

Greener Glendale Plan

THE CITY OF GLENDALE'S SUSTAINABILITY PLAN



MUNICIPAL OPERATIONS

Credits and Acknowledgments

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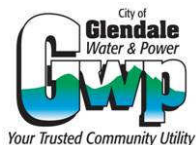
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Introduction

Given the broad consensus that modern global development and consumption patterns are causing negative environmental, social, and economic impacts, the City of Glendale is joining an increasing number of California local governments committed to addressing sustainability at the local level. Sustainability is a long-term approach to environmental protection and process improvements. It prevents pollution from the start and calls for systems thinking, which acknowledges the connections between the economy, the environment, and social responsibility.

The Greener Glendale Plan is funded by the United States Department of Energy's Energy Efficiency and Conservation Block Grant and Glendale Water and Power, and is being completed in order to meet grant requirements and State legal requirements to address climate change.

The *Greener Glendale Plan: Municipal Operations* is the City of Glendale's plan for achieving better sustainability in municipal operations. Community operations will be addressed in a separate document. The Plan assesses what actions the City has already taken to be more sustainable, and recommends how it can build on these efforts. The Plan indicates that the City of Glendale has already completed or initiated many sustainability

programs. In fact, the City began implementing these well before 1990. Because complete data is not available that far back, the City is not able to measure the result of these early efforts. Instead, it is using year 2004, the earliest year for which it has complete data, as its baseline, and comparing this to data from year 2009 in order to identify the growth trend.

The City achieved overall energy and water consumption reductions in its buildings. However, those reductions were offset by increases in public services, such as a growth in the vehicle fleet, and the opening of the new Police Building. Therefore, despite its conservation efforts, it saw a slight increase in total energy consumption and air pollution emissions since 2004. Still, the City's existing and planned conservation programs enable it to meet 93% of its 2020 sustainability goal. *The City will pursue the remaining strategies as funding is or becomes available.*

The Greener Glendale Plan takes advantage of common sense approaches and innovative policies that the local government is uniquely positioned to implement. The actions identified can reduce energy use and waste along with the associated costs, improve air quality and environmental health, and provide other benefits to the City of Glendale for years to come.

Purpose, Scope, and Process Behind the Greener Glendale Plan

Purpose

On November 9, 2010, the City of Glendale adopted a resolution to address sustainability and climate change and to use the United Nations Urban Environmental Accords as a framework for sustainability actions (Appendix A). The UN Accords outlines seven focus areas (Energy, Water, Waste, Transportation, Urban Design, Urban Nature, and Environmental Health) for achieving better sustainability. The Greener Glendale Plan describes specific measures the City can take to address these topic areas. The plan also addresses how the City can meet its state mandated reduction targets for greenhouse gas (GHG) emissions (the air pollution emissions widely believed to contribute to global climate change [Appendix B]). GHG emissions are a subset of the UN Accords Energy category.

Scope

This Plan covers objectives and strategies for increased sustainability in local government operations within the City of Glendale (community activities are addressed in a separate document). It sets forth objectives and strategies in seven focus areas for improving sustainability:

- 1) Energy
- 2) Water
- 3) Waste
- 4) Transportation
- 5) Urban Design
- 6) Urban Nature
- 7) Environmental Health

Process

The Community Development Department Planning Division is working with other City departments to develop the Greener Glendale Plan through a 5-milestone process. The 5-milestone process, a common planning approach applied towards sustainability planning, involves:

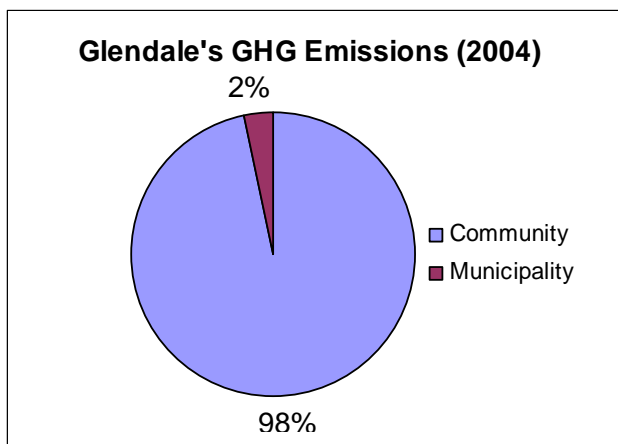
- 1) Inventorying existing conditions
- 2) Adopting a target
- 3) Developing a plan
- 4) Implementing the plan
- 5) Monitoring progress and reporting results, then repeating the cycle as necessary.

Sustainability and Climate Change

Sustainability plans typically address topics such as the environment (natural systems, planning and design, energy and climate), the economy (economic development, employment and workforce training), and society (affordability and social equity; children, health and safety; and education, arts, and community)¹. Because this plan addresses municipal operations only, it primarily addresses environmental issues. One of the issues addressed in this Plan is how the City will contribute to the mitigation of global climate change. This document analyzes City operations against seven topics of sustainability as well as related GHG emissions that

¹ *What is a Sustainability Plan*, ICLEI (www.ICLEI.org)

contribute to climate change. The document shows how implementing sustainability measures will result in reduced GHG emissions by the City, thereby decreasing the City's contribution to global climate change. GHG emissions from local government operations amount to a small percent of the total emissions for the community of Glendale. However, it is important the City demonstrate GHG reductions, primarily because it will then work with the community to reduce citywide emissions.



Staff conducted an inventory of GHG emissions from municipal operations. The inventory includes GHG emissions from sources over which the local government exercises direct operational control, including city buildings, equipment, and property; fleet vehicles, buses, public lighting and water delivery facilities, employee commutes, and government generated waste. Emissions resulting from the production and delivery of products the City consumes (e.g. office supplies) are not included (see discussion in "Waste" chapter). The Hyperion II wastewater treatment plant, active part of Scholl Canyon Landfill, and Bob Hope Airport are not included because they are not Greener Glendale Plan: Municipal Operations

within the direct operational control of the City of Glendale. Emissions from utility power generation and purchases for community use are analyzed in Appendix C. For information on the greenhouse gas inventory methodology, please see Appendix D.

Total GHG Emissions for City of Glendale Municipal Operations were 37,392 MTCO₂e (Metric Tons of CO₂e [CO₂e = CO₂ equivalent, the six GHGs² inventoried and converted into CO₂ units]) in 2004, and 38,538 MTCO₂e in 2009, an increase of 3%.

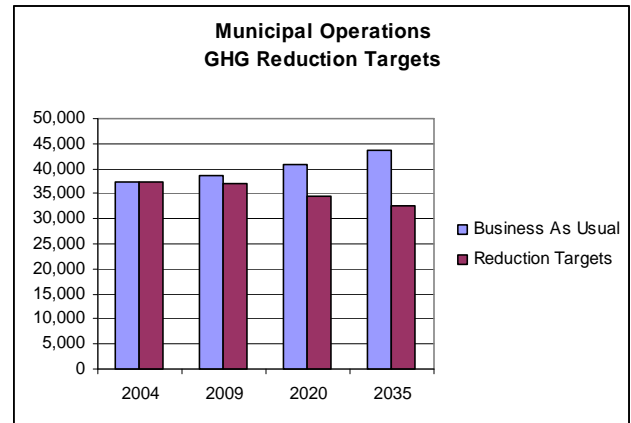
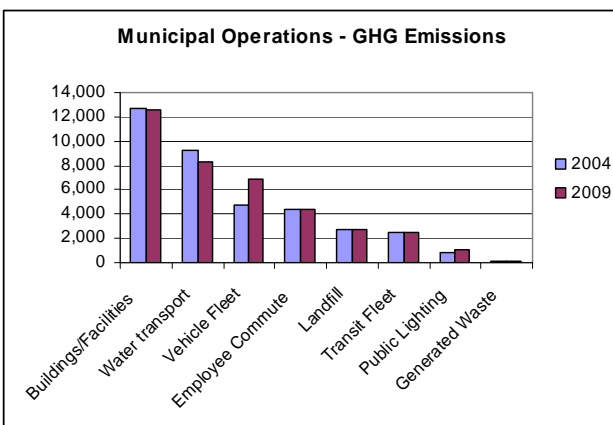
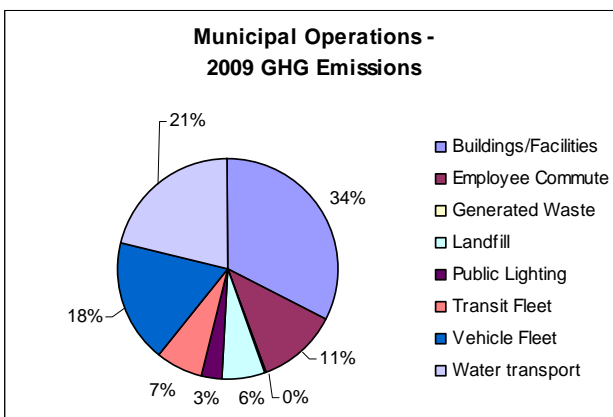
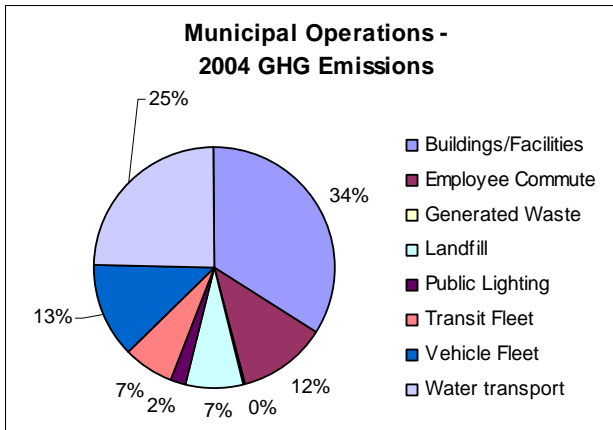
Although the City implemented numerous energy and water saving measures between the years 2004 to 2009, it also increased its services to the public. The fleet size grew by nearly 30%, and the new Police Building opened for service.

The City accomplished overall GHG emission reductions for all other buildings and facilities, the landfill, and in waste generation. Emissions increased for the police building, public lighting facilities, and the vehicle fleet. Staff estimated emissions from employee commutes for year 2009, and due to numerous factors, considered them to be substantially the same for year 2004. Please see Appendix E for details on the GHG inventory results.

² The six internationally recognized greenhouse gases regulated under the Kyoto Protocol, which are listed on page 69.

between cities without a detailed analysis would not be meaningful.

City of Glendale's GHG Emissions Forecast and Reduction Targets



The City of Glendale has completed an emissions forecast based on projections from its 2004 to 2009 trend. The emissions forecast is a "Business As Usual" forecast, a scenario estimating future emissions levels if no further local action (i.e. strategies within this Greener Glendale Plan) were to take place. The forecast indicates that, if the City continues to expand at its current rate and does not take additional action, GHG emissions will continue to increase.

The City of Glendale is using the Southern California Association of Governments' regional GHG reduction targets of 8% by 2020, and 13% by 2035. Staff chose these targets in order to be consistent with regional efforts, and because the targets are achievable.

In many ways, the City of Glendale has been an early adopter of sustainability, energy efficiency, and greenhouse gas reduction strategies. As a result, the 2004 and 2009 inventories likely have

Although it is tempting to compare the City of Glendale's total municipal GHG emissions to neighboring municipalities, it is not possible because municipalities vary greatly in their size, services, operations, and geography. These factors directly determine GHG levels. Therefore, a comparison of GHG numbers

Greener Glendale Plan: Municipal Operations

already reflected greenhouse gas reductions due to these measures. Glendale has implemented such strategies since as early as 1990. Because data is not available as far back as 1990, the reductions cannot be shown via the inventory. Instead, a narrative description of these measures is provided below.

The combination of measures the City of Glendale has implemented, planned, or presented throughout this Greener Glendale Plan are designed to achieve the 2020 and 2035 targets. This document also includes additional measures that, if implemented by year 2035, will result in a 30% GHG reduction from year 2004 levels.

Sustainability Achievements: What the City Has Already Accomplished

For decades, the City of Glendale has shown its commitment to sustainability. This section outlines these achievements in relation to the GHG inventory years. Data is not available to quantify the GHG reductions from early sustainability efforts. Therefore, this chapter describes these measures in narrative form. It is important to note that the City has already pursued the relatively easy to achieve, affordable measures (“low-hanging fruit”). In fact, the City has already pursued numerous measures involving significant investment.

No GHG inventory was completed for years 1990 – 2004, so measures implemented during those years will not be reflected in the inventory. Measures implemented between 2004 – 2009 Greener Glendale Plan: Municipal Operations

will be reflected in the GHG inventories that were conducted for those years. All measures implemented after 2009 will be reflected in the reduction strategies listed in each sustainability topic chapter within this report.

Prior to 1990

- Introduced hydro power into the City’s utility energy mix (1936)
- Began recapping vehicle tires for re-use (1954)
- Introduced propane vehicles into the fleet (1973)
- Began protecting native trees growing within City limits, under the Indigenous Tree Ordinance (1982)
- Maintenance yard began recycling fluids such as oil and anti-freeze, separating oil from wastewater, and recycling oil filters in order to prevent oil from getting into waste stream or wastewater (1980s)
- Began purchase of open space for habitat and watershed protection and recreation (1980s)
- Completed inventory of existing street trees and potential sites for additional street trees (1980s).
- Installed Scholl Canyon landfill gas collection system (1986)

1990 through 2003

- Provided subdivision standards for solar orientation and cluster development (1990s)
- Implemented public transit and ridesharing programs for City employees (1990)

- Incorporated pedestrian facilities into projects as routine accommodation (1990s)
- Introduced first compressed natural gas (CNG) vehicle into vehicle fleet (1990)
- Completed re-inventory of all City street trees (1992)
- Insulated all hot water heaters, converted all restroom and shower fixtures to low-flow devices (1993)
- Implemented the 9/80 work schedule for City employees, which allows employees to work 9 hours a day (80 hours in 2 weeks) in order to eliminate one day of driving every two weeks (1993)
- Developed recycled water system (early 1990's). The system currently supports 80 customers and 20 miles of piping. New multi-family residential buildings are required to have piping connections to recycled water.
- Began utilizing Scholl Canyon landfill gas for energy production (1994)
- Began utilizing reclaimed water for landfill irrigation (1994)
- Installed drip irrigation demonstration project at City Hall (1990s)
- Conducted studies and adopted standards for protection of blueline streams and ridgelines (1990s)
- Modified the Glendale Metrolink Station for service as a transfer center (1990s)
- Grayson Power Plant switched from fuel oil to natural gas and landfill gas (1995)
- Adopted the Bikeway Master Plan (1995)
- Introduced first CNG vehicle into Beeline bus fleet (1996)
- Began utilizing rubberized asphalt (2.5 tires per ton of asphalt concrete) in street improvement projects (1997)
- Replaced hundreds of incandescent lamps with more energy-efficient compact fluorescent light bulbs and more energy efficient fixtures (1998)
- Adopted street standards for multi-modal users in the Circulation Element (1998)
- Began recycling Public Works inert material for re-use (1999)
- Obtained 52% diversion (recycling) rate (2000)
- Introduced hybrid vehicles into the fleet (2000)
- Installed LED lights in all traffic signals (2000)
- Began formal maintenance program for street trees (2000)
- Formally adopted annual street tree planting program (2000)
- Installed energy-saving lighting fluorescent lamps and electronic ballasts in all buildings maintained by Facilities Services. HVAC equipment was also replaced with more efficient systems with state-of-the-art control systems (2001)
- Began recycling batteries and electronic waste (2001)
- Began installation of trash capture devices on city-owned catch basins and storm drain pipes (2002). To date, the City has installed 523 devices.
- Began requiring Urban Stormwater Mitigation Plans for 13 categories of development projects (2002)

- Introduced wind power into the City's utility energy mix (2003)

2004 through 2009

- Conducted energy efficiency upgrades on Grayson Power Plant resulting in 9% equipment efficiency increase, a 2% power plant efficiency increase, and reduction in water consumption (2004)
- Began utilizing up to 15% recycled asphalt concrete in street improvement projects (2004)
- Began using only Energy-Star certified copiers (2005)
- Achieved pavement condition index (PCI) of 73 (Higher PCIs reduce gas usage. State average is 68).
- Began using only ultra-low sulfur diesel instead of regular diesel for all vehicles (2006)
- Police Department began downsizing vehicles and filling tires with nitrogen instead of compressed air, resulting in improved tire life of 25% and increased fuel economy of 3.3% (2006)
- City began purchasing only CNG on-road vehicles instead of diesel on-road vehicles (except for emergency response vehicles and equipment) (2006)
- Installed native plant demonstration garden at the Integrated Waste Recycling Center (2006)
- Began formal effort to test water delivery pumps for energy efficiency and upgrade as needed (2007)

- Began installing drought tolerant landscaping in parks, mulching low use turf areas, shrub beds, planters, tree wells, etc. (2008)
 - Began employing pest management practices that minimize use of toxic pesticides (2008)
 - Eliminated seasonal planting and seasonal planting areas (2008)
 - Achieved a 20% utility renewable energy portfolio (2008)
 - Implemented a new cleaning schedule for City facilities that eliminated night cleaning and resulted in \$200,000 or more in energy savings (2008)
 - Completed energy audits for 23 City buildings and identified opportunities for energy use reductions (2008)
 - Eliminated all environmentally unfriendly cleaning products from custodial cleaning supplies (2008)
 - Converted all Public Works water-using vehicles (e.g. street sweepers, tree watering tanks, etc.) from potable to reclaimed water (2008)
 - Began incorporating bicycle infrastructure into projects as routine accommodation (2008)
 - Began planting street trees in vacant spaces for projects as routine accommodation (2008)
 - Upgraded 51 vending machines for improved energy efficiency (2009)
 - Achieved 61% recycling diversion rate (2009)
- From 1990 to present the Green Fleet has grown to a total of 23 electric vehicles, 12 hybrid vehicles, and 76 CNG vehicles; amounting to 9% of the entire fleet.

To date, the entire Beeline fleet is CNG, except four older buses equipped with particulate traps that are scheduled for replacement with CNG vehicles in 2013.

Over 75% of the City's computer devices are Energy Star compliant, and the majority of remaining models will likely be replaced with Energy Star compliant models within the next 5 years.

Summary Chart of Greener Glendale Plan Strategies in Relation to Reduction Targets

The chart on the following page illustrates the Greener Glendale Plan strategies in relation to its GHG Reduction Targets.

Phase Column

Phase 1 consists of measures the City has completed since year 2009, has in-progress, or is planning to complete in the near future.

Phase 2 consists of measures considered priority because they would not require significant additional funding, although they would require staff time.

Phase 3 consists of all other measures, which need to be funded.

Sustainability Category

This column notes which sustainability category the measure is a subset of, and the section of the document where details on the measure can be found.

MTCO_{2e} GHG Reduction

This column provides an *estimate* of how many metric tons of carbon dioxide equivalent units of greenhouse gas emissions the City expects to prevent by implementing the measure, in other words, the amount of GHGs reduced by the measure.

Cumulative GHG Reduction

This shows the running total of MTCO_{2e}'s of GHG reduced for each measure, and shows at what point each GHG reduction target will be achieved. Measures listed with a "not quantified" value of GHG reduction are understood to result in a definite GHG reduction, but no specific data was available to quantify that reduction. These measures are not included in the running total for GHG reductions.

A symbolizes the point at which the first reduction target of 8% below 2004 levels by 2020 will be achieved. This amount is 6,352 MTCO_{2e}.

B symbolizes the point at which the second reduction target of 13% below 2004 levels by 2035 will be achieved. This amount is 11,186 MTCO_{2e}.

C symbolizes the point at which an ambitious target of 30% below 2004 levels will be achieved. This amount is 17,679 MTCO_{2e}.

Note about Reduction Percents

The reduction calculations include the percent below 2004 levels in addition to the expected continued growth of GHG emissions over time if the City takes no action. Therefore, the earlier the City implements measures, the higher the actual percent of reduction will be. For example, if the City completes all 2035 measures by 2020, the reduction will be 21%, and if those plus all "ambitious" measures are completed by year 2020, the reduction will be 38%, instead of 8%.

Summary Table: Greener Glendale Plan Strategies

Phase	Sustainability Category	Measure	Estimated MTCO ₂ e GHG Reduction	Cumulative GHG Reduction
EXISTING / PLANNED EFFORTS (post-2009)	Energy	33% Renewable Energy Portfolio	3,256	3,256
	Urban Nature	Plant 3,400 trees by 2020	868	4,124
	Energy	Water transport facilities - energy mgmt system	443	4,567
	Energy	Develop two local water wells	355	4,922
	Energy	HVAC upgrades on 23 buildings	308	5,230
	Transportation	Retire underused/older vehicles	221	5,451
	Energy	Water transport facilities - efficiency tests/upgrades	152	5,603
	Energy	Improve water pumping efficiency	152	5,755
	Transportation	Downsizing vehicles	47	5,802
	Energy	Vending misers	41	5,843
	Energy	Brand Library remodel	24	5,867
	Water	Parks Department water efficiency efforts	20	5,887
	Energy	Energy efficient computers	15	5,902
	Transportation	Idle control policy	12	5,914
	Energy	Central Library - Energy Star computers	11	5,925
	Energy	Utilize existing 12 exterior LED lights	5	5,930
	Water	Low maintenance landscaping on City prop	2	5,932
	Energy	Install LED exit signs	1	5,933
	Cross-Cutting	Smart Grid applications within City operations	Not quantified	5,933
	Transportation	Replaced underused/older vehicles	Not quantified	5,933
	Urban Design	Green building for affordable housing projects	Not quantified	5,933
	Urban Design	Green building for City projects	Not quantified	5,933
	Waste	Reduce vehicle maintenance yard waste stream	Not quantified	5,933
	Waste	Replace paper towels with blow dryers	Not quantified	5,933
	Waste	Utilize recycle-in-place pavement	Not quantified	5,933
	Waste	Re-use Parks green waste	Not quantified	5,933
	Transportation	Adopt Green Fleet Policy	Not quantified	5,933
	PHASE 2	Transportation	Switch diesel to B10 biodiesel	765
Energy		Sustainability outreach/Smart Meter tech	1,018	7,716
Transportation		Installation of bike lanes and roadway markings	Not quantified	7,716
Energy		Facility natural gas energy audit and upgrades	Not quantified	7,716
Cross-Cutting		Green Purchasing Policy	Not quantified	7,716
Energy		Facility Energy Efficiency Policy	Not quantified	7,716
PHASE 3	Waste	Implement Zero Waste Plan*	35	7,751
	Transportation	Hybrid vehicles	83	7,834
	Transportation	Rideshare increased incentives/outreach	119	7,953
	Energy	Solar panels on 8 buildings	148	8,101
	Energy	Reflective roofing	165	8,266
	Transportation	Electric vehicles	222	8,488
	Energy	Energy upgrades on 8 buildings	349	8,837
	Transportation	Switch B10 biodiesel to B20 biodiesel	765	9,602
	Energy	Additional facility energy efficiency upgrades	1,018	10,620
	Energy	Additional sustainability outreach	1,018	11,638
	Urban Nature	Plant additional 7,750 trees by 2035	1,978	13,616
	Energy	LED street lights	2,507	16,123

←A

←B

Continued on next page

Energy	Increased Renewable Energy Portfolio by 2035	1,556	17,679
Water	Power generator water efficiency upgrade	Not quantified	17,679
Urban Nature	Enhance wildlife habitats and corridors	Not quantified	17,679
Water	Stormwater management and Low Impact Development	Not quantified	17,679
Environ Health	Reduce use of toxics	Not quantified	17,679
Cross-Cutting	Climate Adaptation Plan	Not quantified	17,679
Environ Health	Employee patronizing of downtown farmers' market	Not quantified	17,679



* Please see discussion in “Waste” section. Actual emission reductions are likely higher.

Note: The State of California implemented regulations to reduce GHG emissions from passenger vehicles, including a Low Carbon Fuel Standard and Clean Car Standard (AB 1493, Pavley, 2002). These regulations are estimated to reduce passenger vehicle related GHG emissions in our region by 25% by 2020 and an additional 10% by 2035. This may potentially have a significant positive impact on the City of Glendale’s reduction in municipal

operations GHG emissions. However, this document contains sustainability measures that are within the direct operational control of the City. Future vehicle turnover rate is uncertain and this plan does not otherwise consider State regulations within its GHG reduction measures. However, when the City conducts a new GHG inventory in the coming years, the inventory will reflect any GHG reductions that have occurred due to these regulations.

Climate Change Policy

The Policy Context of Climate Planning

California

Since 2005, the State of California has responded to growing concerns over the effects of climate change by adopting a comprehensive approach to addressing emissions in the public and private sectors. California's role as a global leader was solidified with the passage of the Global Warming Solutions Act of 2006 (AB 32).

AB 32

AB 32 requires the state to reduce its greenhouse gas emissions to 1990 levels by 2020. In December 2007, the California Air Resources Board (CARB) identified the 2020 limit, equal to statewide emissions in 1990, of 427 million MTCO_{2e} gases. It also requires the California Air Resources Board (CARB) to develop a policy plan for reaching AB 32 emissions reduction goals and to adopt and enforce regulations to implement the plan.

The resulting AB 32 Scoping Plan was adopted by CARB in December 2008. Among the many strategies articulated, it encourages local governments to reduce emissions in their jurisdictions by a degree commensurate with state goals. Given that identifying 1990 emissions levels can be difficult for some local governments, a reduction of approximately 15 percent below "current" levels (this language Greener Glendale Plan: Municipal Operations

was used in 2008) is given as a rough equivalency. However, AB 32 stopped short of setting mandatory targets for local government compliance. The state has not set an air quality threshold, though it has the authority to do so through the CARB. California's 35 air districts, which operate independent of the state and CARB, are responsible for enforcing state and federal air pollution reduction laws in their jurisdiction, including AB 32. The air districts can establish threshold levels that are enforceable within their jurisdiction, and some air districts have set significance thresholds, which trigger mitigation requirements. These thresholds vary by region. The South Coast Air Quality Management District, Glendale's regional air quality district agency, has not set for the region significance thresholds related to GHG emissions.

In addition, AB 32 identifies the following strategies that will impact local governance:

- Develop a California cap-and-trade program (currently in draft and scheduled to start in 2012, with compliance obligations in 2013)
- Expand energy efficiency programs.
- Establish and seek to achieve reduction targets for transportation-related GHG emissions.
- Expand the use of green building practices.
- Increase waste diversion, composting, and commercial recycling toward zero-waste.

- Continue water efficiency programs and use cleaner energy sources to move and treat water.
- Reduce methane emissions at landfills.
- Preserve forests that sequester carbon dioxide.

Important steps that have already been taken by the state include mandating stronger vehicle emissions standards (AB 1493, 2002), establishing a low-carbon fuel standard (EO # S-01-07, 2007), mandating a climate adaptation plan for the state (S-EO # 13-08, 2008), establishing a Green Collar Job Council, and establishing a renewable energy portfolio standard for power generation or purchase in the state. The state also has made a number of legislative and regulatory changes that have significant implications for local governments.

SB 97

SB 97 (2007) requires the Office of Planning and Research to maintain greenhouse gas planning guidelines for the California Environmental Quality Act (CEQA). In addition, CARB is tasked with creating energy-use and transportation thresholds for CEQA reviews which, if exceeded, would require local governments to account for greenhouse gas emissions when reviewing project applications.

CEQA

CEQA (California Environmental Quality Act) is a State statute that requires public agencies to evaluate the environmental impacts of discretionary development plans and projects in their jurisdictions. Pursuant to law, the state

Office of Planning and Research updated CEQA guidelines to require analysis of climate change in CEQA documents, which came into effect in March 2010. Many jurisdictions are finding that climate change impacts from local government activities are "significant" under CEQA, and are identifying emissions reductions targets and Climate Action as mitigation measures to reduce climate change impacts to less-than-significant levels.

The California Attorney General's Office provides guidance on when to prepare a Climate Action Plan if the local government intends it to serve as its primary CEQA mitigation strategy for its General Plan:

"If a city or county intends to rely on a Climate Action Plan as a centerpiece of its mitigation strategy, it should prepare the Climate Action Plan at the same time as its general plan update and EIR (Environmental Impact Report). This is consistent with CEQA's mandate that a lead agency must conduct environmental review at the earliest stages in the planning process and that it not defer mitigation. In addition, we strongly urge agencies to incorporate any Climate Action Plans into their general plans to ensure that their provisions are applied to every relevant project."³

Furthermore, a local government may elect to incorporate climate mitigation into its General

³ Climate Change, the California Environmental Quality Act, and General Plan Updates: Frequently Asked Questions from the California Attorney General's Office. 2011, Jan 26. <http://ag.ca.gov/globalwarming/pdf/CEQA_GP_FAQs.pdf>

Plan and fulfill CEQA through a fully integrated plan rather than separate efforts.

The Natural Resources Agency added a new provision, Section 15183.5 that became effective in March 2010, which provides a framework for plan-level greenhouse gas emissions reduction plans.⁴ An adequate plan must:

- Quantify existing and projected community-wide greenhouse gas emissions over a specified time period;
- Establish greenhouse gas emissions reduction targets over the life of the plan which, if achieved, would render the community's greenhouse gas emissions to be less than significant;
- Identify and analyze the greenhouse gas emissions resulting from specified activities in the community;
- Identify a suite of specific, enforceable measures that, collectively, will achieve the emissions targets;
- Establish a mechanism to monitor the plan's progress and to require amendment if the plan is falling short;
- Be adopted in a public process following environmental review.

Increasingly, local governments view this approach as a practical necessity, in part because state guidance specifies that lead agencies should consider the extent a project complies with a statewide, regional or local climate action plan in order to assess "significance".⁵ Notably, the guidance does not offer a guaranteed safe harbor for such projects – leaving continued uncertainty.

⁴ Ibid.

⁵ Natural Resources Agency. CEQA Guideline Number 15064.4.

Finally, a local government may claim exemption from CEQA through a Categorical Exemption, assuming that the criteria for exemption are met.⁶

State Renewable Energy Programs

California has the most aggressive Renewable Portfolio Standard (RPS) in the nation, requiring 33% renewable procurement by 2020 (20% average over years 2011 – 2013, 25% by 2016, 30% by 2020). Additionally, the state promotes solar uptake in the private sector with the California Solar Initiative (CSI) regulated by the CPUC's CSI proceedings.

AB 811

AB 811 (2007) authorizes all local governments in California, if they so choose, to establish special districts that can be used to finance energy efficiency, solar, or other renewable energy improvements to homes and businesses in their jurisdiction. Because of opposition by Fannie Mae and Freddie Mac, federal regulators have effectively put most of the local programs dealing with residential properties on hold. It may take additional federal legislation to get residential programs fully back on track, although programs designed for commercial properties face no similar roadblocks. A handful of programs in California are continuing but at the time of publication, uncertainty remains.

⁶ California Department of Transportation. Chapter 34 – Exemptions to CEQA. Accessed 2011, Jan 26. <<http://www.dot.ca.gov/ser/vol1/sec5/ch34ce/chap34.htm>>.

SB 375

SB 375 (2008) revises the process of regional transportation planning by metropolitan planning organizations (MPOs), which are governed by elected officials from local jurisdictions. The statute calls on CARB to establish regional transportation-related greenhouse gas targets and requires MPOs to develop a regional “Sustainable Communities Strategy” (SCS) of land use, housing, and transportation policies that will move the region towards its GHG target, or an “Alternative Planning Strategy” (APS) if the SCS cannot achieve the GHG reduction goals. The statute stipulates that transportation investments must be consistent with the Sustainable Communities Strategy and provides CEQA streamlining for local development projects that are consistent with the Strategy.

On Feb 15, 2011, the State of California Air Resources Board adopted Executive Order G-11-024 Relating to Adoption of Regional Greenhouse Gas Emission Reduction Targets For Automobiles and Light Trucks Pursuant to Senate Bill 375. The Executive Order approved proposed greenhouse gas reduction targets for various MPOs, including Southern California Association of Governments (SCAG)⁷. SCAG’s proposed GHG reduction targets are 8% by 2020 and 13% by 2035⁸.

⁷ http://www.arb.ca.gov/cc/sb375/executive_order_g11024.pdf

⁸ State of California, Air Resources Board. (2010). Resolution 10-31. http://www.arb.ca.gov/cc/sb375/eo_attachment.pdf: pg 134.

Other Benefits of Climate Protection Measures

In addition to addressing climate change, measures taken to reduce greenhouse gas emissions have other important benefits. The most obvious of these is the potential for significant cost savings. In 2009, The City of Glendale spent over \$9 million on energy to power buildings and fuel its vehicle fleet. Many of the measures in this plan “pay for themselves” quickly by reducing direct costs, such as fuel or energy used, and indirect costs such as maintenance. For instance, a “right-sized” vehicle fleet is less expensive to purchase and fuel, while also being less costly to maintain.

Other side benefits of climate change mitigation activities include enhanced energy security through reduction in total demand, and cleaner air through reduction of vehicle emissions.

Many of the actions identified here to mitigate GHG emissions will also help the City of Glendale to adapt to a changing climate. For example, extreme and prolonged heat waves can put considerable strain on the reliability of energy delivery in peak periods, possibly leading to service disruption during times when cooling is most needed. By increasing efficiency across the City of Glendale, such service disruptions are less likely and the City will be able to cope better with those situations.

Sample Cost-Benefit Analysis

Strategy Description	Quantity	Annual Energy Savings (kWh or gallons)	Annual Energy Cost Savings	GHG savings (MTCO2e)	Cost	Simple payback (Years)	Note:
Energy Star Computers	70 computers	14,070	\$20,964	11	\$0	0	Incremental cost
Downsize Vehicles	50	4,941	\$20,256	47	\$0	0	Incremental cost
Idle-control Policy	200	1,272	\$5,028	12	\$0	0	
LED Exit Signs	100	27,200	\$40,528	20	\$5,700	0.1	
Reflective Roofing	234,303 s.f.	202,438	\$310,020	165	\$58,576	0.2	Incremental cost
HVAC EE Upgrades	594,964 s.f.	410,177	\$611,164	308	\$916,746	1.5	
Electric Vehicles	35	23,606	\$99,029	222	\$346,602	3.5	Incremental cost
Hybrid Vehicles	50	8,808	\$36,114	83	\$126,399	3.5	Incremental cost
EE Upgrades on 8 Bldgs	18 upgrades	687,679	\$102,152	349	\$542,494	7.5 avg	Simple payback is 3 - 17 depending on measure
Brand Library EE Upgrades	5 upgrades	46,679	\$7,779	24	\$64,435	9 avg	Simple payback is 6 - 12 depending on measure
Tree Planting	3,400	23,800	\$35,462	868	\$761,600	21	

Note: Cost data is not available for the other implementation programs listed in this report.

Sustainability Focus Areas

Eight Focus Areas

The Greener Glendale Plan addresses each of the following sustainability focus areas.

Urban Design
Waste
Energy
Urban Nature
Water
Transportation
Environmental Health
Cross-Cutting Approaches

Each focus area explores a series of objectives with supporting strategies. An “Objective” is a goal, end result, or target that supports a focus area, and a “Strategy” is a means of realizing the objective.





Cross-Cutting Objectives & Strategies

Several strategies have been included in the Cross-Cutting Strategies focus area because they do not clearly fall within one topic area, and because they are considered integral to successful implementation of the other seven focus areas.

Energy efficiency is a critical and common component of this plan. Energy efficiency strategies are woven into all of the focus areas.

Emissions Reductions

Calculating expected emissions reductions for each objective requires making assumptions about degree of implementation, technology, and individual behavioral changes several years into the future. The uncertainty associated with these assumptions makes it difficult to assign exact reduction totals to each objective or strategy. To address this uncertainty and provide a simple but useful reference for reduction potential, a series of symbols and percentage ranges has been devised to represent the emission reductions associated with each objective and its strategies:

Symbol	GHG Reduction Target
	0% - 10%
	11% - 20%
	21% - 30%
	31% - 40%

Our total GHG reduction targets are 6,352 MTCO_{2e} by 2020, and an additional 4,834 MTCO_{2e} by 2035.

New and Existing Strategies

This document includes a combination of existing policies and programs as well as new ideas based on best practices from around the country. Whether a strategy is new or existing is noted in the strategy heading.

Climate Change Adaptation

With the growing recognition that climate change is already underway and science that suggests additional impacts are inevitable despite mitigation efforts, adaptation planning is rapidly becoming an important policy focus in California, the United States, and internationally.

Although 2011 has been an unusually high rainfall year, historically California is already experiencing the effects of climate change. It has seen increased average temperatures, changes in temperature extremes, reduced snow pack in the Sierra Nevada, sea-level rise, and ecological shifts. These trends are expected to continue, and extreme weather events, such as heat waves, droughts, and floods, are expected to intensify.

In addition to these impacts, Glendale's geography creates specific local conditions that are sensitive to climate change:

- 1) Sixty-two percent of Glendale's land area is within a high fire hazard area. This is largely due to the hilly terrain as well as the fact that

many of the City's residential neighborhoods extend into the urban-wildland interface. These areas are also subject to severe mudslide danger for years following wildfires.

- 2) Four major freeways (Golden State Freeway [Interstate 5], Foothill Freeway [Interstate 210], Glendale Freeway [California State Route 2], and the Ventura Freeway [California State Route 134]) pass through our city of 30 square miles, creating a higher than average susceptibility to freeway air pollution.
- 3) Glendale rests near the back of the South Coast Air Basin, against the San Gabriel and Verdugo Mountains, which are at the terminus of the basin's daytime airflows. Due to the high population density and automobile dependency of Southern California, the region's air pollution level is notoriously high. This is exacerbated by the topography, wind, and temperature patterns of the air basin, which result in the pollution becoming trapped within the basin.

Heat waves exacerbate poor air quality and high fire hazard conditions, which will be a direct challenge for the City of Glendale and its emergency response teams. Higher temperatures will lead to higher electrical demand, and reduced snow pack in the Sierra's will further strain Glendale's water supply.

Although the purpose of this document is not to comprehensively address climate adaptation strategies, each objective is noted as to whether or not it supports climate change adaptation. The "Cross-Cutting Approaches" section

includes a recommendation to complete a Climate Adaptation Plan.

Strategy Implementation Details

Each strategy has associated implementation actions, indicators to track progress, and timelines. Implementation timelines are broken down into four phases:

- Short-term (e.g., 2011-2013)
- Mid-term (e.g., 2014-2016)
- Long-term (e.g., 2017-2020)
- 2035 Goal

These periods sync with the 2020 target identified in AB 32, as well as the 2020 and 2035 targets identified in connection with the region's implementation of SB 375.

For each strategy, the City of Glendale has assigned performance targets that will provide guidance on its overall progress toward its objectives. These are communicated in the Progress Indicator Timelines for each strategy.

Urban Design

Urban Design covers the arrangement and design of buildings, public spaces, transportation, and other components that make up urban spaces. The City opened the new Police Building in 2004, but generally has not been building new general operations facilities. However, the City continuously develops new parks and community service facilities, as well as affordable housing projects. These facilities are only included in the City's municipal operations GHG inventory if the City maintains operational control after the facility is constructed. The City does not maintain operational control of affordable housing projects post-construction.

Although the City does not maintain and operate all projects it develops, it still has authority over those projects while they are being designed and constructed. This is where the City has an opportunity to apply urban design strategies to accomplish improved sustainability.

On June 7, 2011, the City adopted a Green Building Standard with requirements exceeding those in the State's mandatory CAL Green Code. These additional requirements will apply to all future City development projects, and include the following:

- Extends applicability of CAL Green to residential buildings over 3-stories
- Exceed California Energy Code requirements by 15%
- Reduce baseline water usage by 20%
- Radiant roof barriers shall be installed
- Gas-fired tankless water heaters shall have an energy factor of at least .80
- Gas-fired storage-tank type water heaters shall have an energy factor of at least 0.61
- Buildings shall be "solar ready"
- 20% permeable paving required
- High-efficiency gas-fired space heating equipment required
- High-efficiency air conditioning equipment required
- Increased natural lighting and ventilation
- Increased green building standards for homes larger than 5,000 square feet

For four years, the City Housing Department has developed affordable housing projects exceeding energy efficiency requirements by at least 15%. The City's new Green Building Standard now makes this mandatory.

The Community Services & Parks Department applies numerous sustainability approaches to

development projects, including mixed-use, water conservation measures, energy conservation, and use of renewable energy. Recent projects have been built to LEED certified standards.

In 2006, the City created the Downtown Specific Plan (DSP), which focuses development in the downtown area along transit corridors and existing public service infrastructure. Although the DSP primarily affects private development, it also directs the location of city services and affordable housing to the city center. This supports State and regional agency regulations and efforts to focus urban growth in existing

developed areas. Doing so reduces environmental impacts by decreasing dependence on vehicular transportation, reducing demand for provision of new infrastructure, and preserving natural resources and open space. The DSP also encourages “mixed-use” development, which further reduces demand for vehicular transportation and added infrastructure.

The following objectives support ongoing efforts to encourage sustainable buildings and urban places within Glendale.

Objective	Supports Adaptation	Reduction Potential
UD1 – Continue existing efforts to encourage affordable housing development projects to exceed Glendale’s Green Building Standards, such as by utilizing additional measures in the Green Point Rated and LEED for Homes checklists.	Y	Not quantified
UD2 – Continue existing efforts to encourage all City renovation or construction projects to exceed Glendale’s Green Building Standards, such as by utilizing solar energy, low-VOC paints, obtaining LEED (or equivalent) certification, etc.	Y	Not quantified
UD3 – Continue to implement Southern California Association of Governments Compass Blueprint strategies in Glendale to coordinate with regional efforts to increase sustainability and livable environments.	Y	Not quantified

Objective UD1 – Continue existing efforts to encourage affordable housing development projects to exceed Glendale’s Green Building Standards

Strategy UD1-A	Complete Geneva Habitat for Humanity Affordable Housing Project (5 units) to Green Point Rated standards			-
Status: Existing	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	Complete construction	Complete	-	-

Strategy UD1-B	Complete Doran Gardens Affordable Housing Project (60 units) to Green Point Rated standards			-
Status: Existing	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	Complete construction	Complete	-	-

Strategy UD1-C	Complete Vassar City Lights Affordable Housing Project (72 units) to Green Point Rated standards - Energy efficiency exceeds existing requirements by at least 40%, project includes solar panels			-
Status: Existing	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	Completed	-	-	-

Strategy UD1-D	Complete Gardens on Garfield Affordable Housing Project (30 units) to Green Point Rated standards			-
Status: Existing	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	Completed	-	-	-

Strategy UD1-E	Complete Glendale City Lights Affordable Housing Project (68 units) to Green Point Rated standards – project includes solar panels			-
Status: Existing	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	Completed	-	-	-

Objective UD2 – Continue existing efforts to encourage all City renovation or construction projects to exceed Glendale’s Green Building Standards

Strategy UD2-A	Complete energy efficiency upgrades on the prior Police Building, including HVAC upgrades, energy and water efficiency upgrades, reflective roofing, LED lighting, and window replacements.			-
Status: Existing	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	Complete construction	Complete	-	-

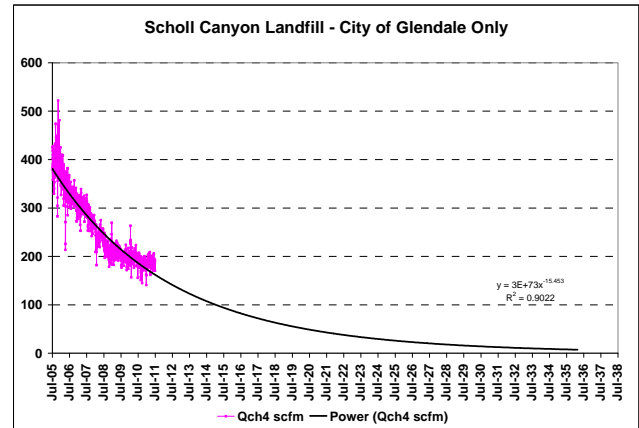
Objective UD3 – Continue to implement Southern California Association of Governments Compass Blueprint strategies in Glendale to coordinate with regional efforts to increase sustainability and livable environments

Waste

The City of Glendale operates the inactive part of Scholl Canyon Landfill (SCLF). The active part is operated by Los Angeles County Sanitation Districts. Only the emissions from the inactive part of the landfill are included in the City of Glendale municipal operations GHG inventory.

Although the inactive part of SCLF is closed (no new waste is being added to the landfill), the existing waste is still actively decaying. The landfill has a comprehensive gas collection system, which collects methane gas (a powerful GHG) generated by decaying trash and routes it to the local utility for use in electricity production. However, a small percent of the gas escapes this collection system. These “fugitive” emissions are included in the GHG inventory. SCLF’s gas collection efficiency is estimated at 95%. See Appendix I for further information.

Although the landfill is closed, its gas emissions fluctuate due to numerous factors, including temperature, moisture, irrigation, rainfall, collection system failure or upgrades, soil cover cracking, and more. Despite these fluctuations, the SCLF methane emissions are on a long-term downtrend.



Source: LA County Sanitation District

The City also operates a landfill at Brand Park, which is not open to the public. However, this landfill contains inert material (not more than 5% live material) and so does not produce significant emissions. Currently, the City uses the landfill to recycle inert material into crushed miscellaneous base for reuse in Public Works projects.

In addition to landfill gas emissions, the inventory includes estimated emissions due to employee-generated waste. Although that waste has not yet begun to decay and emit methane gas, the inventory includes an estimate of what those emissions would be.

A third important but generally unaccounted for type of waste emission is the “embodied” energy in products consumed. The goods we consume are associated with GHG emissions well before they end up in the landfill. Throughout their

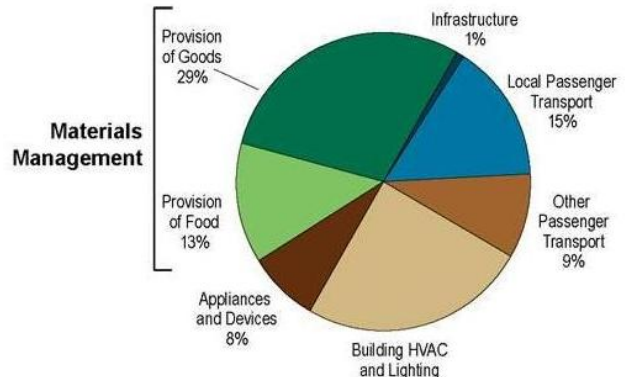
lifecycle, from raw material acquisition, to manufacturing and transport, to waste management, GHG emissions are being released into the atmosphere. Even the choices made about how goods are used or consumed affect how much GHGs end up in the air. When goods are reused or recycled, it prevents the need to extract new raw materials and manufacture new goods, and can even prevent the need to transport those new goods (as with the Brand Park inert material recycling facility), thereby preventing new GHG emissions.

The technology and data availability to calculate the lifecycle emissions from the products consumed are still in their developmental stages. The GHG calculations used for this inventory are based on municipal operations waste generation totals, and include emissions from waste management only. They do not account for the embodied energy of the products the City consumed.

The Greener Glendale Plan GHG inventory shows the City of Glendale’s waste generated GHGs accounting for less than 1% of total emissions. If the life-cycle emissions inventory approach were used, product creation, delivery, consumption, and waste management would

account for closer to 42% (see pie chart), or 49% if emissions from goods created overseas were included.

**Systems-Based GHG Inventory
US (Domestic) Emissions, 2006**



Source: United States Environmental Protection Agency, Region 10 (Pacific Northwest) West Coast Climate & Materials Management Forum


In future Glendale GHG inventories, life-cycle emissions from goods consumption may be included.

This chapter focuses on opportunities to reduce waste, reuse materials, and recycle what cannot be reused.

Objective	Supports Adaptation	Reduction Potential
WS1 – Adopt and implement a Zero Waste Plan to work towards achieving a 90% landfill diversion rate by 2030	N	Not quantified, but probably significant
WS2 – Continue existing efforts to reduce waste and use of energy-intensive products	Y	Not quantified

Objective WS1 – Zero Waste Plan

The Zero Waste Plan (under review by City Council) outlines how the City of Glendale can increase its diversion rate from landfills to 90% by 2030. It explores strategies such as Mandatory Commercial Recycling, Recovering Energy and Compost from Organic Discards, an Extended Producer Responsibility Resolution and assistance to businesses, a Commercial Waste Reduction Initiative, and a citywide ban on stores distributing free single-use plastic shopping bags.

Strategy WS1	Zero Waste Plan		 (According to current inventory accounting methods)
Status: In-Progress	Implementation Actions Needed:	Progress Indicator Timeline	
		2020	2030
Not Funded	Adopt Plan, obtain funding.	70%	90%

Objective WS2 – Continue existing efforts to reduce waste creation and use of energy-intensive products

Strategy WS2-A	Reduce vehicle maintenance yard waste stream – Extend maintenance intervals to reduce waste stream of oil, coolant, and oil filters.		Not quantified
Status: Existing	Implementation Actions Needed:	Progress Indicator Timeline	
		2011 - 2013	2014 - 2016
No new funding needed	Continue existing efforts	100% of vehicles	-

Strategy WS2 -B	Replace paper towels with energy efficient blow dryers in all City bathrooms		Not quantified
Status: In-Progress	Implementation Actions Needed:	Progress Indicator Timeline	
		2011 - 2013	2014 - 2016
No new funding needed	Continue existing efforts	100% replacement	-

Strategy WS2 -C	Utilize recycle-in-place pavement in street improvement projects (street asphalt is removed, reprocessed, and reapplied on site). Three projects will utilize this technology starting in 2012.		Not quantified
Status: In-Progress	Implementation Actions Needed:	Progress Indicator Timeline	
		2011 - 2013	2014 - 2016
No new funding needed	Continue existing efforts	3 projects	TBD







Strategy WS2 -D	Re-use Community Services and Parks green waste – Community Services and Parks re-uses their green waste by mulching it and using it for various groundcover applications		Not quantified
Status: In-Progress	Implementation Actions Needed:	Progress Indicator Timeline	
		2011 - 2013	2014 - 2016
No new funding needed	Continue existing efforts	New projects as determined feasible	TBD

Energy

Energy consumption (electricity and natural gas) by facilities and equipment (including public lighting and water transport facilities) within the City of Glendale account for 58% of the City’s GHG emissions. Glendale Water and Power (GWP) is working hard to increase the percentage of electricity generated from renewable sources, and funded numerous energy efficiency programs throughout the past two decades (see “Sustainability Achievements” chapter). In fact, the City achieved an overall

facility energy use reduction from 2004 to 2009. Several energy efficiency measures currently being implemented are funded by GWP.

Most of the strategies to reduce the City’s GHG emissions are in this chapter. In addition to the City’s past energy saving accomplishments, it has additional measures already in place, funded, or planned. These, plus additional recommended measures are listed in this chapter and will have the biggest impact on the City’s ability to meet its GHG reduction goal.

Objective	Supports Adaptation	Reduction Potential
E1 – Increase Renewable Energy Portfolio to 33% by 2020	Y	
E2 – Achieve additional 12% reduction in facility energy use by 2020	Y	
E3 – Upgrade City equipment/infrastructure for increased energy efficiency by 2020	Y	
E4 - Reduce dependence on imported water and the related energy cost of transporting it to Glendale	Y	
E5 – Further increase Renewable Energy Portfolio to State required targets for 2035	Y	
E6 – Achieve additional 11% reduction in facility energy use by 2035	Y	


Objective E1 – Increase Renewable Energy Portfolio to 33% by 2020

California Senate Bill X1 2 requires utilities to achieve 33% of retail sales from renewable energy by 2030. Glendale Water and Power (GWP) needs an additional 16% renewable energy to meet this goal. GWP has consistently remained ahead of schedule in meeting its REP targets. Prior to SBX1 2, GWP voluntarily set its own REP targets.





Objective E2 – Achieve additional 12% reduction in facility energy use by 2020





Strategy E2-A	Accomplish 5% electricity savings in facilities using sustainability outreach and Smart Meter technology			
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Not funded	Obtain funding or allocate staff time, Coordinate between City Departments	1%	2.5%	5%


Strategy E2-B	Establish facility energy efficiency policy that provides employees guidelines, instructions, and requirements for efficient use of the facility, e.g. lights, computers, etc.			Not quantified
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Not funded	Obtain funding or allocate staff time, Coordinate between City Departments	Complete	-	-


Strategy E2-C	HVAC Upgrades on 23 buildings – HVAC upgrades were completed on 23 major City buildings and included replacement of older units with newer units, equipment energy efficiency upgrades, and installation of devices that transfer energy use to off-peak hours.			
Status: Done	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	N/A (Done)	N/A	N/A	N/A


Strategy E2-D	Improve water pumping efficiency – two water station pumps are being replaced, resulting in 94,000 kWh of annual energy savings			
Status: Done	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	N/A (Done)	N/A	N/A	N/A


Strategy E2-E	Brand Library Remodel (see Appendix G for details)			
Status: Planned	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	Continue existing efforts	Complete	-	-


Strategy E2-F	Install 6 building LED exit signs			
Status: Done	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	N/A (Done)	N/A	N/A	N/A


Strategy E2-G	Energy upgrades on 8 buildings according to existing energy audit recommendations (Appendix G)			
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Not funded	Obtain funding, identify contractor.	-	50% upgrades completed	100% upgrades completed


Strategy E2-H	Install reflective roofing on all City buildings			
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Not funded	Obtain funding, identify contractor.	-	50% upgrades completed	100% upgrades completed

Strategy E2-I	Find installation project for 12 unused LED lights.			
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	Find project, install	Complete	-	-

Objective E3 – Upgrade City equipment/infrastructure for increased energy efficiency by 2020				


Strategy E3-A	Upgrade 70 Central Library computers to Energy Star models			
Status: Done	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	N/A (Done)	N/A	N/A	N/A


Strategy E3-B	Upgrade 51 City vending machines for increased energy efficiency			
Status: Done	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	N/A (Done)	N/A	N/A	N/A


Strategy E3-C	Upgrade 100 City computers to Energy Star models			
Status: Done	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	N/A (Done)	N/A	N/A	N/A


Strategy E3-D	Install energy management system for water transport facilities to support high efficiency operations managed for reduced peak energy use			Not quantified
Status: Ongoing	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	Continue existing efforts	Complete	N/A	N/A


Objective E4 – Reduce dependence on imported water and the related energy cost of transporting it to Glendale	

Strategy E4-A	Develop local groundwater well on Foothill Boulevard			
Status: In-Progress	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	Continue existing efforts	Complete	N/A	N/A


Strategy E4-B	Develop local groundwater well at Rockhaven Sanitarium site			
Status: In-Progress	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	Continue existing efforts	Complete	N/A	N/A


Objective E5 – Further increase Renewable Energy Portfolio to State required targets for 2035	
<p>Currently, there are no State standards for REP above 33%. However, based on historical trends, this is likely to occur. GWP has consistently remained ahead of schedule in meeting its REP targets. This objective will be pursued if the Glendale City Council and/or State Regulations mandate additional increases in REP percentages.</p>	


Objective E6 – Achieve additional 11% reduction in facility energy use by 2035	

Strategy E6-A	Replace all street lights with LED lamps			
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2035 Goal		
Not funded	Identify product, obtain funding	100% of lights replaced		

Strategy E6-B	Perform natural gas energy audit on all City facilities as well as suggested upgrades	Not quantified
Status: New	Implementation Actions Needed:	Progress Indicator Timeline
		2035 Goal
Not funded	Obtain funding, identify contractor.	Audit and upgrades complete

Strategy E6-C	Solar panels on 8 buildings as identified in existing energy audit recommendations	
Status: New	Implementation Actions Needed:	Progress Indicator Timeline
		2035 Goal
Not funded	Obtain funding, identify contractor.	8 buildings completed

Strategy E6-D	Additional 5% energy savings due to education and outreach	
Status: New	Implementation Actions Needed:	Progress Indicator Timeline
		2035 Goal
Not funded	Obtain funding, coordinate with departments.	5%

Strategy E6-E	Improve water pumping and pipe efficiency – the City is conducting ongoing water pump efficiency testing and upgrades, and 70,000 linear feet of pipe upgrades. Estimated time of completion for entire effort: 2022.	
Status: Existing	Implementation Actions Needed:	Progress Indicator Timeline
		2035 Goal
Partially funded	This will be implemented according to funding availability	100% completion

Measures for Future Consideration

- Solar panels on bus shelters – A study needs to be conducted to determine the physical feasibility of installing solar panels on bus shelters in Glendale. Funding (e.g. grant funds) would need to be obtained to pursue this measure. As a

note, most bus shelters are operated and maintained by an external agency.

- Green roofs – a feasibility study is required to determine the workability of this application on City facilities’ roofs, and the necessary irrigation that would be required.

Urban Nature

Cities are embedded within the natural environment. Because of the interconnectedness and interdependency of humans and nature, it is important to preserve and enhance natural areas, and ensure humans have access to and understanding of it.

Urban nature is affected by climate change. Environmental changes due to climate change (e.g. increased temperatures, wildfires, reduced water) threaten habitat for wildlife. At the same time, urban nature (e.g. trees, plants) help to reduce ground temperatures.

The City supports urban nature primarily through the preservation of open space, provision of park space, and programs to connect people to nature. For decades, the City has proactively purchased large tracts of undeveloped land in hillside areas for public open space purposes. This has resulted in preservation of wildlife corridors, wildlife habitat, and areas for groundwater recharge. The City also protects indigenous trees through the Indigenous Tree Ordinance (GMC 12.44).

The City also continuously develops park space in Glendale, and currently provides over 30 parks throughout the city.

The City Community Services and Parks Department operates programs to connect the community of Glendale to nature, including educational programs and workdays at Deukmejian Park to remove invasive species and restore indigenous species.

Trees are a key component of urban nature. They provide wildlife habitat, and provide many benefits to humans, including beauty, shade, fresh air, and support for the groundwater system. Trees, especially once they mature, are a defining character of design and aesthetic in neighborhoods. They are even associated with higher property values.⁹

Modern development consists of large amounts of heat absorbing surfaces, such as dark rooftops, parking lots, and streets. This has been associated with increases in downtown temperatures of nearly 1°F per decade.⁷ This in turn increases energy demands for cooling (and subsequent greenhouse gas emissions), water,

⁹ *Livable Communities and Urban Forests.* Local Government Commission, 2008.



smog levels, and human discomfort and disease.

Neighborhoods with well-shaded streets can be up to 10°F cooler than neighborhoods without street trees. Three well-placed trees around a building can lower air conditioning bills by up to 30%, and windbreak trees can save up to 25% on winter heating costs.⁷

Trees also remove significant amounts of pollutants from the air, and help capture rainwater, redistributing it back into the groundwater system.

The ability of trees to support a cooler environment, protect our water sources, and clean the air makes them an important factor in how well we will be able to adapt to climate change.

Trees provide wildlife habitat and nature for humans, but so can gardens and landscaping. To the degree gardens and landscapes support native wildlife, they are an important part of supporting the natural environment in which the city is embedded.


Objective	Supports Adaptation	Reduction Potential
UN1 – Update Urban Forest Management Plan	Y	
UN2 – Plant 3,700 trees by 2020	Y	
UN3 – Plant additional 8,200 trees by 2035	Y	
UN4 – Explore opportunities to enhance wildlife habitat and preserve/restore wildlife corridors	Y	Not quantified


Objective UN1 – Update Urban Forest Management Plan


Public Works plans to update the Urban Forest Management Plan within the next couple of years. This plan will formalize policies regarding tree-care standards, planned strategies for tree species’ age and diversity, density objectives and site appropriateness, strict criteria for tree removal, criteria for tree species designation and inclusion in the Designated Street Tree List for all city streets, guidelines for dealing with tree/hardscape conflict and construction management, and the inventory administration process.


Objective UN2 – Plant 3,700 trees by 2020

The Community Services and Parks and Public Works Departments currently conduct annual tree plantings on a regular schedule. These trees will be planted as part of ongoing efforts.





Strategy UN2 - A	Public Works Department - Plant 2,500 trees by 2020.			
Status: Existing	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
No new funding needed	Continue existing efforts	536	1,072	1,608


Strategy UN2 - B	Public Works Department - Plant 300 indigenous trees by 2020. In addition to regular tree plantings, the City funded annual planting of indigenous trees. Public Works anticipates being able to plant from 30 - 50 trees per year.			
Status: Existing	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
No new funding needed	Continue existing efforts	100	200	300

Strategy UN2 - C	Community Services and Parks Department - Plant 900 trees by 2020. Community Services and Parks plants approximately 100 trees annually on Arbor Day.			
Status: Existing	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
No new funding needed	Continue existing efforts	300	600	900

Objective UN3 – Plant additional 8,200 trees by 2035				
The Community Services and Parks and Public Works Departments currently conduct annual tree plantings on a regular schedule. These trees will be planted as part of ongoing efforts.				

Strategy UN3 - A	Public Works Department - Plant 6,250 trees by 2035			
Status: Existing	Implementation Actions Needed:	Progress Indicator Timeline		
		2035		
No new funding needed	Continue existing efforts	6,250		

Strategy UN3 - B	Public Works Department - Plant 450 indigenous trees by 2020. In addition to regular tree plantings, the City funded annual planting of indigenous trees. Public Works anticipates being able to plant from 30 - 50 trees per year.		
Status: Existing	Implementation Actions Needed:	Progress Indicator Timeline	
		2035	
No new funding needed	Continue existing efforts	450	

Strategy UN3 - C	Community Services and Parks Department - Plant 1,500 trees by 2035. Community Services and Parks plants approximately 100 trees annually on Arbor Day.		
Status: Existing	Implementation Actions Needed:	Progress Indicator Timeline	
		2035	
No new funding needed	Continue existing efforts	1,500	

Objective UN4– Explore opportunities to enhance wildlife habitat and preserve/restore wildlife corridors

Wildlife habitat is defined as habitat that provides shelter, food, water, and a chemical free environment for wild animals. Wildlife corridors allow a continuous natural path for animals to travel, particularly ones that roam by nature. Wildlife habitat in Glendale includes native oak woodlands, chaparral, and coastal sage scrub. Although the City maintains wildlife habitat and corridors through existing efforts, it is not formalized policy. This objective encourages staff to deliberately incorporate these concepts into existing local and regional efforts.

Measures for Future Consideration

- Green roofs – please see discussion in the Energy section.

Water

Water has become an increasingly important component of sustainability efforts. California's water supply is already under stress from drought, increased demand from population growth, and demand from areas with drier climates.⁷

Additionally, climate change is profoundly affecting California's water resources, as evidenced by changes in snow pack, sea level, and river flows. These changes are expected to continue into the future and more of our precipitation will likely fall as rain instead of snow. This potential change in weather patterns will exacerbate flood risks and add additional challenges for water supply reliability.¹⁰

Additionally, water delivery requires significant energy use. In year 2009, 21% of the City's (government) GHG emissions were due to the consumption of energy to transport water to the community of Glendale.

Because the City's water supply is sensitive to the previously mentioned environmental changes, it is critical that the City reduce its

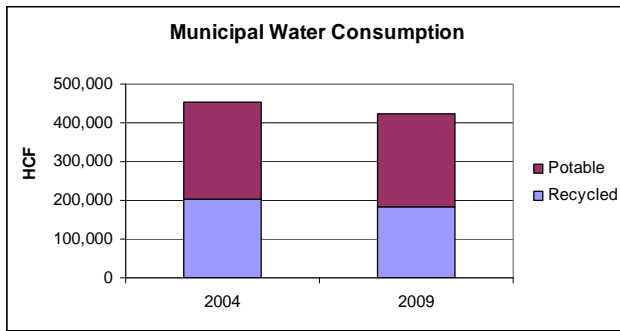
dependence on water, particularly from external sources.

The Glendale 2010 Urban Water Management Plan describes efforts to increase reliance on local water sources, and some of these measures are included in the "Energy" section of this report (because they reduce energy use from water import).

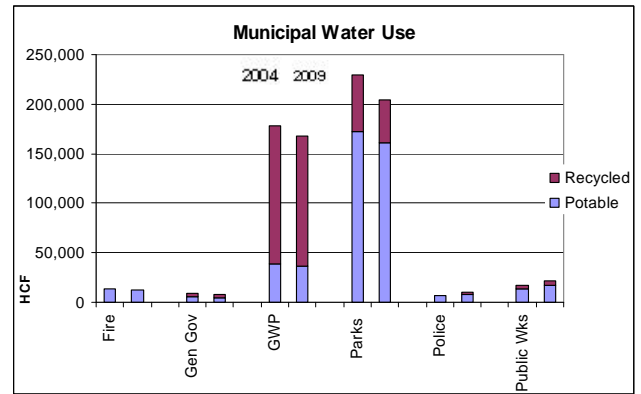
More than 40% of the water used by the City in both 2004 and 2009 was recycled water. In addition to utilizing recycled water, the City also implemented water saving measures, resulting in an overall 7% reduction in water consumption.

The Community Services and Parks Department implemented numerous water conservation measures, accomplishing an 11% reduction for their department. Public Works and Glendale Water and Power partnered to achieve reductions for most of the remaining City facilities. GWP also upgraded their power plant for increased energy and water efficiency.

¹⁰ *20x2020 Water Conservation Plan*. California Department of Water Resources, et al., 2010
Greener Glendale Plan: Municipal Operations



This chart illustrates the overall reduction in water consumption, and the use of recycled water.





This chart illustrates water consumption by department. Most of the water used by GWP and Community Services and Parks is to serve the community of Glendale with power generation, and irrigation and water supply at community centers and parks.


Objective	Supports Adaptation	Reduction Potential
WT1 - Achieve additional water use reductions by Community Services and Parks Department	Y	
WT2 - Achieve additional water use reductions by GWP Department	Y	
WT3- Achieve additional water use reductions by Facilities Management maintained facilities	Y	
WT4- Implement stormwater management best practices to protect water quality and replenish local groundwater sources	Y	Not quantified


WT1 - Achieve additional water use reductions by Community Services and Parks Department	
Most of the following measures began implementation between late 2008 and 2010, with implementation intensifying over time and continuing into the present.	


Strategy WT1-A	Irrigate according to weather – Community Services and Parks utilizes rain sensors and shuts off irrigation controllers during humid and cold weather, watering manually at signs of stress only.			
Status: Done	Implementation Actions Needed:	Progress Indicator Timeline		
Funded		2011 - 2013	2014 - 2016	2017 - 2020
	N/A (Done)	N/A	N/A	N/A


Strategy WT1-B	Reprogram irrigation controllers - Community Services and Parks reprogrammed irrigation controllers to reduce watering times (and therefore usage) by 10%, and also utilizes incremental watering schedules to prevent runoff and conserve water.			
Status: Done	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	N/A (Done)	N/A	N/A	N/A


Strategy WT1-C	Low-water use landscaping - Community Services and Parks installed an acre of drought tolerant landscaping in numerous parks, including mulch in low use turf areas, shrub beds, planters, tree wells, etc. Community Services and Parks is continuing efforts to identify further opportunities for low-water use landscaping installations.			
Status: Done	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	N/A (Done)	N/A	N/A	N/A


Strategy WT1-D	Install smart irrigation control system – This technology is being explored by Community Services and Parks and will be utilized once a feasible (cost-effective) system is identified.			
Status: Done	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Not Funded	Identify system, obtain funding, purchase and install.	TBD	TBD	N/A

Strategy WT1-E	Adjust irrigation watering schedule – Community Services and Parks is monitoring and adjusting as appropriate irrigation watering schedules to conserve water			
Status: Done	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	N/A (Done)	N/A	N/A	N/A


Strategy WT1-F	Use reclaimed water for irrigation – Community Services and Parks is using reclaimed water for irrigation where available			
Status: Done	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	N/A (Done)	N/A	N/A	N/A


Strategy WT1-G	Regular inspections for water saving opportunities – Community Services and Parks routinely checks the irrigation systems, and checks parks for dry, brown areas or areas with standing water in order to maintain effectiveness and conserve water			
Status: Done	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	N/A (Done)	N/A	N/A	N/A


Strategy WT1-H	Improve effectiveness of irrigation – Community Services and Parks aerates and cores turf areas to allow better water infiltration into the soil and to maximize watering efficiency and reduce surface water run-off			
Status: Done	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	N/A (Done)	N/A	N/A	N/A

Strategy WT1-I	Implement tree trimming practices that support water conservation – Community Services and Parks allows trees in remote areas of parks to retain their low growing limbs and branches in order to assist moisture retention and cooling.			
Status: Done	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	N/A (Done)	N/A	N/A	N/A


Strategy WT1-J	Waterless urinals – Community Services and Parks installed 8 waterless urinals in 4 parks, and plans to install in 2 additional parks per year			
Status: Done	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	Continue existing efforts	6	12	18


Strategy WT1-K	Install water saving products – Community Services and Parks utilizes drip irrigation where appropriate, precision spray nozzles, rain sensors, and other equipment to reduce water consumption.			
Status: Done	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	Continue existing efforts	N/A	N/A	N/A

WT2- Achieve additional water use reductions by GWP Department				

Strategy WT2-A	Replace 5 power generation units for increased water efficiency (roughly 50% increased efficiency)			
Status: Planned	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Not Funded	Obtain funding	1	3	5

WT3- Achieve additional water use reductions by Facilities Management maintained facilities				

Strategy WT3-A	Accomplish 5% water savings in facilities using sustainability outreach and Smart Meter technology			
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
No new funding needed	Coordination between departments	1%	2.5%	5%

Strategy WT3-B	Monitor technology for viable water saving equipment upgrade opportunities and pursue those identified			
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
No new funding needed	Continue existing efforts	-	-	-

WT4- Implement stormwater/runoff management best practices to protect water quality and replenish local groundwater supplies – The following measures have the potential to reduce greenhouse gas emissions by increasing local water supply (reducing energy required to import water) and by increasing urban nature (which absorbs GHGs and reduces heat).	Not quantified

Strategy WT4-A	Adopt ordinance requiring use of “Low-Impact Development” - Note: The City adopted Low-Impact Development (LID) ¹¹ guidelines, and is evaluating enactment of an ordinance requiring use of LID in City and community projects. The City’s Municipal Stormwater Permit ¹² will be renewed in 2012 and will likely include LID provisions. If not, the City plans to adopt its own.			
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Not funded	Draft ordinance, gain support from City Council, adopt.	Ordinance adopted	-	-

Note regarding the following measures: The City currently preserves parkways, adds tree wells where feasible, and takes advantage of clear opportunities to utilize landscaping and permeable surfaces. However, to implement a significant number of projects like these would require special studies to determine feasibility, and address certain technical issues such as limited availability of space in public rights-of-way. The City currently has several storm water catch basins and hillside debris basins, however, it does not seem immediately feasible to utilize these for water re-use. These and other applications would need to be further explored for feasibility.

Strategy WT4-B	Explore opportunities to replace reflective/impervious surfaces with landscaping.			
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Not funded	Obtain funding, coordinate with Public Works to conduct feasibility study, explore potential applications	TBD	-	-

¹¹ LID is an approach to land development (or re-development) that works with nature to manage stormwater as close to its source as possible. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treat stormwater as a resource rather than a waste product (www.EPA.gov).

¹² The Municipal Storm Water Permitting Program regulates storm water discharges from “municipal separate storm sewer systems” (“MS4s”). The permits require the discharger to develop and implement a Storm Water Management Plan/Program with the goal of reducing the discharge of pollutants to the maximum extent practicable (www.SWRCB.ca.gov).

Strategy WT4-C		Explore opportunities to install rain gardens, rain water capture/ biofiltration applications, and bioswales		
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Not funded	Obtain funding, coordinate with Public Works to conduct feasibility study, explore potential applications	TBD	-	-

Strategy WT4-D		Explore opportunities to utilize permeable/porous paving (as technology and installation techniques improve)		
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Not funded	Obtain funding, coordinate with Public Works to conduct feasibility study, explore potential applications	TBD	-	-

Strategy WT4-E		Explore opportunities to reduce street widths and parking lot area to install landscaping		
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Not funded	Obtain funding, coordinate with Public Works to conduct feasibility study, explore potential applications	TBD	-	-

Strategy WT4-F		Explore opportunities to design recreation areas that can hold runoff		
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Not funded	Obtain funding, coordinate with Public Works to conduct feasibility study, explore potential applications	TBD	-	-

Strategy WT4-G		Explore opportunities to direct runoff from pavement and buildings to vegetation-lined channels		
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Not funded	Obtain funding, coordinate with Public Works to conduct feasibility study, explore potential applications, coordinate with regional flood control efforts and agencies.	TBD	-	-

Strategy WT4-H		Explore opportunities to replace medians/parkway lawns with drought tolerant landscaping		
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Not funded	Obtain funding, coordinate with Public Works to conduct feasibility study, explore potential applications	TBD	-	-

Notes on Related Measures

The following measures address energy use due to water consumption and can be found in the respective chapters:

- Upgrade City equipment/infrastructure for increased energy efficiency by 2020 (Energy: Objective E3, Strategies D & E: Conduct regular efficiency tests and upgrades on water transport facilities, Install energy management system for water transport facilities to support high efficiency operations managed for reduced peak energy use)
- Reduce dependence on imported water and the related energy cost of transporting it to Glendale (Energy: Objective E4, Strategies A&B: Develop groundwater wells on Foothill Boulevard and at the Rockhaven Sanitarium site).

Measures for Future Consideration

The following measures are recommended for consideration in City construction projects. At this time, gray water piping is still being explored for feasibility.

- Install and utilize gray water piping in new municipal construction projects
- Install and utilize gray water piping in municipal remodel projects
- Green roofs – please see discussion in the Energy section.

Transportation




Transportation is a fundamental part of the activity and services of the City. However, it also requires great amounts of energy. In addition to emitting greenhouse gases, transportation fossil fuels also produce a host of air pollutants when combusted, reducing local air quality and affecting human health. Transportation accounts for 36% of the City of Glendale’s total GHG emissions.

In an effort to reduce air pollution emissions, the city has introduced fleet vehicles that use

cleaner burning or more efficient fuel. To date, these vehicles make up 10% of the City fleet.

Some departments also practice vehicle idle-control, although this is not a formal policy.

The Transportation and Energy sectors provide the greatest potential for the City to reduce its greenhouse gas emissions. Therefore, this chapter also highlights a significant number of existing and future measures to help the City meet its GHG reduction goal.

Objective	Supports Adaptation	Reduction Potential
T1 – Formalize a Green Fleet Policy by 2012	Y	Not quantified
T2 – Increase fleet fuel efficiency	Y	
T3 – Reduce fleet use of fossil fuels	Y	
T4 – Increase employee rideshare participation	Y	
T5 – Incorporate bicycle and pedestrian infrastructure into street improvement projects	Y	Not quantified


T1 – Adopt a Green Fleet Policy by 2012


In 2010, the City began developing a Green Fleet Policy emphasizing alternate fuels, Partial Zero Emissions Vehicle gasoline engines, hybrid engine vehicles, right-sizing vehicles to the job task, and consolidating operations of various departments. However, the policy is not yet formalized in the municipal code.


T2 – Increase fleet fuel efficiency


Fossil fuel use can be reduced by taking measures to increase fuel efficiency of vehicles, including reducing size of vehicles, idle-control technology, and use of newer vehicles that are more fuel-efficient.



T2-A	Replace 8 older/underused vehicles with new vehicles			
Status: Done	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Funded	N/A (Done)	N/A	N/A	N/A

T2-B	Replace 30 additional older/underused vehicles with newer models by 2020			
Status: Existing	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
No new funding needed	Continue existing efforts	10 vehicles	20 vehicles	30 vehicles


T2-C	Downsize 50 vehicles by 2020 (this would involve replacing larger vehicles with smaller vehicles that could accomplish the same task)			
Status: Existing	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
No new funding needed	Continue existing efforts	17 vehicles	34 vehicles	50 vehicles


T2-D	Implement idle-control policy – this will affect approximately 200 vehicles, excluding emergency response vehicles and vehicles/equipment that need to stay on to operate (e.g. forklift, pump)			
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
No new funding needed	Write and adopt policy, implement in all departments	67 vehicles	134 vehicles	200 vehicles


T2-E	Achieve PCI (pavement condition index) of 74.6 – roads with higher PCIs are more fuel efficient for vehicles traveling on them			Not quantified
Status: Existing	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
No new funding needed	Completed	-	-	-


T2-F	Achieve PCI (pavement condition index) of 75			Not quantified
Status: Existing	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
No new funding needed	Continue existing efforts	Complete in 2013	-	-


T3 – Reduce fleet use of fossil fuels	
----------------------------------------------	---------------------------------------------------------------------------------------


T3 – A	Use B-10 biodiesel (10% biodiesel) in all diesel powered vehicles/equipment			
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
No new funding needed	Resolve biodiesel tank recertification issue (existing fueling infrastructure can be used), obtain clearance from manufacturers to use B10	50% of vehicles/equipment	100% of vehicles/equipment	N/A

T3 – B	Use B-20 (20% biodiesel) in all diesel powered vehicles/equipment			
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
No new funding needed	Prerequisite: Implementation of T3-A. Obtain clearance from engine manufacturers to use B20.	-	-	100% of vehicles/equipment

T3 – C	Replace 35 fossil fueled fleet vehicles with electric vehicles (additional charging facilities would need to be installed to accommodate these new vehicles)			
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2035 Target		
Not funded	Obtain funding	35 vehicles		

T3 – D	Replace 50 fossil fueled fleet vehicles with hybrid vehicles			
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2035 Target		
Not funded	Obtain funding	50 vehicles		

T4 – Increase employee rideshare participation			
320 (14%) of employees currently participate in the Rideshare Program.			

T4 – A	Increase employee rideshare participation		
Status: New	Implementation Actions Needed:	Progress Indicator Timeline	
		2035 Target	
Not funded	Obtain funding, administer program	48 person (15% of existing) increase in employee rideshare program participation	

T5 – Incorporate bicycle and pedestrian infrastructure into street improvement projects	

T5 – A	Incorporate bicycle lanes into street improvement projects – Within the past three years the City has installed 5 miles of bicycle lanes			Not quantified
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
No new funding needed	N/A (Done)	N/A	N/A	N/A

T5 – B	Incorporate bicycle shared roadway markings into street improvement projects – Within the past three years the City has installed 4.7 miles of shared roadway markings for bicyclists.			Not quantified
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
No new funding needed	N/A (Done)	N/A	N/A	N/A

T5 – C	Pursue further opportunities to incorporate bicycle lanes/shared roadway markings into street improvement projects			Not quantified
Status: Existing	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
No new funding needed	Continue existing efforts	N/A	N/A	N/A

T5 – D	Incorporate “Complete Streets” into the General Plan - The City is currently amending the General Plan to guide development of a multi-modal street network that provides access for all users.			Not quantified
Status: Existing	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
No new funding needed	Continue existing efforts	-	-	-

Measures for Future Consideration

The following measure was considered but found unfeasible at this time. It is noted here for future reference. As technology improves, it may become a viable option for a future iteration of the Greener Glendale Plan:

- Fuel-efficient vehicles (e.g. scooters) for parking enforcement – Existing models are not sufficiently safe to protect parking enforcement officers from vehicle traffic accidents.

Environmental Health

This category addresses the environment as it relates to human health, including issues such as air pollutants that affect breathing (versus greenhouse gases), toxics, and healthy food. Some toxics, such as volatile organic compounds, emit greenhouse gases. Shipping food over long distances also creates greenhouse gas emissions. The categories discussed in this chapter primarily affect human

health, but do overlap with greenhouse gas emissions. At this time, the inventory does not include corresponding GHG emissions for these categories due to lack of data availability. However, it is widely understood that reducing pollutants in the environment is beneficial to both humans and ecosystems, and ensures better sustainability.

Objective	Supports Adaptation	GHG Reduction Potential
EH1 – Reduce criteria air pollution from vehicles	Y	Not quantified
EH2 – Reduce use of toxics	Y	Not quantified
EH3 – Promote use of locally grown, organic foods	Y	Not quantified
EH4 – Protect water quality by implementing stormwater management best practices	Y	-

EH1 – Reduce criteria air pollution from vehicles (Criteria air pollutants [e.g. particulates, ozone, and carbon monoxide] are regulated by the South Coast Air Quality Management District and do not include greenhouse gases. Regulated entities, including the City of Glendale, are required to implement vehicle best management practices to reduce the emissions of criteria air pollutants, according to the SCAQMD rules).

EH1 - A	Purchase Tier 4 Diesel engines only – Tier 4 engines are built to the fourth and most stringent phase of federal air pollution standards for off-road diesel engines.			
Status: Existing	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
No new funding needed	Continue existing efforts	N/A	N/A	N/A

EH2 – Reduce use of toxics
Identify toxic products for removal or replacement with environmentally friendly alternatives

EH2 - A	Reduce use of toxics			
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Not funded	Obtain funding or assign staff time, coordinate with departments to identify potential products for removal/replacement, remove/replace as appropriate.	Replacement/Removal Plan complete	50% products removed/replaced	100% products removed/replaced

EH3 – Promote use of locally grown, organic food (“locally grown” is commonly defined as grown within an 8-hour drive of the selling location).
The Downtown Farmers’ Market is held every Thursday, in walking distance to City Hall. Numerous grocery stores located near City Hall provide locally grown, organic food. City employees should be informed of the benefits of buying locally grown, organic food, and encouraged to do so.

EH3 – A	Outreach/education to employees to buy locally grown, organic food	
Status: New	Implementation Actions Needed:	Progress Indicator Timeline
		2035 Target
Not funded	Obtain funding, develop outreach/education plan	Increase in number of employees buying locally grown, organic food

EH4 – Protect water quality by implementing stormwater management best practices
The Water section of this document (WT-4) outlines a variety of recommended stormwater management practices.

Measures for Future Consideration

The following measure was considered but found unfeasible at this time. It is noted here for future reference. As technology improves, it may be a viable option for a future iteration of the Greener Glendale Plan:

- Electric leaf blowers – Leaf blowers are used by the Community Services and

Parks Department for large-scale landscape maintenance. Current technology does not provide batteries with enough life to support the required workload. Plug-in equipment is not an option in open space parks. Another option may be to use cleaner burning fuel.

Cross-Cutting Approaches

This section focuses on sustainability measures that affect more than one sustainability category, and/or are considered integral to successful implementation of the other seven focus areas.

Objective	Supports Adaptation	Reduction Potential
CC1 – Smart Grid Installation	Y	Not quantified
CC2 – Explore whether the City’s Green Purchasing Policy can be enhanced	Y	Not quantified
CC3 – Develop a Climate Adaptation Plan	Y	
CC4 – Monitor progress and revise Greener Glendale Plan as needed	Y	
CC5 – Work with City departments to ensure adequate data availability for future greenhouse gas inventories	N	

CC1 – Smart Grid Installation

GWP is transitioning to a Smart Grid management system, which will provide improvements in internal communication, information sharing, and operations efficiency. The ability to access dynamic information remotely and instantly enables better coordination, increased efficiency, and faster response time. The data and communications infrastructure for this system can be used across departments within the City. The ability to improve efficiency within municipal operations may considerably reduce City resource consumption across multiple sectors, such as staff labor, transportation, energy and water consumption, waste, and others. Benefits from this installation will continue for 15 years.

CC2 – Explore whether the City’s Green Purchasing Policy can be enhanced

The City’s Administrative Policy Manual (Purchasing Procedures: 3-12) mandates a “preference for recycled, reusable and recyclable products.” In the interest of increased sustainability, the City may identify additional purchasing guidelines to further reduce consumption, waste, and greenhouse gas emissions. Appendix H includes general examples of Green Purchasing Policies that may be analyzed.

CC2 – A		Explore whether the City’s Green Purchasing Policy can be enhanced		
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Not funded	Obtain funding for staff time, develop policy	-	Complete	-

CC3 – Develop a Climate Adaptation Plan

As covered in the “Sustainability Focus Areas: Climate Adaptation” section of this report, it is critical that the City prepare for the effects of climate change, specifically air quality, fires, floods, and energy and water supply.

CC3 - A		Develop Climate Adaptation Plan		
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Not funded	Obtain funding, assign staff/contractor	-	-	Complete

CC4 – Monitor progress and revise Greener Glendale Plan as needed

The 5-milestone approach used to develop the Greener Glendale Plan (described in the “Introduction: process” section of this document) involves monitoring implementation progress, reporting results, and revising the plan as needed. This would include updating the sustainability and GHG inventories at regular intervals (existing inventory years are at 5-year increments). Monitoring progress and revising for increased effectiveness is a critical component to the long-term success of the Greener Glendale Plan.

CC4 - A		Monitor and report progress annually		
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Not funded	Obtain funding, assign staff/contractor	Complete	-	-

CC4 - B		Re-inventory every five years and revise as needed the Greener Glendale Plan		
Status: New	Implementation Actions Needed:	Progress Indicator Timeline		
		2011 - 2013	2014 - 2016	2017 - 2020
Not funded	Obtain funding, assign staff/contractor	-	Complete	-

CC5 – Work with City departments to ensure adequate data availability for future greenhouse gas inventories

Staff should coordinate with City departments to ensure adequate record keeping and data availability for future GHG inventories, including electrical account information enabling determination of the exact facility type (e.g. public lighting versus water delivery facility), and fire suppressant and refrigerant consumption data.

Next Steps

For decades, the City has sought new ways to conserve resources, improve operations, and create less of an impact on the environment. This has included monitoring and keeping current with sustainability related laws, monitoring technology for viable upgrade opportunities, and monitoring operations to identify opportunities for increased efficiency.

The City will continue existing efforts and will continue to seek funding to pursue additional sustainability measures, including those recommended in this report.

As described in the “Introduction” chapter, the Greener Glendale Plan process follows a 5-step model: inventory existing conditions, set targets, develop a plan to meet those targets, implement, then monitor and revise as needed.

A staff person should be assigned to coordinate and facilitate implementation of the Greener Glendale Plan. This person’s duties should also include monitoring and reporting progress annually, as well as re-inventorying and updating the Greener Glendale Plan after 5 years (see “Cross-Cutting Approaches” chapter).

Due to an extended hiring freeze and recent budget cuts, this may only be possible by securing grant funding, utilizing the help of volunteer interns, or assigning the duties to an existing staff person.

Forming an interdepartmental coordination team is also important to successful implementation of this Plan. The department representatives should be staff who have a broad knowledge of their department operations, and have the authority to make decisions. The various departments should also maintain annual records containing the data necessary to assess GHG reduction and sustainability efforts.

Appendix A

Sustainability Resolution

A Resolution of the City Council of the City of Glendale, California to Address Sustainability and Climate Change

WHEREAS, Sustainability means sustaining society in the long-term by meeting current environmental, social, and economic needs while ensuring future generations can meet theirs; and

WHEREAS, Glendale adopted a strategic goal in the City's Long Range Plan to lead the way toward a sustainable future, to promote a healthy and safe environment for all residents, and to be effective stewards of the community's natural resources; and

WHEREAS, Glendale wishes to integrate its environment, society, economy, and governance in ways that foster vibrant social and economic conditions and a healthy ecosystem and to that end commit ourselves to creating the conditions necessary for a sustainable future; and

WHEREAS, Glendale is committed to lead by demonstrating sustainable stewardship that will yield cost savings to taxpayers by reducing City operating costs, will protect, conserve, and enhance the city's resources, and will establish community standards of sustainable living practices; and

WHEREAS, the Department of Energy awarded the Energy Efficiency & Conservation Block

Grant to the City of Glendale to fund the development of a Greener Glendale Plan to address energy efficiency, conservation, and greenhouse gas emission reductions; and

WHEREAS, local government actions taken to reduce greenhouse gas emissions and increase energy efficiency provide multiple local benefits by decreasing air pollution, creating jobs, reducing energy expenditures, and saving money for the local government, its businesses, and its residents; and

WHEREAS, AB 32, the Global Warming Solutions Act of 2006, mandates that cities reduce their greenhouse gas emissions to 1990 levels by 2020;

NOW THEREFORE, BE IT RESOLVED, that the City of Glendale, California commits to addressing sustainability and climate change and using the concept of sustainability to guide policy now and in the future.

Adopted November 9, 2010



Urban Environmental Accords

*Signed on the occasion of United Nations Environment Programme World Environment Day
June 5th, 2005 in San Francisco, California*

GREEN CITIES DECLARATION

RECOGNIZING for the first time in history, the majority of the planet's population now lives in cities and that continued urbanization will result in one million people moving to cities each week, thus creating a new set of environmental challenges and opportunities; and

BELIEVING that as Mayors of cities around the globe, we have a unique opportunity to provide leadership to develop truly sustainable urban centers based on culturally and economically appropriate local actions; and

RECALLING that in 1945 the leaders of 50 nations gathered in San Francisco to develop and sign the Charter of the United Nations; and

ACKNOWLEDGING the importance of the obligations and spirit of the 1972 Stockholm Conference on the Human Environment, the 1992 Rio Earth Summit (UNCED), the 1996 Istanbul Conference on Human Settlements, the 2000 Millennium Development Goals, and the 2002 Johannesburg World Summit on Sustainable Development, we see the Urban Environmental Accords described below as a synergistic extension of the efforts to advance sustainability, foster vibrant economies, promote social equity, and protect the planet's natural systems.

THEREFORE, BE IT RESOLVED, today on World Environment Day 2005 in San Francisco, we the signatory Mayors have come together to write a new chapter in the history of global cooperation. We commit to promote this collaborative platform and to build an ecologically sustainable, economically dynamic, and socially equitable future for our urban citizens; and

BE IT FURTHER RESOLVED that we call to action our fellow Mayors around the world to sign the Urban Environmental Accords and collaborate with us to implement the Accords; and

BE IT FURTHER RESOLVED that by signing these Urban Environmental Accords, we commit to encourage our City governments to adopt these Accords and commit our best efforts to achieve the Actions stated within. By implementing the Urban Environmental Accords, we aim to realize the right to a clean, healthy, and safe environment for all members of our society.

IMPLEMENTATION & RECOGNITION

THE 21 ACTIONS that comprise the Urban Environmental Accords are organized by urban themes. They are proven first steps toward environmental sustainability. However, to achieve long-term sustainability, cities will have to progressively improve performance in all thematic areas.

Implementing the Urban Environmental Accords will require an open, transparent, and participatory dialogue between government, community groups, businesses, academic institutions, and other key partners. Accords implementation will benefit where decisions are made on the basis of a careful assessment of available alternatives using the best available science.

The call to action set forth in the Accords will most often result in cost savings as a result of diminished resource consumption and improvements in the health and general well-being of city residents. Implementation of the Accords can leverage each city's purchasing power to promote and even require responsible environmental, labor and human rights practices from vendors.

Between now and the World Environment Day 2012, cities shall work to implement as many of the 21 Actions as possible. The ability of cities to enact local environmental laws and policies differs greatly. However, the success of the Accords will ultimately be judged on the basis of actions taken. Therefore, the Accords can be implemented through programs and activities even where cities lack the requisite legislative authority to adopt laws.

The goal is for cities to pick three actions to adopt each year. In order to recognize the progress of cities to implement the Accords, a *City Green Star Program* shall be created.

At the end of the seven years a city that has implemented:

- 19 - 21 Actions shall be recognized as a ★★★★★ City
- 15 - 18 Actions shall be recognized as a ★★★ City
- 12 - 17 Actions shall be recognized as a ★★ City
- 8 - 11 Actions shall be recognized as a ★ City

For more information, visit:
www.GreenCitiesCalifornia.org/urban-environmental-accords

Appendix B

Climate Change Science

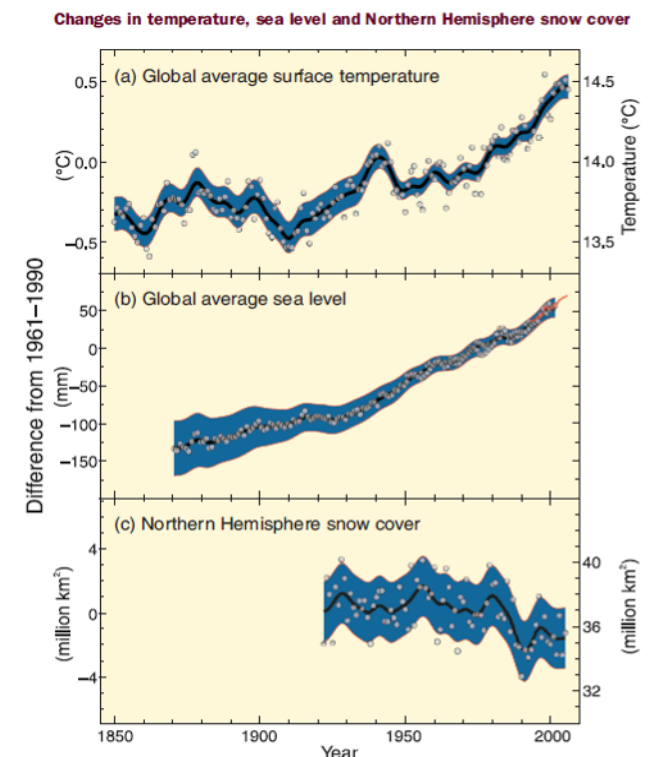
Climate Change

According to the Intergovernmental Panel on Climate Change (IPCC)'s Fourth Assessment Report, "warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level."¹³ Researchers have made progress in their understanding of how the Earth's climate is changing in space and time through improvements and extensions of numerous datasets and data analyses, broader geographical coverage, better understanding of uncertainties and a wider variety of measurements.¹⁴ These refinements expand upon the findings of previous IPCC Assessments – today, observational evidence from all continents and most oceans shows that "regional changes in temperature have had

¹³ IPCC, 2007: Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland, 104 pp.

¹⁴ IPCC, 2007: Summary for Policymakers. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

discernible impacts on physical and biological systems."¹⁵



The Fourth Assessment asserts that "most of the observed increase in global average temperatures since the mid-20th century is *very likely* due to the observed increase in anthropogenic GHG concentrations. This is an advancement since the [Third Assessment

¹⁵ IPCC, 2007: Summary for Policymakers. In: Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 7-22.

Report]’s conclusion that ‘most of the observed warming over the last 50 years is *likely* to have been due to the increase in GHG concentrations.’”

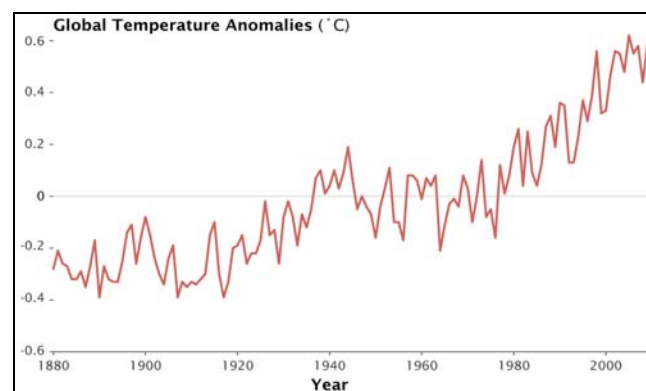
Put another way, “The observed widespread warming of the atmosphere and ocean, together with ice mass loss, support the conclusion that it is *extremely unlikely* that global climate change of the past 50 years can be explained without external forcing and *very likely* that it is not due to known natural causes alone. During this period, the sum of solar and volcanic forcings would *likely* have produced cooling, not warming. Warming of the climate system has been detected in changes in surface and atmospheric temperatures and in temperatures of the upper several hundred [meters] of the ocean. The observed pattern of tropospheric warming and stratospheric cooling is *very likely* due to the combined influences of GHG increases and stratospheric ozone depletion.”¹⁶

In short, the Earth is already responding to climate change drivers introduced by mankind.

Temperatures are Rising Globally

Analysis released in January 2011 by NASA’s Goddard Institute for Space Studies shows that global average surface temperatures in 2010 “tied” 2005 as the warmest on record (the difference is smaller than the uncertainty in

comparing the temperatures of recent years).¹⁷ The next hottest years, also with very close average temperatures, are 1998, 2002, 2003, 2006, 2007, and 2009. The period from January 2000 to December 2009 is the warmest decade on record, followed by the 1990’s, then the 1980’s respectively. These remarkable yearly and decadal trends, based on the Goddard Institute’s global average surface temperature analysis, GISTEMP, are charted since 1880 and closely resemble the findings of other temperature records and analyses produced by the Hadley Centre and the National Oceanic and Atmospheric Administration (NOAA).¹⁸



The steady uptick in average temperatures is significant and expected to continue if action is not taken to manage climatic conditions.

Regional and Local Impacts

Because the impacts of climate change vary geographically, it is important to know what effects are specifically expected for your corner

¹⁶ IPCC, 2007: Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland, 104 pp.

¹⁷ Goddard Institute for Space Studies, “Research Finds 2010 Tied for Warmest Year on Record,” 2011, 18 Jan. 2011, <<http://www.nasa.gov/topics/earth/features/2010-warmest-year.html>>.

¹⁸ Goddard Institute for Space Studies, “Despite Subtle Differences, Global Temperature Records in Close Agreement,” 2011, 18 Jan. 2011. <<http://www.giss.nasa.gov/research/news/20110113/>>

of the globe. According to the U.S. Global Change Research Program, the Southwest region of the United States should expect the following impacts from climate change to occur in the coming years:

- Water supplies will become increasingly scarce, calling for trade-offs among competing uses, and potentially leading to conflict.
- Increasing temperature, drought, wildfire, and invasive species will accelerate transformation of the landscape.
- Increased frequency and altered timing of flooding will increase risks to people, ecosystems, and infrastructure.
- Tourism and recreation opportunities are likely to suffer.
- Cities and agriculture face increasing risks from a changing climate.¹⁹

In terms of California-specific impacts, the California Energy Commission (CEC) issued a report in 2006 detailing anticipated changes for the state. The report details specific impacts related to several sectors and finds that “climate change impacts will affect all of the sectors considered in this report: sea level rise, agriculture, snowpack and water supply, forestry, wildfire risk, public health, and electricity demand and supply.”²⁰ The report analyzed low, mid, and high emissions scenarios, noting that “all climate models show increases in temperature, with the aggregate of several model runs containing a range of warming from 2000 to 2100 from about +2°C to about +6°C (+3.6°F to about +10.8 °F).

¹⁹ Global Climate Change Impacts in the United States, Thomas R. Karl, Jerry M. Melillo, and Thomas C. Peterson, (eds.). Cambridge University Press, 2009.

²⁰ Scenarios of Climate Change in California: An Overview. Dan Cayan, Amy Lynd Luers, Michael Hanemann, Guido Franco, Bart Croes, (eds.). <<http://www.energy.ca.gov/2005publications/CEC-500-2005-186/CEC-500-2005-186-SF.PDF>>.

Increases in temperature alone would impact the California hydrological cycle, with consequences upon the state’s water supply, hydroelectric power supply, agriculture, recreation, and ecosystems.” Additionally, “Climate change could produce compounding impacts—for instance, in the San Francisco Bay Delta, heightened sea levels and high river inflows from warmer storms would place levee systems in greater jeopardy of flooding.”

Greenhouse Gas Emissions Must be Reduced

The figures included below, from the IPCC Fourth Assessment, chart atmospheric concentrations of the three most common greenhouse gases over the 10,000 years prior to 2005 (and since 1750 in the inset panels).

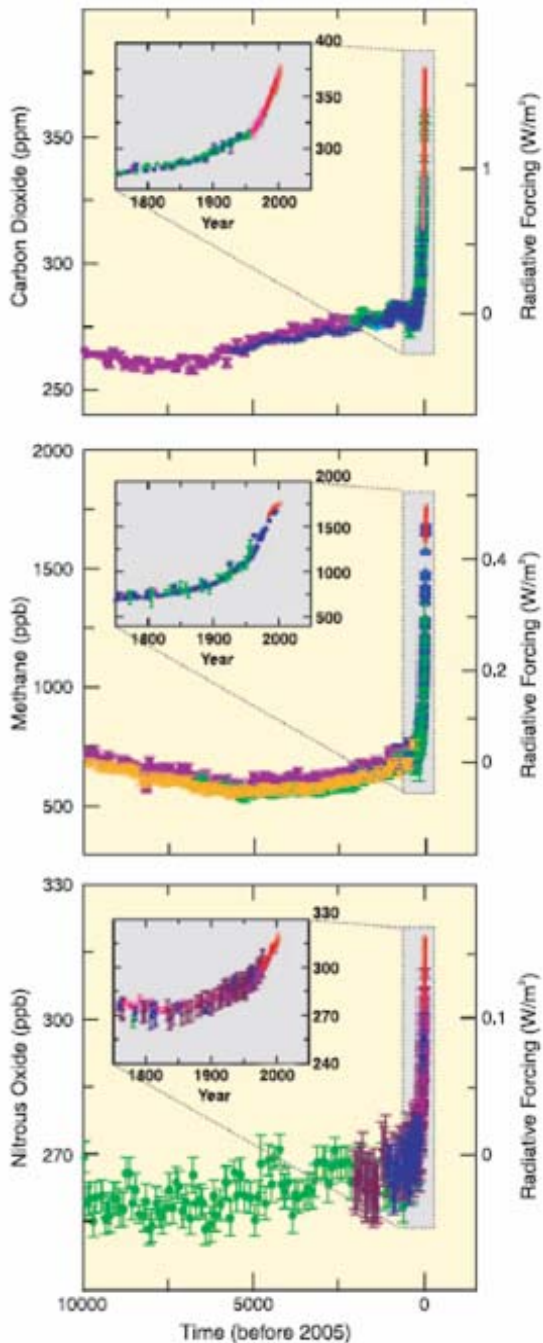
The recent and massive buildup of greenhouse gases in our atmosphere is conceivably even more extraordinary than changes observed thus far regarding temperature, sea level, and snow cover in the Northern Hemisphere in that current levels greatly exceed recorded precedent going back much further than the modern temperature record. The latest monthly average atmospheric CO₂ concentration, for December 2010, as measured at Mauna Loa Observatory, Hawaii, was 389.69 parts per million (ppm).²¹

²¹ NOAA/ESRL, Dr. Pieter Tans. 2011, 18 Jan. <<http://www.esrl.noaa.gov/gmd/ccgg/trends/>>.

Global Greenhouse Gas Emissions

According to the Director of the Goddard Institute, Dr. James Hansen, "If the warming

Changes in GHGs from Ice core and modern data



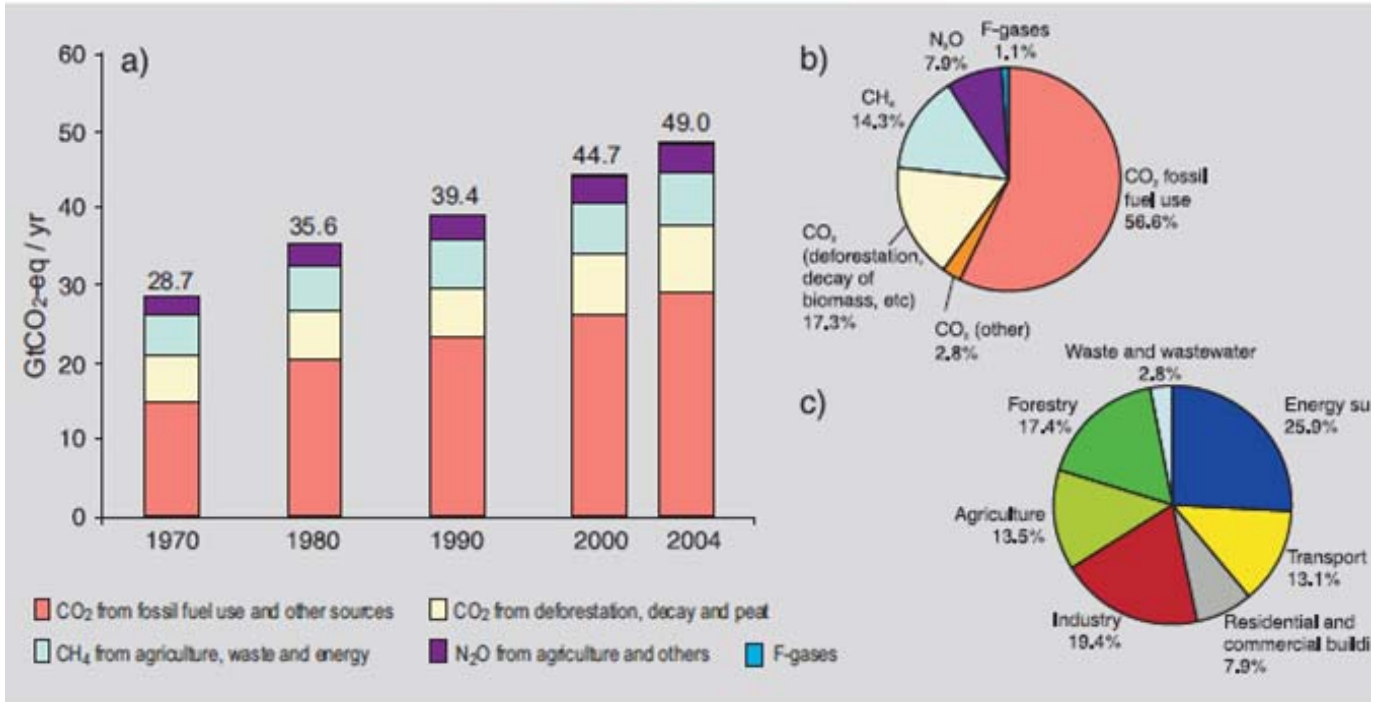
trend continues, as is expected, if greenhouse gases continue to increase, the 2010 [temperature] record will not stand for long."²² In

response to the problem of climate change, many communities in the United States are taking responsibility for addressing emissions at the local level. Since many of the major sources of greenhouse gas emissions are directly or indirectly controlled through local policies, local governments have a strong role to play in reducing greenhouse gas emissions within their boundaries. Through proactive measures around land use patterns, transportation demand management, energy efficiency, green building, and waste diversion, local governments can dramatically reduce emissions in their communities. In addition, local governments are primarily responsible for the provision of emergency services and the mitigation of natural disaster impacts. While this Plan is designed to reduce overall emissions levels, as the effects of climate change become more common and severe, local government adaptation policies will be fundamental in preserving the welfare of residents and businesses.

²² Goddard Institute for Space Studies, "Research Finds 2010 Tied for Warmest Year on Record," 2011, 18 Jan. Greener Glendale Plan: Municipal Operations

<<http://www.nasa.gov/topics/earth/features/2010-warmest-year.html>>.

Global anthropogenic GHG emissions



Appendix C

Utility Emissions

GHG emissions due to the production and purchase of power by Glendale Water and Power (GWP) for community consumption are analyzed here rather than with the rest of the municipal operations GHG emissions.

The purpose of a GHG inventory is to identify the consumption activities under ones control that are creating GHG emissions, and to use that information for GHG mitigation planning. GWP generates and purchases power for the entire community of Glendale. Only a small portion (2%) of that power is consumed by the municipality for government operations.

Combining the utility emissions with the rest of the municipal operations emissions analysis causes confusion and hinders meaningful policy discussion. However, this appendix addresses how those emissions will be reduced.

The total GHG emissions resulting from the generation and purchase of electricity by GWP on behalf of the community of Glendale were 672,538 MTCO₂e in year 2004, and 552,643 MTCO₂e in year 2009²³, an 18% decrease. This

can be attributed to 1) GWP increased its Renewable Energy Portfolio (REP); 2) GWP administered numerous energy saving programs within the community, including education, outreach, rebates, incentives, and more; 3) There may have been reduced energy consumption due to the economic slowdown.

Due to State mandated Renewable Portfolio Standards, GWP is required to increase the REP by an additional 16% by year 2020. This may result in approximately 10% further GHG reductions, bringing the total reduction by 2020 to 29%, well exceeding the GHG reduction targets presented in this Greener Glendale Plan.

GWP is transitioning to a Smart Grid management system, which will improve operations and efficiency for energy and water supply and demand. The system could potentially reduce an estimated 32,821 MTCO₂e annually over the 15-year lifespan of the Smart Grid installation. If this occurs, the utility emissions will have decreased by 35%.

The Greener Glendale Plan for Community Operations will address additional measures that can be taken to further reduce community energy consumption.

²³ These numbers exclude 961 MTCO₂e in 2004 and 1,200 MTCO₂e in 2009 generated from GWP vehicle fuel consumption. These emissions are already included in the fleet emissions analyzed in the main body of this report.

Total Emissions Summary Report

Glendale Water & Power

(Emissions from CA and US operations)



Report Generated On: 05/02/2011 06:13 pm PT

Report Revision #: 0

141 N. Glendale Ave., Level 4
Glendale, CA 91206 United States

www.glendalewaterandpower.com

818-548-4096
vpuffer@ci.glendale.ca.us

Contact: Valerie Puffer
Industry Type: Electric Power Producer
NAIC Code: 2211-Electric Power Generation, Transmission and Distribution
SIC Code: 4931-Electric and Other Services Combined

Description:
Primary Calculation
Methodologies:

Organizational
structure disclosure:

Legend	
Blue	= required
Orange	= optional

673,499.49
Loss 961 = 672,538

VERIFIED EMISSIONS INFORMATION

Reporting Year: **2004**
Reporting Scope: **CA and US**
Reporting Protocol: General Reporting Protocol, Version 1 (October 2002)
Reporting Boundaries:
Direct Baseline Year: 2004
Indirect Baseline Year: 2004

Direct Emissions	CO2e	CO2	CH4	N2O	HFCs*	PFCs*	SF6	Unit
Mobile Combustion	961.06	961.06	0.00	0.00	0.00	0.00	0.00	metric ton
Stationary Combustion	455,875.30	455,875.30	0.00	0.00	0.00	0.00	0.00	metric ton
Process Emissions	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
Fugitive Emissions	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
TOTAL DIRECT (Eqty Share)	456,836.37	456,836.37	0.00	0.00	0.00	0.00	0.00	metric ton
TOTAL DIRECT (Mgmt Ctrl)	16,501,339.13	16,501,339.13	0.00	0.00	0.00	0.00	0.00	metric ton

* HFCs and PFCs are classes of greenhouse gases that include many compounds. These columns may reflect the total emissions of multiple HFC and PFC compounds, each of which has a unique Global Warming Potential (GWP). Emissions of each gas are first multiplied by their respective GWP and then summed in the total CO2-equivalent column.

Indirect Emissions	CO2e	CO2	CH4	N2O	Unit
Purchased Electricity	216,663.12	216,663.12	0.00	0.00	metric ton
Purchased Steam	0.00	0.00	0.00	0.00	-
Purchased Heating and Cooling	0.00	0.00	0.00	0.00	-
TOTAL INDIRECT (Eqty Share)	216,663.12	216,663.12	0.00	0.00	metric ton
TOTAL INDIRECT (Mgmt Ctrl)	216,663.12	216,663.12	0.00	0.00	metric ton

De Minimis Emissions	CO2e	CO2	CH4	N2O	HFCs*	PFCs*	SF6	Unit
None	0.00	0.00	0.00	0.00	0.00	0.00	0.00	metric ton
TOTAL DEMINIMIS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	metric ton

Percentage of Total Inventory: 0.00 %

Total Emissions Summary Report

Glendale Water & Power

(Emissions from CA and US operations)



Report Generated On: 05/02/2011 06:11 pm PT

Report Revision #: 7

141 N. Glendale Ave., Level 4
Glendale, CA 91206 United States

www.glendalewaterandpower.com

818-548-4096

vpuffer@ci.glendale.ca.us

Contact: Valerie Puffer

Industry Type: Electric Power Producer

NAIC Code: 2211-Electric Power Generation, Transmission and Distribution

SIC Code: 4931-Electric and Other Services Combined

Description: Municipal utility owned by the City of Glendale. GWP has a mixed portfolio with local generation, long term energy contracts and increasing renewable resources.

Primary Calculation Methodologies: GWP primarily used existing Carrot emission factors and methodologies.

Organizational structure disclosure: City of Glendale Water & Power - Power Management

Legend	
Blue	= required
Orange	= optional

553,842.57

VERIFIED EMISSIONS INFORMATION

Reporting Year: **2009** less 1199.67

Reporting Scope: **CA and US** = 552642.9

Reporting Protocol: General Reporting Protocol, Version 3.1, (January 2009); Power/Utility Reporting Protocol, Version 1.1 (May 2009)

Reporting Boundaries: Equity Share

Direct Baseline Year: 2004

Indirect Baseline Year: 2004

Direct Emissions	CO2e	CO2	CH4	N2O	HFCs*	PFCs*	SF6	Unit
Mobile Combustion	1,199.67	1,199.20	0.02	0.00	0.00	0.00	0.00	metric ton
Stationary Combustion	532,724.17	530,584.94	7.02	6.42	0.00	0.00	0.00	metric ton
Process Emissions	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-
Fugitive Emissions	233.03	0.00	0.00	0.00	0.00	0.00	0.01	metric ton
TOTAL DIRECT	534,156.86	531,784.15	7.05	6.42	0.00	0.00	0.01	metric ton

* HFCs and PFCs are classes of greenhouse gases that include many compounds. These columns may reflect the total emissions of multiple HFC and PFC compounds, each of which has a unique Global Warming Potential (GWP). Emissions of each gas are first multiplied by their respective GWP and then summed in the total CO2-equivalent column.

Indirect Emissions	CO2e	CO2	CH4	N2O	Unit
Purchased Electricity	9,645.00	9,645.00	0.00	0.00	metric ton
Purchased Steam	0.00	0.00	0.00	0.00	-
Purchased Heating and Cooling	0.00	0.00	0.00	0.00	-
TOTAL INDIRECT	9,645.00	9,645.00	0.00	0.00	metric ton

Appendix D

GHG Inventory Methodology

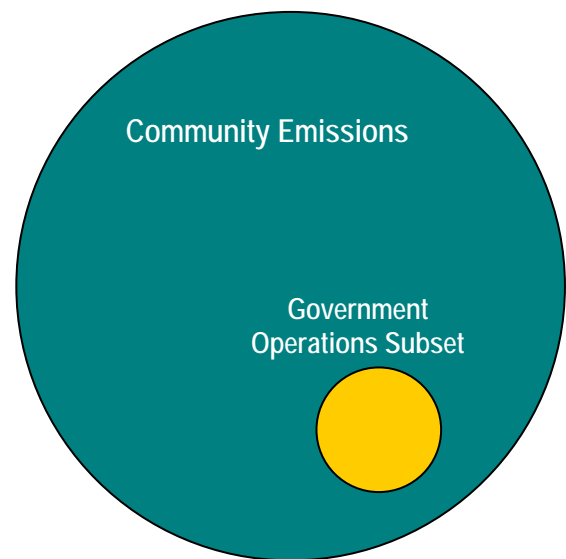
Understanding a Greenhouse Gas Emissions Inventory

The first step toward achieving tangible greenhouse gas emission reductions requires identifying baseline levels and sources of emissions in the community. As local governments have continued to join the climate protection movement, the need for a standardized approach to quantify GHG emissions has proven essential. Standard processes of accounting for emissions have been developed to which this inventory adheres.

Glendale staff used the International Local Government GHG Emissions Analysis Protocol (IEAP) to inventory the City of Glendale's community emissions and the Local Government Operations Protocol (LGOP) to inventory GHG emissions from the City of Glendale's internal operations and activities.

The government operations inventory is a subset of the community inventory; for example, data on commercial energy use by the community includes energy consumed by municipal buildings, and community vehicle-miles-traveled estimates include miles driven by municipal fleet vehicles. The government operations inventory is in this way a subset of

the community-scale inventory. By analyzing emissions in this manner, Glendale's local government is enabled to understand its own impact within the community and lead by



example to reduce its impact on climate change.

Local Government Operations Protocol

In 2008, ICLEI, the California Air Resources Board (CARB), and the California Climate Action Registry (CCAR) released the LGOP to serve as a national appendix to the IEAP.²⁴ The LGOP serves as the national standard for quantifying and reporting greenhouse emissions from local government operations. The purpose of the LGOP is to provide the principles, approach,

²⁴ Local Government Operations Protocol (LGOP). <<http://www.icleiusa.org/programs/climate/ghg-protocol/ghg-protocol>>

methodology, and procedures needed to develop a local government operations greenhouse gas emissions inventory. City of Glendale staff used this protocol to conduct the local government emissions inventory portion of Glendale's GHG inventory.

Quantifying Greenhouse Gas Emissions

Establishing a Base Year

A primary aspect of the GHG emissions inventory process is the requirement to select a base year with which to compare current emissions. The criteria used to select City of Glendale's base year was the earliest year for which data was available and which was representative of average energy consumption. Because statewide GHG reduction efforts involve reducing GHGs to 1990 levels, year 1990 is the ideal year to use as a baseline. However, the level of data detail needed to conduct a quality GHG inventory for that year is simply not available. Staff chose year 2004 as the GHG inventory baseline year because that is the earliest year for which complete data was available, and which was an average year for energy consumption.

Establishing Boundaries

According to the LGOP, a government can use two approaches to define its organizational boundary for reporting greenhouse gas emissions: 1) activities and operations that the jurisdiction controls operationally; and 2) activities and operations that the jurisdiction controls financially. Staff estimated Glendale's local government emissions based on activities

and facilities for which the City of Glendale maintains operational control. This includes all City-owned or operated buildings, facilities, and vehicles (but not when operated by another entity under contract, unless the City maintains control over operational decisions), the inactive part of Scholl Canyon Landfill (the active part is under operational control of Los Angeles County), and the Police helicopter. The wastewater treatment plant that Glendale uses is not located within the geographical boundaries of Glendale, nor is operated by the City of Glendale. The Burbank Airport is owned by the Burbank-Glendale-Pasadena Airport Authority, a separate government agency not within the operational control of the City of Glendale.

Emission Types

The IEAP and LGOP recommend assessing emissions from the six internationally recognized greenhouse gases regulated under the Kyoto Protocol as listed in table below. Hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are not included in the inventory because they were not being tracked in year 2004. However, the City is now tracking these gases for future inventories.

Greenhouse gas emissions are commonly aggregated and reported in terms of equivalent carbon dioxide units, or CO₂e. This standard is based on the Global Warming Potential (GWP) of each gas, which is a measure of the amount of warming a greenhouse gas may cause, measured against the amount of warming caused by carbon dioxide. Converting all

emissions to equivalent carbon dioxide units allows for the consideration of different greenhouse gases in comparable terms. For example, methane is twenty-one times more powerful than carbon dioxide on a per weight basis in its capacity to trap heat, so one metric ton of methane emissions is equal to 21 MTCO₂e. The following table lists the GWPs of the commonly occurring greenhouse gases.

Greenhouse Gases and CO₂e

Greenhouse Gas	Chemical Formula	Global Warming Potential
Carbon Dioxide	CO ₂	1
Methane	CH ₄	21
Nitrous Oxide	N ₂ O	310
Hydrofluorocarbons	Various	43-11,700
Perfluorocarbons	Various	6,500-9,000
Sulfur Hexafluoride	SF ₆	23,900

Quantification Methods

Greenhouse gas emissions can be quantified in the following two ways.

- Measurement-based methodologies refer to the direct measurement of greenhouse gas emissions (from a monitoring system) emitted from a flue of a power plant, wastewater treatment plant, landfill, or industrial facility.
- Calculation-based methodologies calculate emissions using activity data

and emission factors. To calculate emissions accordingly, the basic equation is used: *Activity Data x Emission Factor = Emissions*

Activity data refer to the relevant measurement of energy use or other greenhouse gas-generating processes such as fuel consumption by fuel type, metered annual electricity consumption, and annual vehicle miles traveled. See Appendix E for a detailed listing of the activity data used in composing this inventory.

Known emission factors are used to convert energy usage or other activity data into associated quantities of emissions. Emissions factors are usually expressed in terms of emissions per unit of activity data (e.g. lbs CO₂/kWh of electricity). The table below demonstrates an example of common emission calculations that use this formula. This inventory was conducted utilizing ICLEI’s Clean Air and Climate Protection Software (2009) v. 2.2.1b and all default emissions factors within that software (except the utility emissions factor, see “GHG Inventory Calculation Notes” on page 83 for more information).

Basic Greenhouse Gas Emissions Calculations

Activity Data	Emissions Factor	Emissions
Electricity Consumption (kWh)	CO ₂ emitted/kWh	CO ₂ emitted
Natural Gas Consumption (therms)	CO ₂ emitted/therm	CO ₂ emitted
Gasoline/Diesel Consumption (gallons)	CO ₂ emitted /gallon	CO ₂ emitted
Vehicle Miles Traveled	CH ₄ , N ₂ O emitted/mile	CH ₄ , N ₂ O emitted

Clean Air and Climate Protection 2009 (CACP 2009) Software

To facilitate community efforts to reduce greenhouse gas emissions, ICLEI developed the Clean Air and Climate Protection 2009 (CACP 2009) software package in partnership with the National Association of Clean Air Agencies (NACAA) and the U.S. Environmental Protection Agency (EPA). CACP 2009 is designed for compatibility with the LGOP and determines emissions by combining activity data (energy consumption, waste generation, etc.) with verified emission factors.

The CACP software has been and continues to be used by over 600 U.S. local governments to reduce their greenhouse gas emissions. However, it is worth noting that, although the software provides governments with a sophisticated and useful tool, calculating emissions from energy use with precision is difficult. Calculating GHG emissions depends upon numerous assumptions, and it is limited by the quantity and quality of available data. With this in mind, it is useful to think of any specific number generated by the CACP 2009 software as an approximation of reality, rather than an exact value.

Evaluating Greenhouse Gas Emissions

Greenhouse Gas Emissions by Scope

Emissions sources are categorized relative to the operational boundaries of the government. Emissions sources are categorized as direct or indirect emissions – Scope 1, Scope 2, or Scope Greener Glendale Plan: Municipal Operations

3. The prevention of double counting for major categories such as electricity use and waste disposal is one of the most important reasons for using the scopes framework for reporting greenhouse gas emissions at the local level.

The government operations scopes are divided into three main categories:

- **Scope 1:** Direct emissions from sources within a local government's organizational boundaries that the local government owns or controls.
- **Scope 2:** Indirect emissions associated with the consumption of purchased or acquired electricity, steam, heating, and cooling. Scope 2 emissions are created at sources owned or controlled by another entity, but occur because of activities that take place within the organizational boundaries of the reporting entity.
- **Scope 3:** All other indirect emissions not covered in Scope 2, such as emissions from up-stream and downstream activities that occur as a result of activities within the operational boundaries of the local government, emissions resulting from the extraction of and production of purchased materials and fuels, contracted services, and waste disposal.

Scope 1 and Scope 2 sources are the most essential components of a local government greenhouse gas analysis because these sources are usually significant in scale and are directly under the control of local governments. Local governments typically have indirect control

over Scope 3 emissions. For example, solid waste generated from government operations is included as Scope 3 because of the unique circumstances in which emissions are generated – emissions from waste are generated over time as the waste decomposes and not directly in the base year.

Greenhouse Gas Emissions by Sector

In addition to categorizing GHG emissions by scope, this inventory examines emissions by sector. Many local governments find a sector-based analysis more relevant to policymaking and project management, as it assists in

formulating sector-specific GHG reduction measures and climate action plan components. This inventory evaluates government emissions by the sectors listed in the following table.

Government Sectors	
Government Buildings/Equipment	
Public Lighting	
Water Transport	
Vehicle Fleet	
Employee Commute	
Waste	

Appendix E

GHG Inventory Results

Greenhouse Gas Emissions by Scope

Including all scopes, Glendale's local government emitted approximately 37,392 metric tons²⁵ of CO₂e (MTCO₂e) in the year 2004. Many inventories report only Scope 1 and Scope 2 emissions; for Glendale these would represent 32,837 MTCO₂e.

GHG Emissions by Scope

(excluding HFCs, PFCs, and SF₆, as they were not tracked)

Total Emissions				
	CO ₂ e (tonnes)	CO ₂ (tonnes)	CH ₄ (kg)	N ₂ O (kg)
SCOPE 1	10,019	7,036	135,176	555
SCOPE 2	22,818	22,739	706	210
SCOPE 3	4,555	4,555	248	282
TOTAL	37,392	34,330	136,130	1,047

The following GHG emissions are due to the combustion of biomass or biomass-based fuels, which are tracked separately because the carbon biomass is of a biogenic origin – meaning that it was recently contained in living organic matter – while the carbon in fossil fuels has been trapped in geologic formations for millennia.

- Biodiesel consumption – 29 MTCO₂e
- Landfill gas consumption – 99,094 MTCO₂e

²⁵ All emissions estimated using ICLEI's CACP 2009 Software.

Greenhouse Gas Emissions by Sector & Source

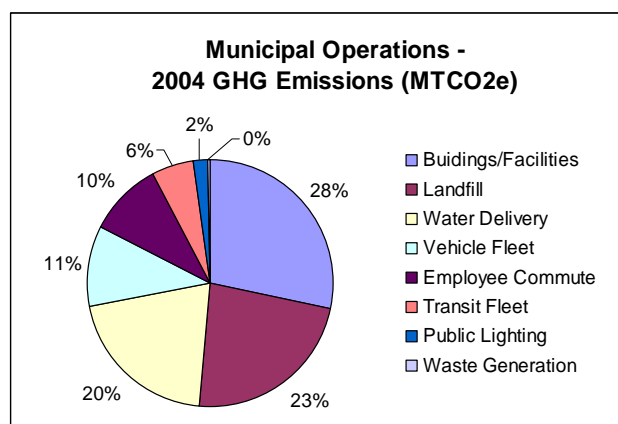
GHG emissions from local government operations are produced by a wide variety of source types, which are categorized into sectors such as those included below.

Greenhouse Gas Emissions by Sector

GHG Emissions by Sector

Sector	MT CO ₂ e
Facilities and Equipment	12,734
Vehicle Fleet	7,273
Employee Commute	4,433
Public Lighting	858
Water Transport	9,226
Solid Waste	122
Landfill	2,746
Totals	37,392

Note: Please see "Waste" section for more information on landfill and waste related emissions.

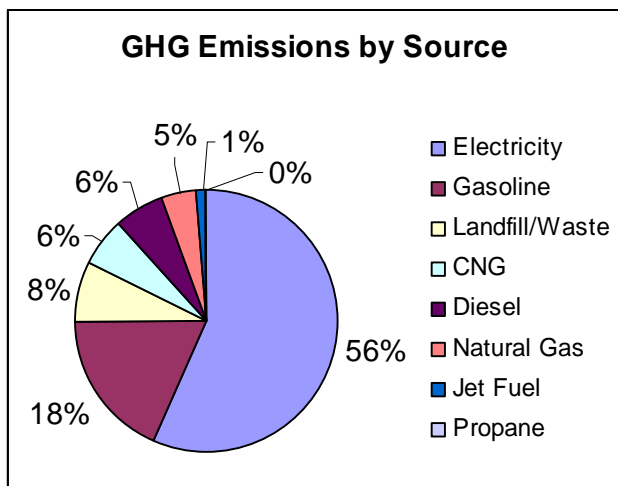


Greenhouse Gas Emissions by Source

The following table lists the sources of the greenhouse gas emissions accounted for under the local government inventory.

GHG Emissions by Source

Source	MTCO ₂ e
Electricity	21,123
Natural Gas	1,693
Gasoline	6,798
Diesel	2,217
CNG	2,282
Propane	4
Landfill/Waste	2,868
Jet Fuel	407
Totals	37,392



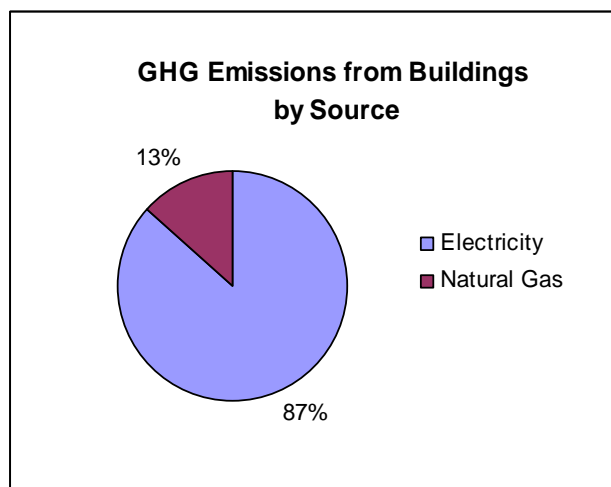
Buildings & Facilities

Facility operations contribute to greenhouse gas emissions in two major ways. First, facilities consume electricity and fuels such as natural gas. This consumption is associated with the majority of greenhouse gas emissions from facilities. In addition, fire suppression, air conditioning, and refrigeration equipment in buildings can emit hydrofluorocarbons (HFCs)

and other greenhouse gases when these systems leak refrigerants or fire suppressants.

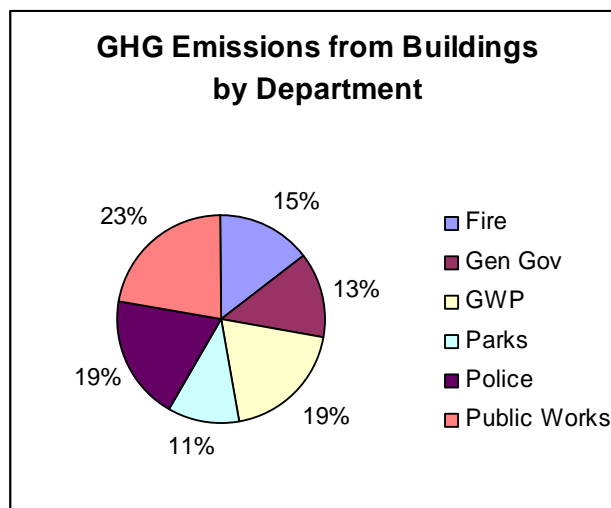
GHG Emissions from Buildings by Source

Source	MTCO ₂ e
Electricity	11,041
Natural Gas	1,693
Totals	12,734



GHG Emissions from Buildings by Department

Department	MTCO ₂ e
Community Services and Parks	1,417
General Government	1,719
Fire	1,867
Glendale Water & Power	2,399
Police	2,454
Public Works	2,878
Totals	12,734



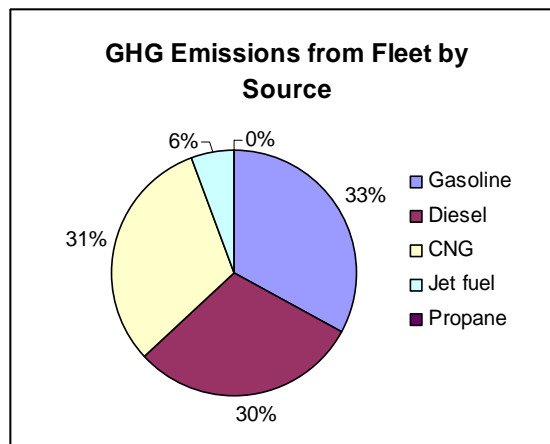
Vehicle Fleet

From maintenance trucks used for parks and recreation to police cruisers and fire trucks, the vehicles and mobile equipment used in The City of Glendale’s daily operations burn gasoline, diesel, and other fuels resulting in greenhouse gas emissions. In addition, vehicles with air conditioning or refrigeration equipment use refrigerants that can leak from the vehicle.

In 2004, the City of Glendale operated a vehicle fleet with 862 vehicles. The City of Glendale’s vehicle fleet performed a number of essential services, including Beeline bus transportation, Fire and Police emergency response, Community Services and Parks maintenance, and Glendale Water & Power electricity and water provision.

GHG Emissions from Fleet by Source

Source	MTCO ₂ e	Consumption (US gal equiv)	Cost (\$)
Gasoline	2,413	268,372	523,825
Diesel	2,169	238,295	369,779
CNG	2,280	314,367	336,231
Jet fuel	407	42,031	84,062
Propane	4	436	1,250
Totals	7,273	863,501	1,315,147



Employee Commute

Emissions in the Employee Commute sector are due to combustion of fuels in vehicles used by government employees commuting to work.

The City of Glendale employs more than 2,000 workers, most who drive to work in single-occupancy vehicles. The average commute distance for City employees is approximately 19 miles.

The City administers a Rideshare Program, to encourage and incentivize employees to take alternative forms of transportation (e.g. carpool, public transit, walk, bike, etc.). It also runs varied schedules and telecommuting to allow employees to drive fewer days to work.

Currently, 14 % of employees participate in the Rideshare program.

GHG emissions due to employee commute are 4,433 MTCO₂e and account for 13% of the City’s total GHG emissions.

Appendix J details the survey methodology. Staff used the survey results to estimate the amount and types of fuel being consumed in year 2009, and the subsequent GHG emissions. Due to the following factors, staff estimated the figures to be substantially the same for year 2004: The Rideshare participation rate remained the same between years 2004 and 2009, and the number of employees increased while the vehicle types likely became more fuel-efficient.

Staff shared the survey results and recommendations (Appendix J) with employees

via the Employee Intranet and citywide email notice.

Public Lighting

Like most local governments, the City of Glendale operates a range of public lighting including traffic signals, sidewalk lighting, holiday lighting, park lights, and so forth. The majority of emissions associated with the operation of this infrastructure are due to electricity consumption.

Three City departments provide exterior public lighting: Glendale Water and Power, Public Works, and Community Services and Parks. GWP primarily provides street lighting, Public Works primarily provides traffic signals, and Community Services and Parks provides lighting for community centers and parks.

In year 2000, Public Works and Glendale Water and Power partnered to replace all traffic signals with LED lights. Public Works Facilities Management is conducting ongoing efforts to replace existing lighting with LEDs. GWP is currently conducting a feasibility study to replace street lighting with LEDs.

GHG Emissions from Public Lighting by Department

Dept.	MTCO ₂ e	% of Sector Emissions	Electricity Use (kWh)	Cost (\$)
GWP	714	83%	1,407,000	\$217,552
CS& Parks	2	<1%	4,000	\$ 615
Public Works	142	17%	279,000	\$41,623
Totals	858	100%	1,690,000	\$259,790

Water Transport

This sector includes emissions from equipment used for the distribution or transport of water and wastewater, including potable water use, sprinkler systems, and irrigation. Electricity consumption is the significant source of greenhouse gas emissions from the operation of the City of Glendale' water transport equipment.

Glendale Water and Power consumes 99.5% of the energy in this category to transport potable and recycled water to the entire community of Glendale.

GWP has taken numerous measures to reduce energy used for water transport, including optimizing piping and pump efficiency and reducing demand on external water sources. Please see "Water" chapter for more information.

Solid Waste Facilities

The most prominent source of greenhouse gas emissions from solid waste facilities is fugitive methane released by the decomposition of organic waste over time in landfills. The scale of these emissions depends upon the size and type of the landfill and the presence of a landfill gas collection system.

The City of Glendale operates the inactive part of Scholl Canyon. The active part is operated by the Los Angeles County Sanitation Districts. Emissions from the inactive part of the landfill are included in this inventory. Because the landfill has a comprehensive landfill gas-to-energy collection system, the only emissions

included in this inventory are the estimated gases that escaped the collection system. Brand Park Landfill consists of inert material only so does not release significant emissions.

Other emissions included in this section are from stationary combustion of fuels and purchased electricity used to generate power for all solid waste management facilities. The City of Glendale operated three waste facilities in 2004, the Integrated Waste Management Facility (IWMF), Glendale Recycling Center (GRC), and a refuse bin enclosure serving a small number of businesses. The IWMF and GRC serve the population of Glendale as well as residents from other cities.

The total fugitive methane emissions from the landfill are estimated at 2,746 MTCO_{2e}. See Appendix I for details on calculations. Total emissions from solid waste facilities were 88 MTCO_{2e}.

Government-Generated Solid Waste

Many local government operations generate solid waste, much of which is eventually sent to a landfill. Typical sources of waste in local government operations include paper and food waste from offices and facilities, construction waste from public works, and plant debris from parks departments. Organic materials in government-generated solid waste (including paper, food scraps, plant debris, textiles, wood waste, etc.) generate methane as they decay in the anaerobic environment of a landfill. Emissions from the waste sector are an estimate of methane generation that will result from the

anaerobic decomposition of all organic waste sent to landfill in the base year. It is important to note that although these emissions are attributed to the inventory year in which the waste is generated, the emissions themselves will occur over the 100+ year timeframe that the waste will decompose.

Estimated GHG emissions from government generated solid waste are 122 MTCO_{2e}. The City does not operate any kitchens or cafeterias, so food waste is minimal. The City also recycles more than 60% of its waste.

Local Government Emissions Forecast

Staff derived the GHG emissions forecast by extrapolating from the GHG emission growth trend from year 2004 to 2009. The total GHG Emissions for City of Glendale Municipal Operations were 37,392 MTCO_{2e} in 2004, and 38,538 MTCO_{2e} in 2009, an increase of 3%. This growth trend was included in the calculations of total GHG reduction needed to meet the City's targets. However, the City initiated a hiring freeze in year 2009, and recently cut services to meet budget needs, so the 2004 to 2009 trend indicates a growth rate unlikely to continue.

GHG Inventory Activity Data Reports

Note: The energy unit is MWh. To convert to kWh, multiply by 1,000. To convert to other units such as gallons, use a conversion tool such as those found on the internet.

7/26/2011

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Glendale

Government Greenhouse Gas Emissions in 2004

Report by Subsector

	CO ₂ (tonnes)	N ₂ O (kg)	CH ₄ (kg)	Equiv CO ₂		Energy (MWh)	Cost (\$)
				(tonnes)	(%)		
Buildings and Facilities							
<i>Scope 2</i>							
Glendale, CA							
Fire - Gas Consumption	170	0	16	171	0.5	940	31,511
Fire - Minor Facilities	107	1	3	108	0.3	212	30,406
Fire Department - Major Facili	1,583	16	41	1,588	4.8	3,128	359,480
General Gov - Gas Consumptic	271	1	25	271	0.8	1,494	44,928
General Government - Major Fi	1,427	14	37	1,432	4.3	2,821	343,688
General Government - Minor Fi	15	0	0	16	0.0	31	4,810
GWP - Gas Consumption	404	1	38	405	1.2	2,230	59,139
GWP - Major Facilities	1,357	13	35	1,362	4.1	2,682	300,552
GWP - Minor Facilities	6	0	0	6	0.0	11	1,647
Parks - Gas Consumption	120	0	11	120	0.4	660	26,097
Parks - Major Facilities	1,109	11	29	1,113	3.4	2,192	345,847
Parks - Minor Facilities	184	2	5	184	0.6	363	54,102
Police - Gas Consumption	606	1	57	607	1.8	3,344	86,481
Police - Major Facilities	1,841	18	48	1,847	5.6	3,638	386,827
Power Generation Facilities -	370	4	10	371	1.1	731	111,003
Power Generation Facilities -	255	3	7	256	0.8	504	71,079
Public Works - Gas Consumpti	119	0	11	119	0.4	656	20,651
Public Works - Major Facilitie	2,583	25	67	2,592	7.9	5,105	637,914
Public Works - Minor Facilitie	36	0	1	36	0.1	71	10,623
Subtotal	12,560	110	442	12,603	38.2	30,814	2,926,784
Subtotal Buildings and Facilities	12,560	110	442	12,603	38.2	30,814	2,926,784

Glendale

Government Greenhouse Gas Emissions in 2004

Report by Subsector

	CO ₂ (tonnes)	N ₂ O (kg)	CH ₄ (kg)	Equiv CO ₂ (tonnes) (%)		Energy (MWh)	Cost (\$)
Streetlights & Traffic S							
<i>Scope 2</i>							
Glendale, CA							
GWP	712	7	19	714	2.2	1,407	217,552
Parks	2	0	0	2	0.0	4	615
Public Works	141	1	4	142	0.4	279	41,623
<i>Subtotal</i>	855	8	22	858	2.6	1,690	259,791
Subtotal Streetlights & Traffic S	855	8	22	858	2.6	1,690	259,791
Water Delivery Facilitie							
<i>Scope 2</i>							
Glendale, CA							
GWP - Major Facilities	9,149	90	238	9,182	27.9	18,085	2,227,365
GWP - Minor Facilities	36	0	1	36	0.1	72	11,437
Parks	5	0	0	5	0.0	10	3,767
Public Works	2	0	0	2	0.0	4	621
<i>Subtotal</i>	9,193	91	239	9,226	28.0	18,171	2,243,190
Subtotal Water Delivery Facilitie	9,193	91	239	9,226	28.0	18,171	2,243,190
Wastewater Facilities							
<i>Scope 2</i>							
Glendale, CA							
Public Works	43	0	1	43	0.1	84	11,238
<i>Subtotal</i>	43	0	1	43	0.1	84	11,238
Subtotal Wastewater Facilities	43	0	1	43	0.1	84	11,238

Glendale

Government Greenhouse Gas Emissions in 2004

Report by Subsector

	CO ₂ (tonnes)	N ₂ O (kg)	CH ₄ (kg)	Equiv CO ₂ (tonnes) (%)		Energy (MWh)	Cost (\$)
Solid Waste Facilities							
<i>Scope 1</i>							
Glendale, CA							
Scholl Canyon Landfill	0	0	130,750	2,746	8.3	0	0
<i>Subtotal</i>	0	0	130,750	2,746	8.3	0	0
<i>Scope 2</i>							
Glendale, CA							
Solid Waste - Major Facilities	81	1	2	81	0.2	159	20,649
Solid Waste - Minor Facilities	7	0	0	7	0.0	14	2,221
<i>Subtotal</i>	88	1	2	88	0.3	173	22,870
<i>Scope 3</i>							
Glendale, CA							
Government Waste Generated	122	0	0	122	0.4	0	0
<i>Subtotal</i>	122	0	0	122	0.4	0	0
Subtotal Solid Waste Facilities	210	1	130,752	2,956	9.0	173	22,870
Vehicle Fleet							
<i>Scope 1</i>							
Glendale, CA							
Fire Department	469	14	12	474	1.4	1,903	99,254
General Government	112	8	6	115	0.3	462	23,712
GWP Biodiesel N ₂ O/CH ₄ Only	0	0	0	0	0.0	81	5,272
GWP Department	649	33	34	660	2.0	2,664	136,540
Parks Department	271	19	15	277	0.8	1,119	56,681
Police Department	1,312	57	46	1,331	4.0	5,293	202,892
Public Works Department	1,881	41	30	1,895	5.7	7,590	324,739
<i>Subtotal</i>	4,695	173	142	4,751	14.4	19,112	849,090
Subtotal Vehicle Fleet	4,695	173	142	4,751	14.4	19,112	849,090

Glendale

Government Greenhouse Gas Emissions in 2004

Report by Subsector

	CO ₂ (tonnes)	N ₂ O (kg)	CH ₄ (kg)	Equiv CO ₂		Energy (MWh)	Cost (\$)
				(tonnes)	(%)		
Transit Fleet							
<i>Scope 1</i>							
Glendale, CA							
Beeline Buses	2,313	382	4,284	2,522	7.7	12,409	387,817
<i>Subtotal</i>	2,313	382	4,284	2,522	7.7	12,409	387,817
Subtotal Transit Fleet	2,313	382	4,284	2,522	7.7	12,409	387,817
Total	29,868	766	135,883	32,959	100.0	82,454	6,700,779

Scope 3

Employee Commute

4,433

Total**37,392****Information Items**

Biodiesel consumption (CO2)

29

Landfill gas consumption (CO2)

99,094

Glendale

Government Greenhouse Gas Emissions in 2009

Report by Subsector

	CO ₂ (tonnes)	N ₂ O (kg)	CH ₄ (kg)	Equiv CO ₂ (tonnes) (%)		Energy (MWh)	Cost (\$)
Buildings and Facilities							
<i>Scope 2</i>							
Glendale, CA							
Public Works - Minor Facilitie	62	1	2	62	0.2	122	22,838
<i>Subtotal</i>	62	1	2	62	0.2	122	22,838
<i>Scope 2</i>							
Glendale, CA							
Fire - Gas Consumption	159	0	15	160	0.4	880	27,595
Fire - Minor Facilities	83	1	2	83	0.2	163	26,530
Fire Department - Major Facili	1,569	15	41	1,575	4.1	3,102	458,892
General Gov - Gas Consumptic	269	1	25	270	0.7	1,486	40,317
General Government - Major F	1,379	14	36	1,384	3.6	2,726	444,274
General Government - Minor F	28	0	1	28	0.1	56	9,443
GWP - Gas Consumption	327	1	31	328	0.9	1,808	40,724
GWP - Major Facilities	1,431	14	37	1,436	3.7	2,829	419,410
Parks - Gas Consumption	95	0	9	95	0.2	523	18,547
Parks - Major Facilities	1,028	10	27	1,031	2.7	2,031	474,994
Parks - Minor Facilities	148	1	4	148	0.4	292	54,570
Police - Gas Consumption	648	1	61	650	1.7	3,580	80,906
Police - Major Facilities	2,090	21	54	2,098	5.4	4,131	571,456
Power Generation Facilities -	392	4	10	394	1.0	776	138,046
Power Generation Facilities -	211	2	5	212	0.5	417	66,215
Public Works - Gas Consumptic	93	0	9	94	0.2	516	16,978
Public Works - Major Facilitie	2,431	24	63	2,440	6.3	4,806	780,605
<i>Subtotal</i>	12,383	109	431	12,426	32.2	30,122	3,669,502
Subtotal Buildings and Facilities	12,445	110	432	12,488	32.4	30,244	3,692,340

Glendale

Government Greenhouse Gas Emissions in 2009

Report by Subsector

	CO ₂ (tonnes)	N ₂ O (kg)	CH ₄ (kg)	Equiv CO ₂ (tonnes) (%)		Energy (MWh)	Cost (\$)
Streetlights & Traffic S							
<i>Scope 2</i>							
Glendale, CA							
GWP	961	9	25	964	2.5	1,899	343,502
Public Works	96	1	2	96	0.2	189	37,973
<i>Subtotal</i>	1,056	10	27	1,060	2.8	2,088	381,475
Subtotal Streetlights & Traffic S	1,056	10	27	1,060	2.8	2,088	381,475
Water Delivery Facilitie							
<i>Scope 2</i>							
Glendale, CA							
GWP - Major Facilities	8,236	81	214	8,265	21.4	16,279	2,674,398
GWP - Minor Facilities	25	0	1	25	0.1	49	10,326
Parks	7	0	0	7	0.0	13	6,324
Public Works	2	0	0	2	0.0	4	865
<i>Subtotal</i>	8,269	82	215	8,299	21.5	16,345	2,691,913
Subtotal Water Delivery Facilitie	8,269	82	215	8,299	21.5	16,345	2,691,913
Wastewater Facilities							
<i>Scope 2</i>							
Glendale, CA							
Public Works	33	0	1	33	0.1	66	11,843
<i>Subtotal</i>	33	0	1	33	0.1	66	11,843
Subtotal Wastewater Facilities	33	0	1	33	0.1	66	11,843

Glendale

Government Greenhouse Gas Emissions in 2009

Report by Subsector

	CO ₂ (tonnes)	N ₂ O (kg)	CH ₄ (kg)	Equiv CO ₂ (tonnes) (%)		Energy (MWh)	Cost (\$)
Solid Waste Facilities							
<i>Scope 1</i>							
Glendale, CA							
Scholl Canyon	0	0	117,700	2,472	6.4	0	0
<i>Subtotal</i>	0	0	117,700	2,472	6.4	0	0
<i>Scope 2</i>							
Glendale, CA							
Major Facilities	67	1	2	67	0.2	132	23,820
Minor Facilities	0	0	0	0	0.0	1	526
<i>Subtotal</i>	67	1	2	67	0.2	133	24,346
<i>Scope 3</i>							
Glendale, CA							
Generated Waste	116	0	0	116	0.3	0	0
<i>Subtotal</i>	116	0	0	116	0.3	0	0
Subtotal Solid Waste Facilities	183	1	117,702	2,655	6.9	133	24,346
Vehicle Fleet							
<i>Scope 1</i>							
Glendale, CA							
Fire Department	607	8	8	610	1.6	2,452	132,224
General Government	100	4	3	101	0.3	413	25,905
GWP	1,009	21	24	1,015	2.6	4,142	262,580
GWP - Biodiesel N2O/CH4 Onl	0	0	0	0	0.0	147	11,382
Parks Department	342	16	12	347	0.9	1,411	86,569
Police Department	1,812	39	55	1,825	4.7	7,428	441,506
Public Works	2,868	161	1,504	2,949	7.7	12,647	696,555
<i>Subtotal</i>	6,738	250	1,606	6,849	17.8	28,640	1,656,721
Subtotal Vehicle Fleet	6,738	250	1,606	6,849	17.8	28,640	1,656,721

Glendale

Government Greenhouse Gas Emissions in 2009

Report by Subsector

	CO ₂ (tonnes)	N ₂ O (kg)	CH ₄ (kg)	Equiv CO ₂ (tonnes) (%)		Energy (MWh)	Cost (\$)
Employee Commute							
<i>Scope 3</i>							
Glendale, CA							
Employee Commute	4,341	282	248	4,433	11.5	17,937	0
<i>Subtotal</i>	4,341	282	248	4,433	11.5	17,937	0
Subtotal Employee Commute	4,341	282	248	4,433	11.5	17,937	0
Transit Fleet							
<i>Scope 1</i>							
Glendale, CA							
Beeline	2,504	397	4,454	2,720	7.1	13,297	771,153
<i>Subtotal</i>	2,504	397	4,454	2,720	7.1	13,297	771,153
Subtotal Transit Fleet	2,504	397	4,454	2,720	7.1	13,297	771,153
Total	35,569	1,132	124,685	38,538	100.0	108,750	9,229,791

Information Items

Biodiesel consumption (CO2) 52
 Landfill gas consumption (CO2) 117,463

GHG Inventory Calculation Notes:

1. The electricity consumption emissions factor utilized consists of the utility's CO2 emission factor from the verified GHG reports to California Air Resources Board (CARB), the N2O and CH4 factors from CARB California Energy Commission California Grid Average, and other criteria pollutants from North American Electric Reliability Corporation Region 13 tables.

The 2009 CO2 emissions factor was used as a proxy for the 2004 CO2 emissions factor, because the 2004 utility emissions factor: A) was not included in the 2004 CARB GHG inventory report, B) used lower CO2e fuel conversion factors than in 2009, and C) only counted CO2 emissions, and not any of the other 6 Kyoto emissions, which are included in the 2009 emissions factor. This resulted in a misleading emissions factor that did not accurately reflect that the 2009 energy mix was more "green" than the 2004 energy mix (in fact it made it appear *less* green), misrepresented activity data, and complicated the analysis process.

For these reasons, and the fact that using the 2009 number for 2004 is still conservative, as it eliminates credit for increasing renewables in the energy mix, the 2009 emissions factor is used as a proxy for 2004. This allows inspection of actual energy consumption activity as well as effectiveness of implemented energy conservation measures.

2. The Fleet annual vehicle miles traveled were calculated as 50% Annual TM (A-30) FY 2003 + 50% of Annual TM (A-30) FY 2004. The fuel breakdown by vehicle/subfleet was not available, so calculation was used instead. Dial-A-Ride fleet was not included - fuel records did not exist.
3. Generated Waste emissions were calculated using the CalRecycle Web site government waste generation rate of 0.59 tons/employee/year. This was multiplied by the number of City employees to get waste generation. A 51% diversion rate was used for 2004 and 61% for 2009.

Appendix F

Sustainability Outreach

The following examples of employee sustainability outreach may potentially be used by City of Glendale to encourage energy and water conservation:

- Launch energy and water efficiency challenge for municipal buildings, and monitor progress using existing Smart Meters. Provide incentives/rewards for biggest conservers.
- Post daily “sustainability”²⁶ tips on the Employee Intranet website.
- Incorporate “sustainability” concepts into the daily survey conducted on the Employee Intranet site.
- Post daily “sustainability” tips above bathroom hand dryers.
- Launch individual carbon footprint reduction challenge and provide incentives/rewards for those who accomplish biggest reductions.
- Encourage all employees to sign a Green/Carbon Reduction Commitment to adopt sustainable habits.
- Offer free seminars/workshops (e.g. “bring your own lunch” sessions) to help employees plan for more sustainable living.
- Implement an on-line suggestion box for employees to contribute sustainability ideas.
- Provide incentives to employees for contributing sustainability ideas.
- Organize group walks/rides to the weekly Farmers’ Market.
- Work with employees who patronize local restaurants during lunch to minimize use of take-out bags, containers, and plastic ware.
- Provide on-line links and resources for employees to get more information on sustainability topics.
- Hold an annual sustainability employee party/fair.
- Conduct an exercise with each department/person to get them thinking about how they can make their operations more sustainable, and how they can implement those ideas.
- Share some of those ideas (e.g. useful/creative/interesting ones) via the Employee Intranet.
- Inform and test knowledge of employees on the City of Glendale’s Green efforts in the community.

²⁶ “Sustainability” refers to practices that protect the environment and support the economy and society in a way that can be sustained long into the future.

- Implement a Green Employee of the Month recognition program.
- Collaborate with local businesses, especially “green” ones, to provide promotional prizes for these programs.
- Use art to raise awareness. For example, hold an art class where employees bring in used materials and re-use them to make art.
- Implement a low-carbon diet campaign.
- Implement a bring-your-own mug/reusable bag/reusable water bottle/reusable bag campaign.
- Organize group walk/bike/take public transit to work day/week events.
- Provide bicycles/zip cars for use by employees during work or lunch hours.

Appendix G

Energy Efficiency Upgrades

Public Works and Glendale Water and Power partnered in year 2008 to complete an energy efficiency audit on 23 major City facilities. A contractor conducted the audit. The audit recommendations listed a variety of energy efficiency measures, including HVAC upgrades.

In year 2010, major upgrades were made to the HVAC systems of many of these facilities. As part of the Greener Glendale Plan, the audit recommendations were re-evaluated to identify appropriate measures to pursue in the future.

The following measures were identified as being applicable and feasible, providing funding becomes available. These comprise Strategy E2– F in the Energy section of this document.

- 1) Central Library
 - a. LED Exit Signs
 - b. Economizers on 3 Air Handling Units
 - c. Retro Commission Direct Digital Control System
 - d. Water conservation
- 2) City Hall
 - Retro Commission Direct Digital Control System
- 3) Fire Station #21
 - Variable Frequency Drive on Cooling Towers
- 4) General Services Building
 - a. Lighting Efficiency Upgrades
 - b. LED Exit Signs
 - c. Water Conservation
- 5) Integrated Waste
 - Packaged Roof Top Units with Economizers
- 6) Municipal Services Building
 - LED Exit Signs
- 7) Perkins Building
 - a. Replace Cooling Tower
 - b. Retro Commission Direct Digital Control System
- 8) New Police Station Building
 - a. LED Exit Signs
 - b. Variable Chilled Water Flow
 - c. Install Variable Frequency Drives on Domestic Water Pumps
 - d. Retro Commissioning

9) Brand Library

- a. Packaged Roof Top Units with Economizers
- b. Variable Frequency Drive on 15 h.p. Air Handling Unit
- c. Occupancy Sensors
- d. EMS HVAC Control System

For further details on the audit recommendations and energy and cost savings estimated for these measures, please see the original Glendale Water and Power audit report, *Energy Efficiency Feasibility and Greenhouse Gas Emission Studies*, prepared by Lincus on March 2, 2009.

Appendix H

Sample Green Purchasing Policies

Commit to purchasing specific products and goods that are climate-friendly:

- New equipment meets Energy Star or comparable energy efficiency standards.
 - Computer purchases meet the highest feasible EPEAT certification level.
 - Office paper purchases (copy paper, printer paper, writing pads, stationery, envelopes, and business cards) contain a minimum specified percentage of post consumer recycled content.
 - Other paper purchases (paper towels, toilet paper, napkins, and similar items) contain a minimum percentage of post consumer recycled content.
 - Carpeting and other furnishings contain a minimum percentage of recycled content.
 - Plastic items (refuse and recycling receptacles, decking, parking lot barriers, furniture, etc.) contain recycled content.
 - Oil and oil-related products contain recycled content.
 - Products certified by either GreenSeal or EcoLogo, as long as they cost no more than an agency-determined percentage above the price of non-certified products.
- Create an interdepartmental team to 1) promote policy implementation, 2) track policy adherence, and 3) suggest additional items to be included in the agency's climate-friendly purchasing program, including such tasks as:
 - Reviewing and analyzing current (baseline) purchasing by major product categories.
 - Prioritizing product categories in terms of greenhouse gas emissions implications and improvement potential.
 - Reviewing policies, procedures, organization/staffing for implementation barriers.
 - Developing multi-year implementation schedule based on priorities, difficulty, upcoming solicitations.
 - Reporting achievements under the policy to policy makers and the public annually.

Purchase services that are climate-friendly:

- Require service providers to follow climate-friendly practices, or provide a preference in selecting and contracting with service

providers to those that follow climate-friendly practices.

- Provide incentives for the use of alternative fuel vehicles for agency contracts for services involving vehicles (buses, waste hauling and recycling, construction, etc.).
- Ensure that the highest feasible percentage of annual expenditures for contract services is with companies registered with the California Climate Action Registry or its successor.

Give preference to climate-friendly vendors:

- Provide a price preference to product vendors that follow climate-friendly practices,

including use of recycled content materials, Energy Star and EPEAT materials and equipment, as well as alternative fuel vehicles.

- Provide a price preference to product vendors that inventory and register their greenhouse gas emissions with the California Climate Action Registry or its successor and that report their verified greenhouse gas emissions within the jurisdiction.

*Source: INSTITUTE FOR LOCAL GOVERNMENT
CLIMATE ACTION & SUSTAINABILITY BEST
PRACTICES FRAMEWORK
VER. 6.4 (MAY 2011) www.ca-ilg.org/climatechange*

Appendix I

Landfill Gas Emissions

The Environmental Protection Agency states that reported landfill collection efficiencies range between 60% - 85%, and that a value of 75% collection efficiency is most commonly used.²⁷ However, this is not a Southern-California-specific number and does not take into account local regulations and climate.

A recent study on this issue states that, “widely used default collection efficiency values such as 75% may grossly underestimate the true collection efficiency, particularly for landfills operated for emission control purposes (e.g., US EPA Municipal Solid Waste NSPS and SCAQMD Rule 1150.1)”²⁸

The actual values for these types of landfills (e.g. Scholl Canyon), based on field-testing, were found to be 95%.²⁷

A second study states that the assumed 75% collection efficiency is not based on test data, is somewhat dated, and does not take into account the dry California climate.²⁹

Therefore, this inventory uses a 95% collection efficiency in the landfill GHG emissions calculations.

²⁷ EPA AP 42 Emission Factors, Solid Waste Disposal, pg 2, 4-6 (1998)

²⁸ *Field Comparison of Landfill Gas Collection Efficiency Measurements*. Huitric, et al. Solid Waste Association of North America 30th Annual Landfill Gas Symposium, Monterey, CA. (2007)

²⁹ *Current MSW Industry Position and State-of-the-Practice on LFG Collection Efficiency, Methane Oxidation, and Carbon Sequestration in Landfills*, SCS Engineers. (2007)

Appendix J

Employee Commute Survey Results

Employee Commute Carbon Footprint Survey Results

Greenhouse Gas Emissions

Total annual vehicle miles traveled by employees commuting to and from work were 8.1 million.

Resulting greenhouse gas emissions (GHGs) were equivalent to 9.7 million pounds (4,433 tonnes) of CO₂.

It would take 945 acres of pine forest to absorb these emissions, or 113,667 tree seedlings grown for 10 years.¹

Employee commutes account for 12 % of the GHGs from City of Glendale municipal operations.

Employee Commute Distances (see map below)

Average employee commute trip distance is 19.3 miles.

25% of employees live within a 5.2 mile commute to City Hall.

50% of employees live within an 11.5 mile commute to City Hall.

75% of employees live within a 31.2 mile commute to City Hall.

What We Should Do

Ultimately, we need to reduce the amount of carbon-based fuel we are burning to travel to and from work. Here are some ways we can do this:

Change How We Travel

Instead of driving alone in a vehicle, consider walking, biking, taking public transit, or carpooling for one or more days per week or month. Find fellow employees who live in your neighborhood with which to travel. Contact Mirna Martinez for assistance. Take advantage of work schedules that allow you to commute less days to work.

Improve Our Vehicles

In the coming years, new vehicles in California will be designed to emit less carbon pollution. Hybrid and electric vehicle availability will also improve. The City, companies, and organizations within the community are exploring how to increase electric vehicle infrastructure in Glendale. If you drive a diesel vehicle, consider using biodiesel instead.

For your current vehicle, improve fuel efficiency by:

- Keeping it tuned up

- Keeping tires properly inflated

- Not storing heavy objects in the vehicle

- Not speeding. Speeding can reduce fuel efficiency by up to 33%.

- Accelerating smoothly with moderate throttle

- Avoiding stop-and-go driving and idling

For more information, visit <http://www.wikihow.com/Increase-Fuel-Mileage-on-a-Car>.

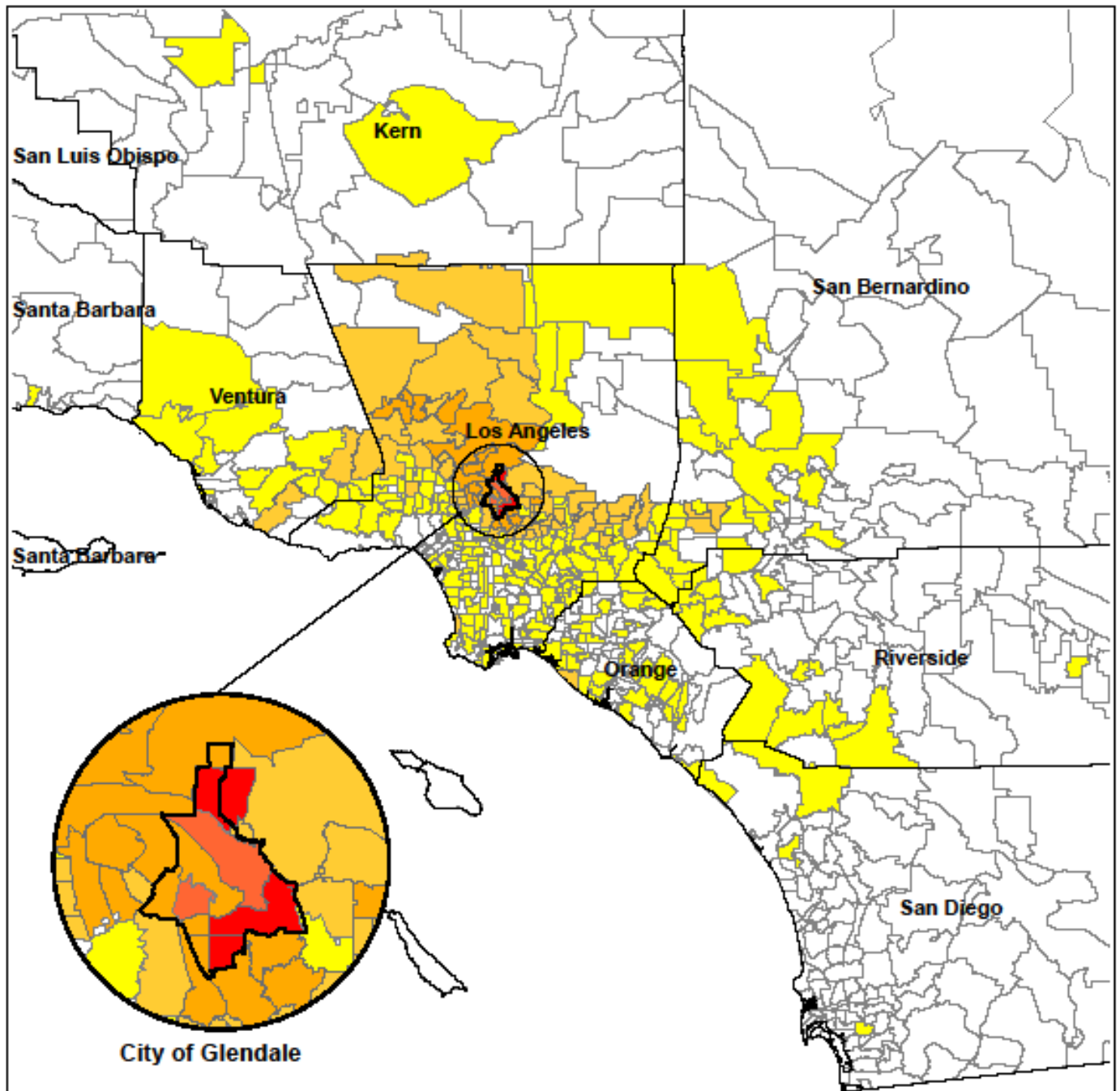
About the Survey Data

Data was calculated using total vehicle trips from the Traffic Department's annual rideshare survey, commute distances from the zip codes of employee residences (anonymous), and vehicle types and number of days traveled from our sample survey (online *Employee Commute Carbon Footprint* survey*) of more than 200 participants.

Assumptions used to facilitate calculation: Commute distances are from employee residential zip codes to City Hall using the average trip distance from Google Maps. Vehicle fuel efficiencies are for combined road and highway driving.

*The *Employee Commute Carbon Footprint* survey was posted on the City of Glendale Employee Intranet home page on 2/24/2011. An email was sent to all City of Glendale employees on 3/4/2011 inviting participation in the survey.

¹ <http://www.epa.gov/cleanenergy/energy-resources/calculator.html#results>



Employee Commutes

Geographic Distribution

Appendix K

Program Status, Cost, and Funding Information

On September 19, 2011, the Glendale Water and Power Commission requested additional cost and funding information regarding the programs listed in the Greener Glendale Plan for Municipal Operations. The information is provided in the following chart.

Notes about the chart:

1. This document is a policy level, guidance document. It lists sustainability programs that may forward general goals. In some cases, the activities associated with a program are known to definitely result in greenhouse gas (GHG) emission reductions, but specific projects have not yet been identified. To quantify associated emissions, specific project data is required. For example, gallons of fuel consumed, vehicle miles traveled, kWh of electricity consumed, etc. In those cases, the data can only be obtained through a feasibility study, which is beyond the scope of this document. GHG estimates are only provided when supported by a reasonable methodology or assumption.
2. "\$0 cost" items indicate that the item does not require additional work or funding on top of existing work program efforts.
3. "Incremental cost" refers to the cost of the item over what is already conducted as part of existing work programs. For example, if the City will already purchase a vehicle for X cost, and a hybrid vehicle costs X plus Y, the incremental cost is Y.
4. Although "Cost per MTCO_{2e} GHG Reduced" is one way to consider the priority of programs, the chart itself is already organized by priority. Phase 1 programs are considered highest priority because they have already been initiated in some way and/or are already part of the budget. Phase 2 items, although unfunded, are considered higher priority than Phase 3 items because they could be accomplished with existing staff by changing staff work plans and policy direction and with minimal overhead.

Phase	Line #	Sustainability Category	Measure	Estimated MTCO2e GHG Reduction	Cumulative MTCO2e GHG Reduction	Status	Funding Source/Status	Mandatory vs. Voluntary	Cost per MTCO2e GHG reduced	Cost/Calculation/Notes
(PHASE 1) Existing / Planned and Funded Efforts (post-2009)	1	Energy	33% Renewable Energy Portfolio	3,256	3,256	In progress	Info pending	Mandatory	Info pending	Required by State law. Additional funding would come from the Fuel Adjustments Charge, i.e. the ratepayers, where grant funding cannot be obtained to offset the cost. Estimated \$5.4 Million each year (high estimate).
	2	Urban Nature	Plant 3,400 trees by 2020	868	4,124	In progress	PW/ CS&Parks	Voluntary	\$877	Tree quantity was calculated by multiplying the current tree planting rate from Public Works and CS & Parks by 10 years. Cost: \$761,600. Public Works has \$40,000/yr in Urban Forestry account, and \$10,000/yr in the Urban Forest Fund for planting indigenous trees. CS & Parks tree plantings are almost fully funded by Glendale Beautiful (~\$5,675/yr) with the remaining (~\$225/yr) coming from the CS&Parks enterprise fund.
	3	Energy	HVAC upgrades on 23 buildings	308	4,432	Completed	Completed	Voluntary	\$2,976	\$916,746
	4	Transportation	Retire underused/older vehicles	221	4,653	Current departmental policy	Completed	Voluntary	\$0	No cost associated with this item. GHG reduction calculation applies to those already completed (50). Vehicles are replaced according to a predetermined schedule and auctioned off.
	5	Energy	Improve water pumping efficiency	152	4,805	Info pending	Info pending	Voluntary	Info pending	Info pending
	6	Transportation	Downsizing vehicles	47	4,852	Current departmental policy	No funding needed	Voluntary	\$0	No cost associated with this item. This is an ongoing effort, with 20-40 vehicles planned for replacement. Vehicles are replaced, according to a predetermined schedule, with smaller versions appropriate to the job task. Retired vehicles are auctioned off.
	7	Energy	Vending misers	41	4,893	Completed	Completed	Voluntary	\$197	51 vending misers installed. \$8,077
	8	Energy	Brand Library remodel	24	4,917	Completing design development, moving into construction documents stage.	CIP	Voluntary	\$2,685	\$64,435 for the energy efficiency/water upgrades. The project has been in the CIP since 1989 and is scheduled to be completed in 2013.
	9	Water	Parks Department water efficiency efforts	20	4,937	Current departmental policy	Completed	Voluntary	Not available	GHG reduction calculation applies to those already completed. These efforts are integrated into the normal work plan and so are not tracked and budgeted as a separate project.
	10	Energy	Energy efficient computers	15	4,952	Current departmental policy	Completed	Voluntary	\$0	Energy efficient computers cost the same as other models. GHG reduction calculation applies to those already complete (100 computers).
	11	Transportation	Idle control policy	12	4,964	Planned	Staff time only	Voluntary	\$0	Some City departments currently practice idle-control but this is not formalized policy (part of the City's Administrative Policy Manual). This would require staff time to coordinate, but is not currently assigned to any work program. No other cost associated with this measure. Measure would affect at least 200 vehicles.
	12	Energy	Central Library - Energy Star computers	11	4,975	Completed	Completed	Voluntary	\$0	Energy efficient computers cost the same as other models. GHG reduction calculation applies to those already complete (70 computers).
	13	Energy	Utilize existing 12 exterior LED lights	5	4,980	Planned	No funding needed	Voluntary	\$0	These lights have already been purchased.
	14	Water	Low maintenance landscaping on City property	2	4,982	Current departmental policy	Completed	Voluntary	Not available	These efforts are integrated into the normal work plan and so are not tracked and budgeted as a separate project. GHG reduction calculation applies to those already completed (1 acre).
	15	Energy	Install LED exit signs	1	4,983	Current departmental policy	Completed	Voluntary	Info pending	GHG reduction calculation applies to those already completed (6 lights).

Phase	Line #	Sustainability Category	Measure	Estimated MTCO2e GHG Reduction	Cumulative MTCO2e GHG Reduction	Status	Funding Source/Status	Mandatory vs. Voluntary	Cost per MTCO2e GHG reduced	Cost/Calculation/Notes
(PHASE 1) Existing / Planned and Funded Efforts (post-2009)	16	Cross-Cutting	Smart Grid applications within City operations	Not quantified	4,983	Planned	GWP	Voluntary	Not available	The Smart Grid will result in increased efficiency within municipal operations, however, it is not possible to estimate how many vehicle miles, staff hours, etc. will be reduced from these efforts. A GHG reduction estimate was provided for the entire water and electric service to the community, but not solely for municipal operations. The Smart Grid for water and electric is being paid by GWP.
	17	Transportation	Replaced underused/older vehicles	Not quantified	4,983	Current departmental policy	Completed	Voluntary	\$0	To calculate GHG reductions, the number of vehicle miles and/or gallons of fuel reduced is required. This data was not available to make the calculation. However, newer vehicles emit less pollution than older vehicles, so there would be a definite decrease in emissions. 8 vehicles were replaced. No cost is associated with this effort.
	18	Urban Design	Green building for affordable housing projects	Not quantified	4,983	Current departmental policy	Redevelopment setaside funds,	Voluntary	Not available	All affordable housing projects are at least 15% more energy efficient than Title 24 requirements. Geneva and Doran are required to be Green Point Rated, are mid-construction, and are scheduled for completion in 2012.
	19	Urban Design	Green building for City projects	Not quantified	4,983	Required by Glendale Municipal Code	CIP	Voluntary	Not available	The "Old Police Building" is being upgraded for water and energy efficiency and is scheduled for completion in 2012. The project is paid for through the CIP (\$900,000).
	20	Waste	Reduce vehicle maintenance yard waste stream	Not quantified	4,983	Current departmental policy	Completed	Voluntary	Not available	Data and technology not available at this time to quantify GHG reductions.
	21	Waste	Replace paper towels with energy efficient blow dryers	Not quantified	4,983	Completed	Completed	Voluntary	Not available	Data not available at this time to quantify GHG reductions. Manufacturer states that the embodied energy of the product is less than that of paper towels.
	22	Waste	Utilize recycle-in-place pavement	Not quantified	4,983	2 projects planned	No funding needed	Voluntary	Not available	Project specifics are not available at this time but are expected to save the City \$100,000-\$200,000 on each project. There is no up-front cost associated with this measure.
	23	Waste	Re-use Parks green waste	Not quantified	4,983	Current departmental policy	Completed	Voluntary	Not available	No cost associated with this measure. No data or technology available at this time to quantify GHG reductions, however, reduced waste definitely results in reduced GHGs.
	24	Energy	Water transport facilities - efficiency tests/upgrades	152	5,135	Completed	CIP	Voluntary	\$1,020	\$155,000. Replacement of inefficient pumping units on the Glendale Water system.
	25	Energy	Water transport facilities - energy management system	443	5,578	Planned	GWP/CIP	Voluntary	\$1,354	\$600,000. Energy cost savings were achieved by reducing or eliminating peak demand power charges, improving and anticipating storage requirements in the water distribution system, and selecting and utilizing the lowest cost sources of water and transport path first within all constraints.
	26	Energy	Develop two local water wells	355	5,933	Foothill Well - Completed Rockhaven Well - In progress	CIP	Voluntary	\$8,451	\$3,000,000. Energy savings were realized by pumping ground water in the La Crescenta area of Glendale instead of pumping imported water.
	27	Transportation	Installation of bike lanes and roadway markings	Not quantified	5,933	Ongoing effort	Grant funded	Voluntary	Not available	For the next three years we have allocated over \$500K (all grants funds) for bike facilities. We are aggressively looking for any available local, state, and federal funds that we can get for bicycle facilities. Specific projects are not yet identified so GHGs cannot be calculated.
28	Transportation	Adopt Green Fleet Policy	Not quantified	5,933	In progress	Staff time only	Voluntary	Not available	Included as part of staff work program. Policy document does not include specifics on individual vehicles, so GHGs cannot be calculated at this time.	

Phase	Line #	Sustainability Category	Measure	Estimated MTCO2e GHG Reduction	Cumulative MTCO2e GHG Reduction	Status	Funding Source/Status	Mandatory vs. Voluntary	Cost per MTCO2e GHG reduced	Cost/Calculation/Notes
PHASE 2 (No Significant Additional Funding)	29	Transportation	Switch diesel to B10 biodiesel	765	6,698	Potential project	Info pending	Voluntary	\$0	GWP fleet already experimented with switching from diesel to B20 biodiesel and used it from 2002 to 2009. No difference in cost or performance were noticed. The average fuel cost of biodiesel is the same as diesel. To implement this for the entire fleet, some logistics need to be sorted out, such as whether or not the tanks need to be recertified, which is pending regulatory guidance surrounding the issue.
	30	Energy	Sustainability outreach/Smart Meter tech	1,018	7,716	Potential project	Staff time only	Voluntary	Not available	This project refers to promotion of energy/water savings among City buildings using consumption readings from Smart Meters. It would require staff time or a person to coordinate the effort and is not currently part of any workplan.
	31	Energy	Facility natural gas energy audit and upgrades	Not quantified	7,716	Potential project	Not funded	Voluntary	Not available	SoCal Gas has provided free energy audits to us in the past. Subsequent to the audit results and recommendations, we would explore applicable upgrades, and necessary funding. When project specifics are known, GHGs can be estimated.
	32	Cross-Cutting	Explore enhancement of existing Green Purchasing Policy	Not quantified	7,716	Potential project	Staff time only	Voluntary	Not available	This would require staff time that is not currently part of any workplan.
	33	Energy	Facility Energy Efficiency Policy	Not quantified	7,716	Potential project	Staff time only	Voluntary	Not available	This would require staff time that is not currently part of any workplan. It would include energy/water conservation guidelines for employees.
PHASE 3 (Unfunded)	34	Waste	Implement Zero Waste Plan*	35	7,751	Draft under review	AB 939 Fees	Voluntary	\$10,000 according to our current inventory methods, but likely over estimated	\$350,000/yr, which is currently available with AB 939 fees. No additional cost to City. Actual GHG reductions would likely be much higher than what is listed, but due to current inventory methods, are not possible to quantify.
	35	Transportation	Hybrid vehicles	83	7,834	Potential project	Not funded	Voluntary	\$4,398	\$365,000 incremental cost
	36	Transportation	Rideshare increased incentives/outreach	119	7,953	Potential project	Not funded	Voluntary	Info pending	Info pending
	37	Energy	Solar panels on 8 buildings	148	8,101	Potential project	Not funded	Voluntary	\$7,297	\$1,080,000 (without incentives/rebates)
	38	Energy	Reflective roofing	165	8,266	Potential project	Not funded	Voluntary	\$355	\$58,576
	39	Transportation	Electric vehicles	222	8,488	Potential project	Not funded	Voluntary	\$3,028	\$672,175 incremental cost (government agencies are not eligible for the federal and state tax credits that consumers get).
	40	Energy	Energy upgrades on 8 buildings	349	8,837	Potential project	Not funded	Voluntary	\$1,554	\$542,494
	41	Transportation	Switch B10 biodiesel to B20 biodiesel	765	9,602	Potential project	Not funded	Voluntary	\$0	GWP fleet already experimented with switching from diesel to B20 biodiesel and used it from 2002 to 2009. No difference in cost or performance were noticed. The average fuel cost of biodiesel is the same as diesel. To implement this for the entire fleet, some logistics need to be sorted out, such as whether or not the tanks need to be recertified, which is pending regulatory guidance surrounding the issue.
	42	Energy	Additional facility energy efficiency upgrades	1,018	10,620	Potential project	Not funded	Voluntary	Not available	Not known. This is a general placeholder for additional energy efficiency upgrades. Buildings generally see a 10% energy savings with upgrades, which is the estimate used here.
43	Energy	Additional sustainability outreach	1,018	11,638	Potential project	Not funded	Voluntary	Not available	This would require staff time and is not currently part of any work plan.	

As of 9/27/2011

Phase	Line #	Sustainability Category	Measure	Estimated MTCO2e GHG Reduction	Cumulative MTCO2e GHG Reduction	Status	Funding Source/Status	Mandatory vs. Voluntary	Cost per MTCO2e GHG reduced	Cost/Calculation/Notes
PHASE 3 (Unfunded)	44	Urban Nature	Plant additional 7,750 trees by 2035	1,978	13,616	Planned	PW/CS&Parks	Voluntary	\$877	Tree quantity was calculated by multiplying the current tree planting rate from Public Works and CS & Parks by 15 years. Cost: \$1,736,000. Public Works has \$40,000/yr in Urban Forestry account, and \$10,000/yr in the Urban Forest Fund for planting indigenous trees. CS & Parks tree plantings are almost fully funded by Glendale Beautiful (~\$5,675/yr) with the remaining (~\$225/yr) coming from the CS&Parks enterprise fund.
	45	Energy	LED street lights	2,507	16,123	Potential project	Not funded	Voluntary	\$4,787	Accurate data is not available on LED costs. A rough, ballpark figure is \$12 million over existing cost of lights.
	46	Energy	Increased Renewable Energy Portfolio by 2035	1,556	17,679	Potential project	Not funded	Voluntary	Not available	Not known. This measure would only be pursued if mandated by State law, or City Council.
	47	Water	Power generator water efficiency upgrade	Not quantified	17,679	Potential project	Not funded	Voluntary	Not available	This project is in the initial stages of a feasibility study.
	48	Urban Nature	Enhance wildlife habitats and corridors	Not quantified	17,679	Potential project	Not funded	Voluntary	Not available	Specific projects would need to be identified to determine cost and GHG reduction. This measure supports the City's sustainability goals.
	49	Water	Stormwater management and Low Impact Development	Not quantified	17,679	Potential project	Not funded	Voluntary	Not available	Specific projects would need to be identified to determine cost and GHG reduction. The City's Municipal Stormwater Permit will be renewed in 2012 and will likely include LID provisions. The City currently has Low Impact Development Guidelines and is evaluating enactment of an ordinance requiring use of LID in City and community projects.
	50	Environ Health	Reduce use of toxics	Not quantified	17,679	Potential project	Not funded	Voluntary	Not available	Specific projects would need to be identified to determine cost and GHG reduction.
	51	Cross-Cutting	Climate Adaptation Plan	Not quantified	17,679	Potential project	Not funded	Voluntary	Not available	Staff time would be required to complete the plan. If a consultant were hired to complete the plan, it would cost roughly \$150,000, not including any costs associated with environmental review or technical studies. The City may be able to secure grant funding for this project.
	52	Environ Health	Employee patronizing of downtown farmers' market	Not quantified	17,679	Potential project	Not funded	Voluntary	Not available	Specific projects and outcomes would need to be identified to determine cost and GHG reductions.

As of 9/27/2011