530.6	279.4	117.5	0.0	**6,600.4**
2013	72.9	568.5	1,058.5	581.1	1,360.7	57.2	223.6	215.5	1,599.6	536.7	282.6	118.9	0.0	**6,675.8**
2014	73.8	575.0	1,070.6	587.7	1,376.2	57.8	226.1	217.9	1,617.9	542.8	285.9	120.2	0.0	**6,752.1**
2015	74.6	581.6	1,082.9	594.4	1,392.0	58.5	228.7	220.4	1,636.4	549.0	289.1	121.6	0.0	**6,829.3**
2016	75.5	588.2	1,095.3	601.2	1,407.9	59.2	231.3	223.0	1,655.1	555.3	292.4	123.0	0.0	**6,907.3**
2017	76.3	595.0	1,107.8	608.1	1,424.0	59.8	234.0	225.5	1,674.0	561.7	295.8	124.4	0.0	**6,986.3**
2018	77.2	601.8	1,120.4	615.0	1,440.2	60.5	236.7	228.1	1,693.1	568.1	299.2	125.8	0.0	**7,066.1**
2019	78.1	608.6	1,133.2	622.1	1,456.7	61.2	239.4	230.7	1,712.5	574.6	302.6	127.3	0.0	**7,146.9**
2020	79.0	615.6	1,146.2	629.2	1,473.3	61.9	242.1	233.3	1,732.0	581.1	306.0	128.7	0.0	**7,228.6**

Residential Waste – Baseline Mass of Degradable Organic Carbon Disposed (DDOC mdt)

Year	Newspaper	Office Paper	Corrugated Boxes	Coated Paper	Food	Grass	Leaves	Branches	Lumber	Textiles	Diapers	Construction/ Demolition	Sludge/ Manure	Total
2010	76.3	273.5	207.8	345.7	1,181.8	44.3	105.3	41.5	253.1	296.4	370.9	21.9	1.2	**3,219.7**
2011	77.2	276.7	210.2	349.7	1,195.3	44.8	106.6	42.0	256.0	299.8	375.1	22.2	1.2	**3,256.5**
2012	78.0	279.8	212.6	353.6	1,208.9	45.3	107.8	42.4	258.9	303.2	379.4	22.4	1.2	**3,293.8**
2013	78.9	283.0	215.1	357.7	1,222.8	45.8	109.0	42.9	261.9	306.7	383.7	22.7	1.3	**3,331.4**
2014	79.8	286.3	217.5	361.8	1,236.7	46.3	110.2	43.4	264.9	310.2	388.1	22.9	1.3	**3,369.5**
2015	80.7	289.5	220.0	365.9	1,250.9	46.8	111.5	43.9	267.9	313.7	392.6	23.2	1.3	**3,408.0**
2016	81.7	292.8	222.5	370.1	1,265.2	47.4	112.8	44.4	270.9	317.3	397.0	23.4	1.3	**3,446.9**
2017	82.6	296.2	225.1	374.3	1,279.6	47.9	114.1	44.9	274.0	320.9	401.6	23.7	1.3	**3,486.3**
2018	83.5	299.6	227.6	378.6	1,294.2	48.5	115.4	45.4	277.2	324.6	406.2	24.0	1.3	**3,526.2**
2019	84.5	303.0	230.2	382.9	1,309.0	49.0	116.7	46.0	280.3	328.3	410.8	24.3	1.3	**3,566.5**
2020	85.5	306.5	232.9	387.3	1,324.0	49.6	118.0	46.5	283.5	332.1	415.5	24.5	1.4	**3,607.2**

Table B-13
Mitigated Degradable Organic Carbon Disposed

Commercial Waste – Mitigated Mass of Degradable Organic Carbon Disposed (DDOC mdt)

Year	Newspaper	Office Paper	Corrugated Boxes	Coated Paper	Food	Grass	Leaves	Branches	Lumber	Textiles	Diapers	Construction/ Demolition	Sludge/ Manure	Total
2010	70.5	549.5	1,023.1	56.2	131.5	27.6	108.0	104.1	386.5	518.7	273.2	114.9	0.0	3,363.8
2011	71.3	555.7	1,034.8	56.8	133.0	27.9	109.3	105.3	390.9	524.6	276.3	116.2	0.0	3,402.2
2012	72.1	562.1	1,046.6	57.4	134.5	28.3	110.5	106.5	395.4	530.6	279.4	117.5	0.0	3,441.1
2013	72.9	568.5	1,058.5	58.1	136.1	28.6	111.8	107.7	399.9	536.7	282.6	118.9	0.0	3,480.4
2014	73.8	575.0	1,070.6	58.8	137.6	28.9	113.1	109.0	404.5	542.8	285.9	120.2	0.0	3,520.2
2015	74.6	581.6	1,082.9	59.4	139.2	29.2	114.4	110.2	409.1	549.0	289.1	121.6	0.0	3,560.4
2016	75.5	588.2	1,095.3	60.1	140.8	29.6	115.7	111.5	413.8	555.3	292.4	123.0	0.0	3,601.1
2017	76.3	595.0	1,107.8	60.8	142.4	29.9	117.0	112.8	418.5	561.7	295.8	124.4	0.0	3,642.3
2018	77.2	601.8	1,120.4	61.5	144.0	30.3	118.3	114.0	423.3	568.1	299.2	125.8	0.0	3,683.9
2019	78.1	608.6	1,133.2	62.2	145.7	30.6	119.7	115.3	428.1	574.6	302.6	127.3	0.0	3,726.0
2020	79.0	615.6	1,146.2	62.9	147.3	31.0	121.1	116.7	433.0	581.1	306.0	128.7	0.0	3,768.6

Residential Waste – Mitigated Mass of Degradable Organic Carbon Disposed (DDOC mdt)

Year	Newspaper	Office Paper	Corrugated Boxes	Coated Paper	Food	Grass	Leaves	Branches	Lumber	Textiles	Diapers	Construction/ Demolition	Sludge/ Manure	Total
2010	76.3	273.5	207.8	86.4	295.4	22.1	52.7	20.7	63.3	296.4	370.9	21.9	1.2	1,788.8
2011	77.2	276.7	210.2	87.4	298.8	22.4	53.3	21.0	64.0	299.8	375.1	22.2	1.2	1,809.2
2012	78.0	279.8	212.6	88.4	302.2	22.6	53.9	21.2	64.7	303.2	379.4	22.4	1.2	1,829.9
2013	78.9	283.0	215.1	89.4	305.7	22.9	54.5	21.5	65.5	306.7	383.7	22.7	1.3	1,850.8
2014	79.8	286.3	217.5	90.4	309.2	23.2	55.1	21.7	66.2	310.2	388.1	22.9	1.3	1,871.9
2015	80.7	289.5	220.0	91.5	312.7	23.4	55.8	22.0	67.0	313.7	392.6	23.2	1.3	1,893.3
2016	81.7	292.8	222.5	92.5	316.3	23.7	56.4	22.2	67.7	317.3	397.0	23.4	1.3	1,915.0
2017	82.6	296.2	225.1	93.6	319.9	24.0	57.0	22.5	68.5	320.9	401.6	23.7	1.3	1,936.9
2018	83.5	299.6	227.6	94.7	323.6	24.2	57.7	22.7	69.3	324.6	406.2	24.0	1.3	1,959.0
2019	84.5	303.0	230.2	95.7	327.3	24.5	58.3	23.0	70.1	328.3	410.8	24.3	1.3	1,981.4
2020	85.5	306.5	232.9	96.8	331.0	24.8	59.0	23.2	70.9	332.1	415.5	24.5	1.4	2,004.0

SW-2.1: Enhanced Methane Recovery

This measure estimates the reductions resulting from installation of, and upgrading existing, landfill gas recovery systems in order to comply with an adopted ARB regulation described as a discrete early action GHG emissions reduction measure in the AB 32 *Climate Change Scoping Plan.* This regulation was applied here for landfills known to accept municipal solid waste (MSW) generated within the City of Burbank. Historical disposal data from CalRecycle was used to identify landfills that have accepted MSW from Burbank in the past. Due to the large number of historic landfills used, AECOM calculated the weighted average of waste disposed at 23 landfills listed in the CalRecycle database between 1995 and 2007. The methane capture rates of known landfill gas recovery systems at each landfill was used with the weighted MSW contribution averages to calculate an existing methane capture rate for Burbank's total historic waste profile. Table B-14 shows the landfills used to calculate the weighted averages and their associated known methane capture rates. Attempts were made to update the methane capture rates for those landfills with rates lower than 75% to ensure upgrades had not already been made to comply with the ARB regulation. Without the benefit of a statewide database describing existing landfill gas recovery systems and efficiency rates for all MSW landfills in the state, Table B-14 represents the best available information at the time of GGRP preparation.

Using the list of known methane capture rates, AECOM modified the weighted methane capture rate to reflect a scenario under which all eligible MSW facilities would comply with the ARB regulation. AECOM assumed that no landfill gas recovery system would be installed in the future at landfills that currently lack one (i.e., landfills with a methane capture rate of 0% in Table B-14). Additionally, some landfills are excluded from the ARB regulation, including Nu-Way Live Oak Reclamation, Reliance Landfill, and Peck Road Gravel Pit. Therefore, these landfills were not assumed to implement a landfill gas recovery system.

AECOM also developed an historic MSW model for Burbank's waste contributions beginning in 1950 and projecting into the future to year 2100. Using this model, an inventory of the community's organic waste was created using CalRecycle waste volume and characterization data. Using the first-order decay methodology from the 2006 IPCC guidelines, fugitive methane emissions from the organic landfill waste were calculated for base-case and mitigated scenarios. This measure would apply to GHG emissions associated with new waste generated and waste-in-place disposed prior to GGRP implementation.

Year	Performance Metrics	GHG Reduction (MT CO_2e/yr)	Sources
2020	Burbank Landfill methane capture system operates with a 75% methane capture rate	10,600 MT CO_2e/yr in 2020	*CalRecycle Disposal Reporting System data, 1995-2007* *CalRecycle Solid Waste Information System, 2012* *CalRecycle Waste Characterization Data, 2011* *IPCC, 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 5 Chapter 3.*
2035	Burbank Landfill methane capture system operates with a 75% methane capture rate	13,848 MT CO_2e/yr in 2035	

Table B-14
Historic Waste Contributions per Landfill – 1995-2007

Landfill	Weighted Average Contribution to Total Waste Profile (1995-2007)	BAU Scenario – Methane Capture Rates	Mitigated Scenario – Methane Capture Rates
Burbank Landfill Site No. 3	37.54%	75%	75%
Bradley Landfill West And West Extension	10.89%	79%	79%
Simi Valley Landfill & Recycling Center	3.33%	75%	75%
BKK Sanitary Landfill	2.63%	75%	75%
Lancaster Landfill and Recycling Center	1.11%	75%	75%
Azusa Land Reclamation Co. Landfill	0.86%	89%	89%
El Sobrante Landfill	0.04%	75%	75%
Arvin Sanitary Landfill	0.01%	75%	75%
Kettleman Hills - B18 Nonhaz Codisposal	0.03%	75%	75%
Spadra Sanitary Landfill #2	0.02%	75%	75%
Bakersfield Metropolitan (Bena) SLF	0.00%	75%	75%
Puente Hills Landfill	19.01%	48%	75%
Chiquita Canyon Sanitary Landfill	11.10%	0%	75%
Sunshine Canyon SLF County Extension	8.57%	0%	0%
Nu-Way Live Oak Reclamation, Inc.	1.73%	0%	75%
Sunshine Canyon City/County Landfill	1.38%	0%	0%
Sunshine Canyon City Landfill Unit 2	1.10%	0%	0%
Reliance Landfill	0.31%	0%	75%
Antelope Valley Public Landfill I and II	0.14%	0%	75%
Antelope Valley Public Landfill I	0.08%	0%	75%
Peck Road Gravel Pit	0.06%	0%	0%
Olinda Alpha Sanitary Landfill	0.04%	8%	75%
Frank R. Bowerman Sanitary LF	0.01%	8%	75%