1. Introduction/Purpose

"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."

—Intergovernmental Panel on Climate Change, Fourth Assessment Report, November 17, 2007

"Here in Los Angeles, climate change will likely mean longer and hotter summers, longer droughts, more devastating wildfires, and shortages of water that threaten public health and our economy."

—Mayor Antonio Villaraigosa, Green LA Climate Change Action Plan, May 2007

"Continued greenhouse gas emissions at our above current rates would cause further warming and induce many changes in the global climate system during the 21st century that would very likely be larger than those observed during the 20th century."

—IPCC Fourth Assessment Report

"Our goal is to reduce greenhouse gas emissions 35% below 1990 levels by 2030."

—Mayor Antonio Villaraigosa, Green LA Climate Change Action Plan.

Taking Responsibility for an Urgent Problem

Every city and country must take responsibility for its contributions to climate change. With four million residents and more than four hundred sixty square miles, Los Angeles emitted in 2004 more than fifty million metric tons of carbon dioxide, the primary greenhouse gas (GHG), representing approximately 0.2% of worldwide emissions. By way of comparison, Los Angeles emits about the same amount of carbon dioxide as the country of Sweden.

Mayor Antonio Villaraigosa and the City of Los Angeles have joined with the US Conference of Mayors, the Clinton Climate Initiative, and the C40 Large Cities Climate Leadership Group to develop a forceful response to the challenge of climate change, the umbrella term that encompasses all climate impacts attributable to human activities, including global warming. The Mayor's goal of reducing greenhouse gas emissions to 35% below 1990 levels is one of the most ambitious commitments announced by a major international city.

To reach this goal, we, as a city, will need to lower emissions to thirty-five million metric tons by the year 2030. Reaching this goal will require ongoing effort and ingenuity by city government, businesses, and residents.

Potential Impacts of Climate Change on Los Angeles

The world's leading atmospheric scientists predict that climate change will have serious environmental, economic, and public health consequences in the coming decades. For Los Angeles, scientists predict that summers will be even hotter, with a doubling or more in the number of heat wave days per year. In addition, Los Angeles will see a 75-85% increase in the number of days with poor air quality and high ground-level ozone concentrations. Hotter, smoggier days mean more stress on electricity and water supplies, more heat-related deaths, and more strain on those with respiratory and cardiovascular diseases. Changing rainfall patterns could make severe droughts routine, and one of our primary sources of potable

water, snow melt in the eastern Sierra Nevada Mountains, could be drastically reduced. Sea level rise could impact low-lying coastal neighborhoods and facilities at the Port of Los Angeles. Los Angeles intends to act now—not only to reduce our contribution to climate change, but also to learn to adapt to its inevitable consequences.

Urgent Action—the City's Plan

The City of Los Angeles has arrived at that moment when consideration of climate impacts has become integrated into the policy development and decision making process. In May 2007, the City published "Green LA: An Action Plan to Lead the Nation in Fighting Global Warming," which included more than fifty specific actions designed to reduce the City's contributions to climate change, and to prepare a response to the changes that have already begun to occur. Since its publication, City departments have been working together to respond to the challenge set forth in the Plan.

The result is ClimateLA, the implementation program that provides detailed information about each action item discussed in the Green LA framework. Action items range from harnessing wind power for electricity production and energy efficiency retrofits in City buildings, to converting the City's fleet vehicles to cleaner and more efficient models, and reducing water consumption. Information about proposed and/or ongoing programs, opportunities for achieving the City's goals, specific challenges, and a list of milestones is provided for each action item. The scope of these actions range from those impacting only municipal facilities, such as retrofitting City Hall with high efficiency lighting systems, to those facilitating changes in the private sector, such as rebates for the purchase of energy-efficient appliances.

ClimateLA is a living document, reflecting a process of ongoing learning and continuous improvement as technology advances and City departments develop expertise in the methods of lowering greenhouse gas emissions.

Policy Principles and Community Values

All City actions to reduce greenhouse gas (GHG) emissions are guided by a set of policy principles and community values. First and foremost, we aim to achieve real, measurable reductions in carbon dioxide (CO2) emissions[1] by City government (municipal) operations and facilities, the business sector, and residential households. We will begin with our own operations, and, through continued investments in our buildings, facilities, infrastructure, vehicles, and programs, achieve efficiencies that will reduce the associated emissions. We intend for the City to serve as an example for the greater community—the businesses, residents, nonprofits, and other governments that comprise Los Angeles. Our actions will also facilitate emission reductions by community members. An active public participation process is key to our efforts. Without community support, we will not reach our goals.

The City's municipal efforts in responding to the Mayor's call to action are detailed in this document. Because of the diversity of facilities owned and operated by the City of Los Angeles, we expect to gain experience and knowledge that can be used by others. For example, by constructing fifty LEED-certified new buildings over the past four years, the City has helped create a highly skilled workforce of architects, engineers, and contractors who have become experts in Green Building. These professionals are now applying their expertise to other sustainable projects in this region and beyond.

The City will create incentives for all sectors of our community to reduce their own emissions, by making carbon reduction a smart economic choice. Federal policies that assign a value to emissions are anticipated, as part of a national program that limits GHG emissions. Today's City policies and incentives will help the public and private sectors prepare for a challenging future in which CO2 efficiency directly affects the bottom

line. As we have seen from prior efforts, when we reduce consumption of fossil fuels, electricity and water, we also reduce our impacts and create a healthier and more sustainable environment.

Throughout this process, we will invite public input on how City government can best facilitate emission reductions throughout our community while reducing the impacts of municipal operations. Public input is also critical to ensure that City policies and programs reflect the concerns of Los Angeles' diverse communities. EnvironmentLA (ELA), the Environmental Affairs Commission (EAC), and other departments will conduct public participation and outreach and educational activities in collaboration with on-going environmental efforts whenever possible. City staff will also be educated about climate change, mitigation, and adaptation, so they carry this message in their daily work activities.

We will chart our progress in reducing emissions against our 1990 baseline. Although not yet required by state law, the City will begin publishing an annual CO2 emissions inventory for municipal operations—including emissions from energy use for buildings, facilities, and vehicles owned and/or operated by the City of Los Angeles government—starting in late 2008. Data for calendar year 2004 through 2007 have been collected, and are being reviewed prior to third-party verification and submittal to the California Climate Action Registry. Of the City's proprietary departments, the Los Angeles Department of Water and Power (LADWP) and the Port of Los Angeles (POLA) have already published annual greenhouse gas inventories, and the Los Angeles World Airports will publish its inventory soon.

A community-wide inventory of greenhouse gas emissions will also be prepared, building upon the preliminary assessment prepared for the Green LA Climate Action Plan. We will coordinate these efforts with the California Air Resources Board, California Climate Action Registry, ICLEI, and other organizations and agencies involved in the development a methodology for measuring community-wide emissions.

Mandatory Reporting for Selected Municipal Entities

Beyond the City's voluntary plan to reduce GHG emissions, specified City-owned facilities are mandated per state law to report their emissions. In December 2007, the California Air Resources Board approved regulations that require certain California facilities to report their greenhouse gas emissions on an annual basis, pursuant to the state's landmark climate change legislation, the Global Warming Solutions Act (Assembly Bill 32). LADWP, the City-owned (municipal) utility, will be required to report emissions associated with its electrical power generation and distribution activities each year. Other specified facilities, including the co-generation facility at the Los Angeles International Airport, may also be required to submit emissions reports or inventories.

Sources of CO_2 Emissions in 2004

Community-wide Emissions

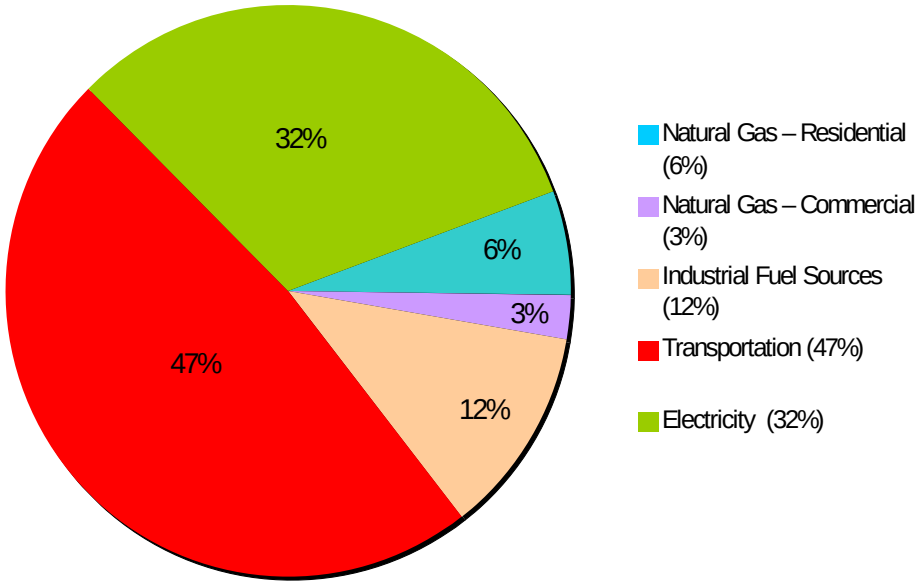
To give us a sense of the magnitude of greenhouse gas emissions resulting from activities that occur within the geographic boundaries of the City of Los Angeles, we have compiled a preliminary estimate of carbon dioxide (CO2) emissions from the consumption of electricity, industrial fuels, natural gas, and transportation fuels by all sectors (government, business, and residential) in the City. This estimate uses electricity consumption figures from the LADWP; CO2 emissions from other fuels are derived from statewide figures. We have estimated a total of 51.6 million metric tons of CO2 resulting from all activities in the City, given the limited information available.

As noted in the figure below, emissions from electricity use represent 32% of CO2 emissions generated within the City; 47% is from transportation sources, natural gas use generates 9% of emissions, and the balance of 12% is from burning other industrial fuels. As noted, nearly half of citywide CO2 emissions in 2004 came from privately operated cars and trucks. Because our electricity is generated and provided by

the LADWP, for the purposes of this document, we are considering CO2 emissions from electricity as a "municipal" activity. In reality, emissions from electricity use come from the generation of electrical power—coal or natural gas-fired power plants—not the use of electricity. To reduce these emissions, the City government and utility must partner with all sectors of the community to provide cleaner sources of electricity and to use less electrical power.

We have also compiled a very detailed inventory of CO2 emissions from facilities and operations of the municipal government, which are needed to deliver the wide range of City services to a population of four million residents. This "municipal CO2 inventory" is further described in Appendix B to this report.

Figure 2. Communitywide CO_2 Emissions—All Sectors 2004



As we refine the community GHG inventory, we must carefully consider electricity. The amount of GHG emissions resulting from electricity generation and use are necessarily related to the source of that electricity. Coal and natural gas-fired power plants produce CO2 emissions as they generate electricity; wind and solar-powered facilities do not. The demand for electric power dictates the amount of power that must be generated. As we compile the inventory, we must not count emissions from the same kilowatt of electricity twice (once for generating it, called "direct emissions," and again for using it, called "indirect emissions"). The methodology used will clearly define how we will account for emissions from electricity.

Effective Strategies to Do Our Part

As noted in the policy principles above, we begin our strategy to reduce emissions by looking at our municipal government activities. How can we make our operations cleaner? What can we do differently to reduce our impact on the climate? The following departmental action plans provide details on many actions that reduce our burden on the climate. But because government operations and programs exist to provide services to the community of Los Angeles, many of our emission reduction strategies involve

offering opportunities to the community, businesses and residents alike, to reduce their own impact on the climate. Following are highlights of several strategies that are detailed later in this report.

Renewable Energy

Nearly half of LADWP's energy is generated by from relatively low cost coal-fired power plants, which emit more CO2 per megawatt than other kinds of power generation. Replacing coal-fired power with renewable energy is the most significant action the City can take to reduce overall CO2 emissions.

The Mayor has set an aggressive goal of increasing LADWP's use of renewable energy to 20% by 2010 and 35% by 2020. Renewable energy has already become a significant part of LADWP's generation portfolio over the past few years, rising from 3% in 2003 to 7% in 2006. Major new projects using wind power, solar power, biomass, geothermal and small hydro will come online in future years, displacing coal power and reducing CO2 emissions from energy generation.

Energy Efficiency

In order to reach our emissions goal, the entire community will need to learn how to use electricity more efficiently. City government is taking a lead role, setting an example with its own facilities and creating incentives for businesses and households to use less electricity. By some measures, Los Angeles is already a leader in this crucial area, having upgraded over 50 existing City-owned buildings with energy-efficient lighting and heating systems.

At the same time as City departments reduce their energy consumption, LADWP will continue to invest in helping businesses and households save energy. In fiscal year 2007-2008, LADWP will double its investment in energy efficiency programs from the previous year. In late 2008, LADWP will distribute 2.4 million compact fluorescent light (CFLs) bulbs to Los Angeles households at no charge. If most of these are installed, the program could reduce CO2 emissions from power generation by 70,000 metric tons.

Green Building

Having paved the way by constructing 49 new LEED-certified or higher level municipal buildings, the City adopted a green building policy for private development on April 22, 2008. This policy will have three parts: establishment of an interdepartmental Green Team, baseline requirements for all new buildings that exceed minimum threshold requirements, and incentives for projects to go beyond the baseline. The US Green Building Council's LEED standards will be used.

City Vehicle Fleets

Over the last several years, the City has been moving rapidly to bring new alternative-fueled and advanced technology vehicles into the City fleets. These efforts are reducing both CO2 emissions and emissions of traditional pollutants such as particulate matter. The City already owns and operates more than 2,400 such vehicles, including hundreds of natural gas fueled refuse collection trucks, DASH buses and street sweepers.

Land Use

The growing impact of CO2 emissions has created another powerful motivator for City policies that promote vibrant, walkable, transit-accessible neighborhoods. When housing, jobs and retail are located together in a pedestrian-oriented community, people tend to reduce car trips, significantly reducing emissions. The City is working closely with Metro (the Metropolitan Transportation Authority) to identify development opportunities at current and planned rail stations and is in the process of revising twelve community plans to create a more livable city.

Tracking and Reporting

To underscore our commitment to meeting the City's emission reduction goals, we will put into place a tracking and reporting process. EnvironmentLA, as lead for the interdepartmental working group charged with implementing the Green LA Climate Action Plan, has established a reporting schedule for all departments with action items noted in this report. All departments will track progress made and goals achieved; this information will become part of an ongoing report for the Mayor, City Council and public. The reporting process will allow departments the flexibility to add new measures, redesign measures that are not working well, and replace measures that cannot be implemented. All the while, as inventories are prepared and program benefits calculated, we will track the City's progress toward our goal.

Based on available calculations, fully executing the current ClimateLA measures appears sufficient to meet the 35% reduction goals ahead of 2030. ELA is developing a tracking tool which will keep those calculations up-to-date with reduction activities undertaken by the City. Overarching municipal and City progress will be measured by the inventories compiled by ELA and the tracking tool will provide more detailed links to performance in defined sectors. This will allow prioritization of future efforts by opportunity, cost, and co-benefits. ELA will recommend new measures and phase out existing measures accordingly.

An aggressive public participation and outreach effort is planned to solicit public input to the Climate Program and to challenge all Angelenos to reduce their individual carbon footprint. To that end, working with the Environmental Affairs Commission (EAC), the ELA contracted with the Urban and Environmental Policy Institute at Occidental College and the Green LA Coalition to develop an outreach and participation strategy for the City's Climate Program. The resulting report, Engaging the Public in the Fight Against Global Warming, provides a series of key findings and recommendations for a Climate Action Campaign. The report was developed after substantial research into other municipal outreach efforts, and a lengthy series of interviews (over 150) with representatives of various sectors, including environmental organizations, financial institutions, business interests, media and movie industries, and youth groups. These interviews represent the beginning of public engagement on climate issues. ELA, in partnership with the EAC and other City departments, looks forward to implementing many of the recommendations in the report in the coming months. Our formal outreach and public participation program is now in development, and we expect to release more information this Spring. The public engagement report is available at www.environmentla.org.

While ClimateLA 2008 primarily addresses the measures from the GreenLA Plan, the ClimateLA program will continue to grow. We will expand the ClimateLA implementation program to incorporate new ideas, fill in gaps, and address strategies that are outside the City's direct control. Some of these new measures may require legislative action by the City to ensure implementation; the City may also consider incentive programs or other ways of encouraging private actions to reduce GHG emissions. The actions in this document set us on a solid path toward the City's goal, but we will continue to expand the program to become more comprehensive and to ensure continued progress and participation by all sectors in the community.

2. Departmental Action Plans

Green LA: An Action Plan to Lead the Nation in Fighting Global Warming, released in May 2007, directs City departments, lead by the EnvironmentLA, to compile a set of actions to be taken to support the City's greenhouse gas goals and targets. These "departmental action plans" follow, and describe the steps identified to date to reduce carbon dioxide (CO2) emissions from municipal facilities and operations, and, in some cases, from private activities that occur within the City limits.

The action plans are arranged according to the Focus Areas in the Green LA Climate Action Plan, which are Energy, Water, Transportation, Land Use, Waste Open Space and Greening, Green Economy, efforts by the Proprietary Departments, and Climate Change Education. In the near future, we will also address Adaptation; namely how can the City government adapt, and assist our residents and businesses in adapting, to changes in our climate that are already occurring.

The departmental action plans below focus on current and future steps to achieve the identified goals. In many cases, the text notes accomplishments from past programs and policies, several of which are also listed in the Green LA Climate Action Plan.

The plans represent the departments' current proposals for moving ahead with actions, but specific actions and timelines are subject to change. We will soon begin an extensive public participation process that will help refine the actions listed here and new measures that might be feasible. We will proceed with actions that are funded or ongoing, but the action plans will not be finalized until public input is received and incorporated.

This compilation of action plans is a flexible, "living document" that will be amended as departments continue to refine measures, replace those that have proven ineffective, add new measures to reflect new information or the development of new technologies, and modify timelines as a result. We will develop a monitoring process to track our progress on each measure and in reducing greenhouse gases emissions in the City.

While the Green LA Climate Action Plan directs us to reduce "greenhouse gas emissions," we will initially track only carbon dioxide (CO2) emissions. CO2 is the most prevalent greenhouse gas and the one that is tracked in most voluntary reporting schemes. Emissions of the additional five GHGs, as identified by the United Nations, will be beginning in our fourth year of reporting.

Action Plans

Each action plan below contains a description of the action, the lead and partner agencies responsible for implementation, associated opportunities and challenges, implementation steps and timelines, and a brief evaluation of the GHG reduction potential of the action, when available.

Please note that some action items are intended to implement City environmental goals (water quality, greening, etc.) other than GHG reductions. GHG reductions from these actions may be a secondary or indirect benefit, such as the benefits from transit-oriented districts. In many cases, standardized methods for calculating such reductions have not yet been developed. Therefore, the emission reduction potential of each action may not be included.

2.1 Focus Area: Energy

GOAL: Green the power from the largest municipal utility in the United States

GOAL: Make Los Angeles a worldwide leader in green buildings

GOAL: Transform Los Angeles into the model of an energy efficient city

GOAL: Help Angelenos be energy misers

Action No.	Measure	Page
E13	Distribute two compact fluorescent light (CFL) bulbs to each of the 1.4 million households in the City.	37
E14	Increase the level and types of customer rebates for energy efficient appliances, windows, lighting, and heating and cooling systems.	39
E15	Increase the distribution of energy efficient refrigerators to qualified customers.	41
E16	Create a fund to “acquire” energy savings as a resource from Los Angeles Department of Water and Power (LADWP) customers.	42

In addition to the above measures, The City will continue to evaluate emerging issues and strategies for reducing GHG emissions relating to energy and will incorporate findings into future versions of this document. This includes cool pavements, proven carbon sequestration strategies, energy-use feedback mechanisms, feed-in tariffs, and innovative market-based incentives.

GOAL: Green the power from the largest municipal utility in the United States

Action E1	**Meet the goal to increase renewable energy from solar, wind, biomass, and geothermal sources to 20% by 2010.**
Action E2	**Increase use of renewable energy to 35% by 2020.**

The Los Angeles Department of Water and Power's (LADWP's) Renewable Portfolio Standard (RPS) goal is one example of the Department's environmental leadership. This goal calls for an increase in the supply of electricity from eligible renewable resources to 20% by December 31, 2010, and 35% by 2020. Reducing the amount of electricity generated by fossil fueled power plants will result in direct, real reductions in greenhouse emissions.

To meet these renewable energy goals, LADWP is focused on developing new renewable energy projects in southern California, and the associated transmission lines needed to bring the renewable power to Los Angeles. LADWP has issued three major Requests for Proposals (RFPs) for renewable energy projects, and has identified over 30 projects that will assist it in meeting the 2010 and 2020 RPS goals. In addition, to provide the necessary transmission capacity, LADWP is simultaneously moving forward with the planning and environmental assessment activities for two new transmission lines.

Over the last three years, LADWP has made considerable progress on increasing the amount of renewable energy, as illustrated in the following tables:

Table 1. E1/E2 Percent Renewable Sales to Customers

Year	Percent Renewable Power
2006	7%
2005	6%
2004	5%
2003	3%

Source: Power Content Label

www.ladwp.com

Table 2. E1/E2 Existing Renewable Projects

Project	Technology	Acquisition	In-Service Date	Capacity (MW)	Annual Energy Production (GWH)
Powerex, Pacific Northwest	Small hydro		2007	50	430
Pleasant Valley, Wyoming	Wind		2006	82	230
Penrose Landfill	Landfill gas		2005	6	45
Bradley Landfill	Landfill gas		2005	6	36
Solar Rooftop Photovoltaics (PV)	Solar		2000	10	18
Lopez Canyon Landfill	Landfill gas		2000	1.5	5
Hyperion Treatment Plant	Digester gas		1995	22	143
Aqueduct Hydro Plants	Small hydro	1908 -	1987	166	670
Totals				**344**	**1,577**

Lead Agency	Los Angeles Department of Water and Power (LADWP)
Other Agencies	Bureau of Sanitation (BOS) of the Los Angeles Department of Public Works (LADPW); (see Action Item E5 - Increase biogas firing of natural gas-fired power plants)
	The Harbor Department (Port of Los Angeles, or POLA)

Opportunities

LADWP is developing renewable resources including wind (Tehachapi), geothermal (Salton Sea), and from such resources already in hand, the City is in a unique position to lead the country, if not the world, in the shift to renewable energy sources. Furthermore, because these resources are so close at hand, LADWP can ensure that the jobs and economic development that result from its critical investment stay at home. Beyond a reduction in GHG emissions, the use of these renewable resources will also confer air quality benefits through the avoidance of increased criteria pollutant emissions (e.g. nitrogen oxide or NOx emissions). Because the renewable "fuel" from the wind and sun and the earth is "free" and locally produced, the addition of significant renewable resources to LADWP's generation portfolio insulates our customers from the volatile prices and potential supply disruptions associated with conventional fuels.

As stated in the Energy Efficiency-Related action items (Action Items E11, E16), LADWP offers a variety of Demand Side Management (DSM) programs to encourage customers to implement energy efficiency technologies and strategies. The DSM programs are designed to influence the time, pattern, and magnitude of the participating customers' electrical loads. Thus, customer participation in DSM programs also represents an opportunity for lower customer bills and for LADWP to use less fossil fuel to serve the City's needs.

Challenges

As LADWP's shifts to increased reliance on renewable energy sources, one of the primary challenges will be the transition of the remaining fossil fuel power plants from a role of supplying "base load" energy to one of filling in the "gaps" for periods when the sun is not shining or the wind is not blowing. As we implement Action E4 to increase the efficiency of in-basin natural gas-fired power plants, LADWP must also ensure that these plants have the flexibility for quick start and stop capabilities, in order to fill in such "gaps." In addition, in order to prepare for the efficient utilization of this new renewable energy generation mix, LADWP must also increase the efficiency and flexibility of Castaic Power Plant, which is the principal existing energy storage facility; reconfigure and improve the efficiency of the in-basin transmission and distribution infrastructure; and upgrade our "command and control" capability.

The other critical issue is LADWP's ability to construct two new transmission lines that are needed to bring renewable energy resources to the Los Angeles Basin. Barren Ridge Castaic, the first transmission line project, will bring new wind, solar and geothermal resources from locations in the Tehachapi/High Desert region. The Pine Tree Wind Development Project, which will be the largest municipally owned wind farm in the United States, is the first of many projects that will utilize this critical "transportation corridor" for a 21st Century LADWP. However, construction of the transmission line must precede the significant expansion of additional renewable generation in the area. Without this transmission line, LADWP will be forced to compromise on location, cost, and ownership possibilities by accessing remote, out-of-state renewable energy sources. Therefore, timing is absolutely critical to achieving the City's broader goals.

Green Path North, the second transmission line project, is directly tied to development of the specific and significant geothermal opportunities in the Salton Sea/Imperial Valley area. The two principal challenges for this project are determining an environmentally, politically, and financially acceptable route from the Imperial Valley; and ensuring that the generation and transmission projects develop together, in time to meet the City's goals.

The successful execution of measure E3 is contingent upon the successful implementation of measures E2 and E4. The latter two call for replacing coal for serving our load, and in order to hold down the cost of this radical shift in the City's generation portfolio, extracting the maximum value from the disposition of these coal assets,

Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. LADWP will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation of the projects. LADWP is proceeding with the engineering and environmental studies needed to site the new transmission line projects. In addition, LADWP is in the negotiation and contract development phase for proposed renewable resources resulting from its Requests For Proposal. The RPS are summarized in the following table:

Table 3. E1/E2 Planned Renewable Projects

Technology	Number of Projects	Total Capacity (MW)	Estimated Annual Energy Production (GWH)
Biomass	3	12	83
Geothermal	4	287	2,291
Small Hydro	3	17	102
Solar	7	1,000*	2,394
Waste-to-Energy	4	100	800
Wind	10	1,159	3,255
Totals	**31**	**2,575**	**8,925**

The Bureau of Sanitation (BOS) is also in the process of evaluating proposals for Alternative Technology Facilities that would process post-source separated municipal solid waste. The Mayor has set the goal of having the City's first Alt Tech facility operational by 2010. The syngas (or synthetic gas, which is composed primarily of carbon monoxide and hydrogen), biogas, or steam, etc, generated by the Alternative Technology treatment process will be used as a renewable energy source.

The Board of Water and Power Commissioners and the Board of Harbor Commissioners of the City of Los Angeles formed a committee, the Electrification of Los Angeles Harbor Committee, to discuss innovative ways to produce and utilize renewable energy, both within the Harbor Department and among Port tenants. As a result of this collaboration, on December 7, 2007, the Port of Los Angeles announced that it will construct a solar photovoltaic (solar PV) system within the port's footprint to provide POLA with ten megawatts (10 MW) of zero-emission electricity. This system will help offset future incremental load or increased electricity demand that will result from port electrification. POLA staff has compiled an inventory of potential solar PV sites within the Port.

Measure Evaluation

The ability to meet the RPS goals in 2010 and 2020 is critical to meeting the City's overall greenhouse gas emission reduction targets.

LADWP will provide an annual report to its customers of the resource mix used to serve its retail customers by fuel type, the status in implementing an RPS and progress toward attaining the standard. LADWP will also provide a quarterly Power Content Label Report to its customers. For purposes of attaining RPS goals, given that there may be significant fluctuations from year to year in the amount of energy generated, particularly from hydroelectric, wind and solar resources due to weather conditions, LADWP RPS goals may report energy that would have been generated in an average year from individual projects utilizing these technologies.

Preliminary Calculations: An increase in use of renewable energy to 20% by 2010 and 35% by 2020 will reduce GHG emissions by about 1.5 and 4.5 million metric tons CO_2, respectively, compared to 2008. The 35% level will provide a savings of 153,000 metric tons of CO_2 per year from *indirect* GHG emissions originating from Council controlled departments. There would be an indirect savings from Proprietary departments amounting to 109,000 MT CO_2/yr. Thus, for all departments, a savings of 262,000 MT CO_2/yr of indirect emissions will be achieved. The calculations assume no growth in the baseline inventory (2004) and no changes in the LADWP emissions factor.

Tons GHG (CO2) Reduced (compared to 2008)	**2010**	**2020**
	1.5 million	**4.5 million**

Action E3	Reduce the use of coal-fired power plants.

Reducing the amount of electricity produced by coal, the most greenhouse gas intensive of the fossil fuels, will reduce the CO_2 intensity of LADWP's power mix.

Lead Agency Los Angeles Department of Water and Power (LADWP)

Mohave Generating Station

In 2001, LADWP sold one half of its 20% interest in the coal-fired Mohave Generating Station, thus reducing LADWP's ownership share to 10%. On December 31, 2005 the entire Mohave plant was shut down. The sale of half of LADWP's share reduced our annual CO_2 emissions by 1.1 million short tons. The plant's closure further reduced LADWP's CO_2 emissions by an additional 1.1 million short tons per year.

Navajo Generating Station

LADWP has a 21.2% entitlement share in the coal-fired Navajo Generating Station, which is equivalent to approximately 3.8 million short tons of CO_2 emissions per year. It is assumed that LADWP's agreement with Navajo Generating Station will expire on December 31, 2019.

Intermountain Power Plant

LADWP's agreement with coal-fired Intermountain Power Project (IPP) began on February 1, 1983, and will end on June 15, 2027. Per the agreement, LADWP is entitled to receive approximately 44% of the plant's generation (equivalent to approximately 6.2 million short tons of CO_2 emissions per year). LADWP also purchased a 4% entitlement share of the plant from Utah Power and Light (UP&L) equivalent to approximately 0.5 million short tons of CO_2 emissions per year.

In addition, LADWP has been able to purchase up to an additional 18% of the plant's generation from other IPP participants, under the Excess Power Sales Agreement. LADWP anticipates that all of IPP's excess power will be recalled by the other IPP participants by the end of 2012. This recall would result in a projected decrease in LADWP's CO_2 emissions of 2.1 million short tons per year.

The Intermountain Power Agency (IPA) and the Southern California Public Power Authority (SCPPA) are evaluating options to reduce IPP's greenhouse gas emissions, including efficiency improvements, reduction in coal consumption, use of renewable fuels, and the capture and sequestration of carbon. The latter refers to the use of technologies to capture, utilize, and store CO_2 that's generated by large stationary sources. Through this evaluation, IPA and SCPPA seek to understand the technical, economic, and legal risks of each option available to reduce greenhouse gas emissions from IPP, and to identify areas for further research and study.

Opportunities

LADWP's ongoing efforts to transition from coal-fired power plants to lower emitting CO_2 sources will enable the City to significantly reduce its GHG footprint. LADWP may be able to further reduce its carbon footprint as new sources of reliable, clean base load generation are developed. It is also possible that innovation in clean coal technologies will result in reduced IPP carbon emissions.

Challenges

- Since approximately 47% of LADWP's energy comes from relatively low cost coal-fired power plants, LADWP needs to identify and procure alternative, lower carbon power sources to replace its coal generation.
- Carbon capture and sequestration technology has not been tested or demonstrated on a commercial scale.
- Policies to site, construct, license and ensure the environmental integrity of CO_2 pipelines and sequestration methods remain unresolved at this time.

Partnerships

LADWP has partnered with the other IPP participants (e.g., municipal utilities, electric cooperatives, and investor-owned utilities) in funding and participating in the feasibility study to evaluate ways to reduce the carbon emissions from IPP. The initial feasibility study has been completed and LADWP, as the operating agent, is moving forward with more detailed analysis of some of the recommendations from the initial feasibility study.

Table 4. E3 Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. LADWP will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation of the projects.

Milestone	Completion Date
Final draft feasibility study on reducing IPP's carbon footprint.	Spring 2008

Measure Evaluation

The percentage of coal in LADWP's power mix is reported on LADWP's Power Content Label, which is provided to the City Council, Board of Water and Power Commissioners and all retail customers, and published on its Web site. See Section 3.8 for LADWP's forecast CO2 emissions and emission reductions resulting from the combination of Actions E1, E2, E3 and E4.

Action E4	Increase the efficiency of natural gas-fired power plants.

The Los Angeles Department of Water and Power (LADWP) plans to replace four steam boiler electric generating units with advanced gas turbines. Steam boiler units 5 and 6 at the Haynes Generating Station (HGS) are to be replaced with simple cycle turbines. Units 1 and 2 at Scattergood Generating Station (SGS) will be replaced with combined cycle turbines and/or simple cycle turbines.

Replacing old generating units with more efficient generating units will reduce the amount of natural gas burned per unit of electric energy produced, and will therefore reduce greenhouse gas emissions from the combustion of natural gas.

Lead Agency Los Angeles Department of Water and Power (LADWP)

Other Agencies Los Angeles Department of Public Works (LADPW)

Opportunity

The use of gas turbines, which are about 15% more fuel efficient at generating electricity than steam boilers, will reduce electricity costs for LADWP customers.

Challenges

The combined cycle gas turbines proposed for SGS are about 35% more fuel efficient than existing steam boilers, but they require a significant amount of cooling water. The use of ocean cooling water has been linked to population declines of several marine species. The alternative, wet cooling towers, requires large amounts of land and can produce large plumes of evaporate under certain meteorological conditions.

Given the small amount of space available at SGS, it may be necessary to build the new units in the same location as the units they are replacing. This would require shutting down the existing units for about 2 years. However, the Hyperion Treatment Plant (Hyperion), which treats wastewater (sewage), constantly produces digester gas, which currently is combusted in Units 1 and 2, which also supply steam to Hyperion for the sewage treatment process. If the existing units are shut down during construction, an alternative means of burning Hyperion's digester gas and supply steam must be found. A proposed joint SHARE (Scattergood-Hyperion Alternative Renewal Energy) project calls for the Los Angeles Department of Public Works (LADPW) and LADWP to build and operate gas turbines at Hyperion to consume all of the digester gas and supply steam.

Table 5. E4 Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. LADWP will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation of the projects.

Milestone	Completion Date
4/07 - Approval of Memorandum of Understanding (MOU) between LADPW and LADWP to study the feasibility of building electric generating units at Hyperion Treatment Plant.	4/2007
Approval of LADWP's 2007 Integrated Resource Plan by the Board of Water and Power Commissioners, which recommends repowering projects at Haynes and Scattergood Generating Stations.	1/8/2008
Completion of the SHARE study.	Spring 2008

Measure Evaluation

A schedule with critical milestones will be developed for the Haynes and Scattergood repowering projects. The progress on meeting each milestone will be reported on an ongoing basis to the Board of Water and Power Commissioners. See Section 3.8 for LADWP's forecast CO2 emissions and emission reductions resulting from the combination of Actions E1, E2, E3 and E4.

Action E5	Increase biogas co-firing of natural gas-fired power plants.

The combustion of biogas will displace a portion of natural gas usage at power plants, thus reducing greenhouse gas emissions. The following represent the City's major projects to more fully utilize biogas emissions:

- Transition the 1 Megawatt (1 MW) Terminal Island Fuel Cell at the Terminal Island Wastewater Treatment Plant from natural gas to digester gas.
- Inject bio-solids underground into abandoned/depleted oil and gas reservoirs as part of the 4 MW Terminal Island Renewable Energy Project (TIRE). The earth's natural heat will digest the bio-solids, resulting in the production of methane gas. The methane gas will be recovered and used in fuel cells to produce electricity.
- Approve power purchase contracts on two landfill gas-to-energy projects (3 MW and 5 MW) within the City of Los Angeles.
- Increase the amount of digester gas combusted at natural gas fired electric power plants. Units 1 and 2 at Scattergood Generating Station (SGS) burn pipeline natural gas as well as digester gas from the nearby Hyperion Treatment Plant. The digester gas currently generates about 22 MW of electricity.

Lead Agency

Terminal Island Fuel Cell: Bureau of Sanitation (BOS) of the Los Angeles Department of Public Works (LADPW)
Terminal Island Renewable Energy: Los Angeles Department of Water and Power (LADWP) and Bureau of Sanitation (BOS)
Two Landfill Gas-to- Energy Projects: LADWP
Scattergood Generating Station, Digester Gas: LADWP & LADPW)

Grant money from the California Energy Commission (CEC) is being used to offset the costs of the two Terminal Island projects.

Opportunity

Biogas is considered GHG neutral because it is not of fossil origin. Biogas firing reduces natural gas consumption, thus reducing greenhouse gas emissions.

Challenges

Units 1 and 2 at Scattergood are scheduled for replacement by 2013. If the existing units need to be taken out of service during construction, the Hyperion digester gas will need to be diverted to another generating unit. See the discussion of the SHARE project under Action E3.

Table 6. E5 Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. LADWP and BOS will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation of the projects.

Milestone	In-Service Date
Terminal Island Fuel Cell.	11/2008 (tentative)
Two landfill gas-to-energy projects: The first project already exists and the LADWP expects to begin receiving the power by 6/2008. The second project has a 6/2009 in-service date.	6/2008; 6/2009
Terminal Island Renewable Energy: Begins with a 5-year proof of concept demonstration project.	2013 (tentative)
Scattergood/Hyperion SHARE project: The amount of digester gas is expected to increase gradually over time due to natural population increases and process optimization. The SHARE project will increase the conversion efficiency of the digester gas to electricity and process heat by 35%.	

Measure Evaluation

Progress on increasing the amount of electricity generated from biomass will be reported as part of the Measure Evaluation of Actions E1 and E2.

GOAL: Make Los Angeles a worldwide leader in green buildings

Action E6	**Present a comprehensive set of green building policies to guide and support private sector development.**

GHGs associated with City facilities have already been significantly reduced by the City's green building initiative where 49 City projects (that have been completed or are underway) will meet the US Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) certified standard or better. The City recently embarked on an effort to establish green building requirements, paired with incentives, for medium- to large-private projects. The Green Building Program, which was adopted by the City Council on Earth Day 2008, and will be administered by an interdepartmental Green Building Team, consists of a Standard of Sustainability and Standard of Sustainable Excellence. Effective in November 2008, the Standard of Sustainability will require non-residential projects and residential projects greater than 6 stories of 50,000 square feet or more to meet the intent of LEED at the Certified level. In May 2009 residential projects that are six stories or less with at least 50 units and 50,000 sf will also need to comply with the requirement. The Program establishes Silver LEED as the Standard of Sustainable Excellence eligible for priority and expedited services and financial incentives.

Lead Agency	Department of City Planning (Planning)
Other Agencies	Department of Building and Safety (DBS); Bureau of Engineering of the Los Angeles Department of Public Works (BOE); EnvironmentLA (ELA); Los Angeles Department of Water and Power (LADWP); Port of Los Angeles (POLA)

The City has adopted the USGBC's LEED standards for its own facilities, and recently adopted these for private buildings. The City will also coordinate with CalEPA as resources become available through its programs. Please see Section 3.8 for proprietary department green building efforts.

Opportunity

Buildings account for a majority of electricity use. Each building site is a microcosm of the environmental issues faced by the City, so addressing each site in a comprehensive manner will provide a variety of environmental benefits. The efficiency of green buildings also offers a relatively short cost recovery period. In addition, recent studies have shown that such high performing buildings can not only be quite profitable, but also create more productive working and learning environments.

Challenges

Few outside programs fund green building efforts, so the City must identify revenue sources for support staff and facilities. The City's private sector requirements are already perceived as onerous, so it is important that any new green building requirements be integrated as seamlessly as possible.

Current and proposed policies primarily address new construction, but new buildings are greatly outnumbered by existing buildings. Many programs (i.e., LADWP rebate programs) already offer incentives for retrofitting existing buildings for greater energy and water efficiency, but a more comprehensive outreach program may be necessary to increase awareness of such programs.

Table 7. E6 Implementation Steps

Now that the Green Building Ordinance and Program are approved, outreach is very important to prepare developers for the revised procedures and requirements. The Planning Department will hire staff to process the green building submittals. Additionally, the Green Team will continue to meet both internally and publicly to consider code and process improvements to further green building in the City.

Milestone	Completion Date
Receive approval from Planning Commission, Council, and Mayor.	4/22/2008
Provide outreach materials to developers.	5/2008-ongoing
Process 100 new buildings.	12/2008
Process 300 new buildings.	12/2009
Implement process for existing buildings.	TBD

Measure Evaluation

Buildings, as the largest electricity users, represent a prime opportunity for the reduction of GHGs. Since most LEED certified or silver level buildings can be built for little or no additional cost, and the buildings become profitable in a relatively short period, the economics of this measure are outstanding. The extent to which other programs address existing buildings needs to be more comprehensively evaluated, and may lead to additional policy development.

GHGs Reduced

Quantification of this measure was calculated using building energy intensities from the 2000-03 CBECS inventory to estimate the LEED savings over buildings with Title 24 standards. The City will work to better characterize growth versus replacement square footage in future calculations as well as quantify other CO2 reduction benefits from LEED features.

Electric Energy Intensity for newest buildings in Pacific region (kWh/sq-ft)	11.0
Estimated electric energy consumption for a 50,000 sq-ft, Title-24 building (kWh)	550,000
Natural Gas Energy Intensity for newest buildings in Pacific region (cubic feet/sq-ft)	19.9
Estimated natural gas energy consumption for a 50,000 sq-ft, Title-24 building (therms)	10,219
Minimum Energy Savings for new construction projects registered after June 26,2007 (new buildings)	14%
Electricity Savings from each retrofit (kWh/yr)	77,000
Natural Gas Savings from each retrofit (therm/yr)	1,431
Emissions Avoided by 400 LEED buildings (MT CO_2/yr)	**22,000**

GOAL: Transform Los Angeles into the model of an energy efficient city

Action E7	**Reduce energy use by all City departments to the maximum extent feasible.**

This section contains a few key examples of departmental energy reduction measures. Other measures are still being evaluated as part of their departmental sustainability plans and will be added to future versions of this report.

-To reduce energy use associated with the operation of streetlights with energy-efficient lighting sources and solar-powered lighting-

Installation of more efficient light sources that will reduce the consumption of energy from the power grid system is ongoing. A five-year program to convert the City's approximately 9,000 incandescent lights to an induction system is underway. Street Lighting has also been evaluating several types of solar lighting equipment for approximately seven years. The City continues to test solar powered systems to verify the reliability of the batteries used in each system.

Lead Agency	Bureau of Street Lighting (BSL) of the Department of Public Works (LADPW)
Other Agencies	Los Angeles Department of Water and Power (LADWP)

Opportunity

Unlike incandescent lamps, induction lamps do not use electrodes, and the induction lighting system uses a high-frequency generator with a power coupler. The generator produces a radio frequency magnetic field that excites the gas-filled bulb. Since it has no electrodes, the lamp has been shown to last longer. An induction lamp will last up to 100,000 hours and will still produce 70% of its maximum light output after 60,000 hours of use. An induction lamp's rated life is 5-13 times longer than that of a metal halide, and about seven times longer than fluorescent.

An existing pilot program testing LEDs (light-emitting diodes) in roadway fixtures will be expanded in approximately 6 months. LEDs have been shown to cut energy use by 40%, compared to conventional bulbs.

New streetlights will be equipped with a remote monitoring system that signals which bulbs have burned out and which lights have failed to automatically turn off at the appointed time. The monitoring system will assist the City in achieving its GHG reduction goals by decreasing electricity usage by streetlights.

Challenges

Funding for the pilot project is available and the costs are reasonable, when compared to standard streetlights that are powered by grid electricity. Funding for future projects has not been identified at this time.

Solar lighting systems use batteries, which contain high levels of lead. Battery handling and disposal costs must be evaluated when calculating the overall benefit and impact of solar lighting systems.

Table 8. E7 Implementation Steps

Install solar power lighting fixtures for the purposes of evaluating performance and energy efficiency. Evaluate the performance of more energy-efficient light sources such as induction lamps and light emitting diodes (LED). Of the 9,000 incandescent lamps remaining in the City's system, 2,800 are funded and undergoing construction for conversion. The remaining 6,200 lamps require approximately $35 million for conversion ($7 million per year for 5 years).

Milestone	Completion Date	Quantity of Measure
Complete installation of pilot solar lighting.	June 2008	Number of lights installed, funding allocated.
Installation of LEDs – expand program.	June 2008	
Acquire funding for further installations.	June 2009	
Installation of new solar lighting equipment.	June 2012	
Convert incandescent to induction.	June 2013	

Measure Evaluation

Incandescent Lamps - It is estimated that the replacement of all 9,000 incandescent lamps will save the City a minimum of $1 million per year. The savings will be realized through a reduction in electricity costs, elimination of the need to relamp (re-place) incandescents every 6 months, and through the more efficient allocation of maintenance staff resources. The decreased use of maintenance vehicles will also lower direct GHG emissions.

GHGs Reduced

Expected energy savings (kWh)	49,621,933
Estimated emissions eliminated (Approx. MT CO_2/yr)	**31,000**

Solar Lighting - This measure will be evaluated by the reduction in the amount of electricity required to operate streetlights that is achieved through the use of solar. There was approximately 137,000 metric tons of CO_2 from the City's street lighting based on the 2004 Council-Controlled inventory. For this measure, the approximate amount of CO_2 emissions that could be eliminated by successful conversion of 1%, 5% and 10% of the City's streetlights to solar power was calculated. The 2004 LADWP CO_2 emission factor was used for these calculations. For the purposes of this calculation, the solar powered streetlights were assumed to result in zero CO_2 emissions.

GHGs Reduced

2004 Streetlight electricity consumption (kWh)	224,781,609
Emissions eliminate by **1%** conversion (Approx. MT CO_2/yr)	**1,000**
Emissions eliminated by **5%** conversion (Approx. MT CO_2/yr)	**7,000**
Emissions eliminated by **10%** conversion (Approx. MT CO_2/yr)	**14,000**

-Replace incandescent bulbs in traffic signal lights with energy-efficient LEDs (light-emitting diodes)-

The Los Angeles Department of Water and Power (LADWP) and the City's Department of Transportation (DOT) have a joint pilot project to replace energy-intensive incandescent bulbs in traffic signal lights with highly efficient LEDs. The project is expected to reduce energy use by 95% and reduce maintenance requirements, as LEDs need to be replaced much less frequently than incandescent bulbs. In addition, innovations such as battery backup systems using solar photovoltaics (PV) will be incorporated.

Lead Agency

Los Angeles Department of Water and Po... Department of Transportation (DOT)

Opportunity

Both energy consumption and maintenance time will be reduced. ...ase as a result of a reduction in the amount of electricity consumed, and the number ... vehicles on the road; the vehicles' total hours of operation may also be reduced.

Challenges

By 2011, the number of signaled intersections converted will total 4,608. The challenge will be to retrofit approximately 922 intersections per year on average. The number of signalized intersections is expected to increase about 10 per year.

Table 9. E7 Implementation Steps

Implementation is ongoing has been incorporated into departmental plans and budgeting. DOT will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation of the projects.

Milestone	Completion Date	Quantity of Measure
Begin conversion of first 820 intersections.	7/07	Number of intersections completed.
Conversion of next 948 intersections.	7/08	
Conversion of next 948 intersections.	7/09	
Conversion of next 948 intersections.	7/10	
Conversion of final 944 intersections.	7/11	

Measure Evaluation

Significant electricity and emission reductions are expected upon full replacement of all 4,608 intersections. Savings will be realized through a reduction in energy costs, elimination of frequent light bulb changes, and reduced maintenance requirements. GHGs may also be further reduced through the decreased use of maintenance vehicles.

GHGs Reduced

Expected energy savings (MWHr)	52,045
Emissions eliminated (MT CO_2/yr)	**27,075**

-Solar power conversion at Sun Valley Metrolink station-

Lead Agency Department of Transportation (DOT)

Other Agencies Los Angels Department of Water and Power (LADWP); South Coast Air Quality Management District (AQMD)

DOT is partnering with LADWP and AQMD for rebates and funding.

Opportunity

The DOT is proposing installation of a 12-kiloWatt solar photovoltaic electric system that will generate an estimated 18,815-kilowatt hours each year, resulting in about $2,000 annual savings in electricity costs.

Challenges

The primary challenge of this goal is implementing a cost-effective demonstration of solar use that will

encourage further use in future applications.

Table 10. E7 Implementation Steps

All costs will be covered by LADWP and AQMD. The actions under this measure have been incorporated into departmental plans and budgeting. DOT will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation of the projects.

Milestone	Completion Date	Quantity of Measure
12 Kilowatt solar photovoltaic (PV) system.	October 2008	kW hours of electricity produced.
Evaluate other opportunities for implementation	December 2008	Locations identified

Measure Evaluation

This measure can be evaluated by the amount of electricity produced by the solar power system, and the resulting reduced consumption of LADWP-provided electricity for Metrolink station operations.

GHGs Reduced: The Plan states that DOT is proposing a 12-kilowatt solar system to generate approximately 18,815 kilowatt-hours electricity per year. The 2004 LADWP CO_2 emission factor was used to obtain the amount of CO_2 reductions from this solar system. For the purposes of this calculation, the solar powered system was assumed to result in zero CO_2 emissions. Backup data is needed to confirm the amount of electricity that would be generated by this system. It appears this action will reduce community-wide emissions rather than City department emissions.

Expected energy savings (kWh)	18,815
Emissions eliminated (MT CO_2/yr)	**12**

-Reduce energy consumption by all City depa

In response to the heat waves of Summer 2007 and State energy conservation actions, the Los Angeles City Council approved a Motion (Council File 06-1723) that instructed the General Managers of all departments, including the three proprietary Departments (Los Angeles Department of Water and Power; Los Angeles World Airports; Port of Los Angeles), to immediately initiate power consumption reduction measures, whenever possible, to alleviate the record-setting electrical demand then underway. Since that time, Environment LA has coordinated the development of departmental sustainability plans and initiated a sustainable City Hall pilot project.

Lead Agency Department of General Services (GSD), Environment LA (ELA)

Other Agencies All City Departments

Opportunity

Energy conservation is the most cost-effective and easily implemented measure for reducing greenhouse gas emissions. The City can alter the behavior of potentially tens of thousands of employees through education and directives.

Challenges

Other than measures being implemented by GSD, it's not known which additional measures are being implemented (using task versus overhead lighting), and how widely. Providing reinforcing feedback to divisions and employees may be challenging, as targeted metering is typically not available.

Table 11. E7 Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. GSD will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation of the projects.

Milestone	Completion Date	Quantity of Measure
Memo issued to all General Managers.	March 2008	KWh reductions per building
"Lights off" and water reduction reminder stickers placed in Council-Controlled buildings.	April 2008	
Evaluate opportunities for zoned controlling of interior temperatures.	August 2008	
Encourage video conferencing use and capability	January 2009	

Measure Evaluation

Energy efficiency measures offer low cost quick impacts in terms of GHG reductions. Accurate measurement of behavioral changes can be difficult. For Council-controlled buildings, GSD can compare electricity consumption, on a building-wide basis, before and after implementation of these conservation measures, but other factors may obfuscate reductions caused by these measures. The proprietary departments can attempt similar assessments. Future versions of this document will provide any emissions reduction estimates made.

-Universally power manage City computers-

This measure is highlighted due its immediate impact potential and the fact that it was proposed by a department in response to the initial coordination of the Climate LA program. City staff use an estimated 31,000 computers in the course of their day-to-day work. Currently, based on individual staff preferences, some computers are turned off between uses, some are put into a standby mode and some are left running full time. To create energy savings and greenhouse gas reductions, the City will institute energy savings power management for all of its computers.

Lead Agency Information Technology Agency (ITA)

Other Agencies General Services Division (GSD)

Opportunity

The City has the ability to quickly implement this measure through its relatively centralized control over 31,000 computers. This will achieve an immediate substantial energy savings.

Challenges

The City must ensure that no productivity losses occur due with shutdown and standby settings for the computers. Initial experience has shown incompatibilities of standby modes and network software resulting in the recommendation for computer shutdown instead.

Table 12. E7 Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. ITA will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation of the projects.

Milestone	Completion Date	Quantity of Measure
Instructions to all General Managers for employees to shut down computers after work	September 2008	31,000 computers managed
Instructions to all General Managers for IT staff to set sleep setting on monitors and additional recommendations	February 2009	
Continue to work with network vendor on standby mode incompatibilities	Ongoing	

Measure Evaluation

This is a feasible measure with significant short term impacts. Since the City has not collected its own shut down rate data, a 36% rate is assumed based upon the 2004 Lawrence Berkeley National Lab Report of shut down rates for offices. The City will follow the Energy Star recommendation of 15 minutes monitor sleep mode.

Number of desktop computers	31,000
Current shut down rate	36%
Energy savings from 100% after-work shutdown (kWh/yr):	17,000,000
Energy savings from monitor sleep mode (kWh/yr):	2,000,000
Total Annual Energy Savings (kWh/yr)	19,000,000
Emissions avoided (MT CO_2/yr)	**11,900**

Action E8 **Perform energy efficient retrofits on 497 City-owned buildings to continuously reduce energy consumption.**

For several years, the City has been meeting aggressive environmental standards for its new construction program, but has now also identified energy saving opportunities for 497 of the existing Council-controlled buildings that it owns and operates.

Lead Agency Department of General Services (GSD)

Other Agencies Los Angeles Department of Water and Power (LADWP); City Administrative Officer (CAO); Community Redevelopment Agency (CRA)

Over a 7-month period in 2007, LADWP surveyed 497 City-owned, Council-controlled facilities to identify the main energy-using equipment and offer recommendations for reducing energy consumption. LADWP

staff identified opportunities that could produce annual energy savings of up to 53.8 million kilowatt hours, which could, in turn, equal as much as $6 million in cost savings each year. The City has therefore embarked on a program to implement the most time- and cost-effective energy retrofits. For Port and LAWA energy retrofits, please refer to Section 3.8 covering the proprietary departments.

Opportunity

LADWP staff identified cost effective energy efficiency opportunities for the 497 buildings. GSD will be responsible for verifying the energy efficiency opportunities identified by the LADWP and implementing the cost efficiency technologies that yield savings. The LADWP will provide technical advise, assistance and financial incentives. The LADWP also has plans to construct a district cooling plant for buildings in the downtown Los Angeles area. The cooling plant will provide energy efficiency opportunities to cool buildings in the Los Angeles Civic Center area.

Challenges

Ongoing maintenance needs and the opportunities for energy-efficiency upgrades often "compete" for budget allocations and staff. The current CIEP and MICLA funding programs for energy efficient equipment replacement/retrofits must continue if the City is to make its buildings as energy-efficient and climate-friendly as possible.

Implementation

The City has surveyed its facilities for energy saving opportunities and has identified upgrading HVAC and refrigeration equipment and energy management systems as high benefit measures. GSD will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation of the projects.

The Los Angeles Convention Center (LACC), which is a member of the USGBC's national and Los Angeles chapters, is now pursuing LEED-EB (existing building) certification. It has also retro-commissioning the entire facility to develop a new list of measures that could yield an additional increase in energy efficiency of 10% to 15%. 6. LACC has also signed an agreement with LADWP to purchase 30% Green Power effective February 1, 2008.

Table 13. E8 Implementation Steps

Milestone	Completion Date	Quantity of Measure
Replace a minimum of 10 HVAC rooftop units with SEER rating of 13 or better and/or EER of 11.3 or better.	12/2008	24 units replaced
City Hall Environmental Management System	6/09	
Convention Center LEED EB Certification		
Replace a minimum of 35 HVACR units with ratings of 16 SEER, 12 EER, and kWh/ton of .56, or better.	12/2010	
Continuous lifecycle replacement of HVAC equipment with the most energy-efficient equipment and technology available.	2011-2027	
Design and construct a district cooling plant and distribution system to supply chilled water to downtown Los Angeles buildings for space cooling applications.		

Measure Evaluation

A few key sub-measures are being evaluated for their actual energy savings potential including additional HVAC preventative maintenance, T8 32W to 25W conversions, LED exit signs, and occupancy sensors. Five staff positions are being requested by GSD to help implement the program. If such resources are made available, 16 buildings will be completed as a pilot followed on by a target of 100 buildings each year. Future versions of this document will provide more detailed energy savings and emissions reduction estimates.

Total Annual Energy Savings (kWh/yr)	19,000,000
Potential Emissions avoided (MT CO_2/yr)	**18,000**

The approximate amount of kWh that could be saved by successful conversion of 10 rooftop units was estimated using the ENERGY STAR Central Air Conditioner savings calculator. It was assumed that the old units do not have programmable thermostats and the new units do. The full-load cooling for the Los Angeles area was assumed to be 1,000 hours. Only the cooling benefits are quantified here. An email from GSD Building Maintenance District Supervisor on 3/7/2008 stated that the old rooftop units range from 14 to 16 years old, ranging from 2-ton to 10-ton cooling capacity. It was assumed that this age class corresponds with a SEER rating of 9. The calculation was done with both cooling capacity sizes and their results averaged. The 2004 LADWP CO_2 emission factor was used to convert the kWh to Council-Controlled CO_2 emissions.

Old units S.E.E.R. rating	9
New units S.E.E.R. rating	13
Energy Star savings from 2-ton unit replacement (kWh/yr):	1,116
Energy Star savings from 10-ton unit replacement (kWh/yr):	5,579
Average of 2-ton and 10-ton unit replacement savings (kWh/yr):	3,348
10 RTUs Savings (kWh/yr)	33,475
Emissions avoided (MT CO_2/yr)	**21**

The estimate for replacement of 35 HVACR units was done as above, using the ENERGY STAR Central Air Conditioner savings calculator. The assumptions are the same with the exception that the old HVACR units are 15+ years old and they are assumed to have an 8 SEER rating. These units range from 2-ton to 5-ton cooling capacity.

Old Units SEER	8
New Units SEER	16
EnergyStar savings from 2-ton unit replacement (kWh):	1,740
EnergyStar savings from 5-ton unit replacement (kWh):	4,350
Average of 2-ton and 5-ton unit replacement savings (kWh):	3,045
35 HVACRs Savings (kWh/yr)	106,575
Emissions avoided (MT CO_2/yr)	**66**

The benefits from continuous lifecycle replacement of HVAC equipment were estimated by assuming 5 HVAC units would be replaced annually, and using the same ENERGY STAR savings calculator as described above. The calculations were carried forward assuming the old units are SEER 10 and the new units SEER 16. This estimate is uncertain, as the number and sizes of HVAC units replaced annually are unknown.

Old Units SEER	10
New Units SEER	16
EnergyStar savings from 2-ton unit replacement (kWh):	1,140
EnergyStar savings from 5-ton unit replacement (kWh):	2,850
Average of 2-ton and 5-ton unit replacement savings (kWh):	1,995
5 HVACs Savings (kWh/yr)	9,975
Emissions avoided (MT CO_2/yr)	**6**

Action E9	Install the equivalent of 50 “cool roofs” on new or remodeled City buildings.

In many parts of the world, cool and green roofs are common, but in the U.S., cities have only recently begun to recognize their environmental value. Designed with high albedo (reflectivity) to reflect the sun's heat, cools roofs can provide energy saving to buildings and also help reduce the urban heat island effect. Green or vegetated roofs provide the same benefits, with the additional benefits of green space and reduced stormwater runoff. There are two types of green roofs. Intensive green roofs are essentially conventional gardens that happen to be located on the roof of a building. Extensive green roofs are designed primarily to achieve an array of environmental benefits, including: 1) increased thermal insulation of the roof, which promotes energy savings for heating and cooling; 2) to shield the roof's water-proof roofing membrane from the elements, thus greatly extending membrane life and generating potential savings on reroofing costs; 3) increased sound absorption resulting in less reflection of noise into the surrounding area and less penetration of noise into the building; and 4) creation of additional natural habitat for birds and insects in urban areas. The following discussion pertains to extensive green roofs.

Lead Agency Existing buildings and roofs: Department of General Services (GSD)
New Buildings and Major Renovations: The Bureau of Engineering (BOE) of the Los Angeles Department of Public Works (LADPW)

Other Agencies Los Angeles Department of Water and Power (LADWP); EnvironmentLA (ELA)

GSD will be responsible for retrofitting existing roofs. BOE will be responsible for installing cool roofs on new buildings, where appropriate. ELA will coordinate and explore the opportunities and resources available, particularly for green roofs.

Opportunity

The City has more than 800 Council-controlled rooftop spaces; approximately 300 of these represent opportunities for energy-saving cool roofs, while only a few are suitable for use as green roofs. Both roof types extend the life of the roof membrane and lower energy costs. Since buildings account for a significant portion of the City's electricity use and associated CO_2 emissions, the costs savings and other beneficial environmental impacts make such roofs a worthwhile investment.

Challenges

With limited budgets, ongoing maintenance needs and cool or green roof opportunities often "compete" for allocations of dollars and staff. For existing buildings, engineering and fire safety considerations may make such roof retrofits unfeasible or cost-prohibitive. The City needs to identify the most cost-effective retrofit sites and then secure funding for implementation of this measure. Cool roofs are relatively easy for the City to install; green roofs are more difficult, especially on existing buildings, but offer additional environmental and community benefits.

Table 14. E9 Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. GSD and BOE will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation.

Milestone	Completion Date
Install 10 new cool roofs; retrofit 7 existing roofs as cool roofs.	3/2008
Install an additional 16 new cool roofs, retrofit 20 existing roofs as cool roofs, and install 1 green roof. GSD plans to apply cool roof coatings to 12 –15 existing buildings annually as part of the "Major Roof Repair Capital Improvement Program."	6/2009
Green roofs opportunity analysis for Arroyo-Seco Cornfields Specific Plan area private-sector buildings.	6/2009
Install 3 new cool roofs; retrofit 20 existing roofs as cool roofs and 3 as green roofs. The GSD commitment is to install 12 –15 cool roof applications annually on existing buildings.	12/2010

Measure Evaluation

This is an achievable measure, which will provide a limited reduction of GHGs due to the limited number of suitable City controlled rooftops. Once ELA completes its target area analysis for private buildings, then the City will encourage cool/green roofs for private buildings.

GHGs Reduced - Studies have shown that the installation of a cool roof can achieve up to 40% cooling energy savings (eetd.lbl.gov/HeatIsland/CoolRoofs). For this measure, the amount of cooling energy used in each building was estimated by assuming an HVAC size and rating. This action is more beneficial if applied to larger buildings, so a larger, 10-ton unit was assumed for this calculation. The full-load cooling for the Los Angeles area was assumed to be 1,000 hours. Where the cool roof is retrofit to an existing building, the HVAC rating was assumed to be 8 SEER. Where the cool roof is installed on a new building, the HVAC rating was assumed to be 13 SEER. Once the total annual cooling energy was is estimated, the 40% energy reduction was applied to estimate the savings. The 2004 LADWP CO_2 emission factor was applied to the electricity savings.

For purposes of simplicity in this early stage of estimation, the green roofs are treated the same as cool roofs. Although the this action calls for 50 cool roofs in the title of the measure, the number of new cool/green roof installations targeted in the actual implementation plan is 30 and the number of retrofits targeted is 47. The emission reductions from new cool roofs will primarily impact growth in the GHG inventory, rather than reducing the existing inventory. As the Green LA Plan calls for some new cool roofs and some retrofit cool roofs, the two are evaluated separately. The actual savings benefits from this measure depend largely on the size, design and activities within the specific buildings being retrofit as well as the design of cool-roof being applied and the number of cool or green roofs successfully installed.

Energy usage for HVAC units with 10-ton cooling capacity (btu/hr)	120,000
Los Angeles area cooling load (hr)	1,000
SEER rating for new units (for new cool roof installation)	13
SEER rating for existing units (for cool roof retrofit)	8
Annual energy usage to run new units (kWh)	9,231
Annual energy usage to run existing units (kWh)	15,000
Potential cooling energy savings through cool/green roof installation	40%
Emissions Avoided by installing 30 new cool/green roofs (MT CO_2/yr)	**70**
Emissions Avoided by 47 cool roof retrofits (MT CO_2/yr)	**170**

Action E10	Install solar heating for all City-owned swimming pools.

Lead Agency Department of Recreation and Parks (RAP); Los Angeles Department of Water and Power (LADWP)

Opportunity/Challenges

With millions of square feet of facility space, the City is a significant energy consumer. Electricity used by City buildings and facilities accounts for much of the indirect greenhouse gas emissions associated with municipal operations.

At the direction of the Mayor, the Department Recreation and Parks (RAP) reviewed the amount of energy used to heat public pools under its jurisdiction. RAP operates approximately 60 public swimming pools, the majority of which are seasonal and therefore not heated. Of the 60, only a dozen are year-round, heated pools. LADWP does not currently offer rebates for the use of solar power equipment to heat pools, and solar power would reduce natural gas use, rather than electricity. In addition, RAP staff determined that the pools are currently covered to retain heat, which is the most cost-effective method for heating the pools. Further, the costs to retrofit the pools to operate on electricity would be extremely prohibitive.

Measure Evaluation

This measure was determined to be infeasible. A partnership with LADWP is not applicable, because using solar power to heat the pools would reduce natural gas usage rather than electricity.

Action E11	Improve energy efficiency at drinking water treatment and distribution facilities.

This action is intended to reduce the amount of electricity used for water pumping and water treatment, thus leading to reduced greenhouse gas emissions from fossil-fueled electric power plants.

Los Angeles Department of Water and Power (LADWP) Energy Efficiency staff are working with Water Supply and Operations Division staff, and with lighting and electric motor manufacturers, to develop a design specification for water treatment and distribution facilities that includes high efficiency motors, lighting and other measures.

Lead Agency Los Angeles Department of Water and Power (LADWP)

Opportunity

- Reduce the energy consumption of the Water System by increasing the energy efficiency of equipment at water treatment and pumping facilities.
- Maximize energy recovery from pressure reductions in the water distribution system.

Challenges

Water treatment and distribution operations require the use of large pumping motors. The magnitude of the energy efficiency improvements that can be achieved from installing high efficiency motors is less for larger motors than for smaller motors used in other applications, and as a result may not be as cost effective.

Table 15. E11 Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. LADWP will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation.

Milestone	Completion Date
Develop a scoping plan to determine the potential annual energy savings at selected water treatment and distribution facilities, including the payback times, cost/benefit ratios and GHG emission reductions.	12/2008
Install energy recovery devices in the water distribution system according to the survey conducted by the Power System.	12/2010

Measure Evaluation:

Future evaluations will be based on meeting the critical milestones for each project identified in the scoping plan, and on the associated energy savings and cost of each project.

Action E12	Maximize energy efficiency of wastewater treatment equipment.

Wastewater consists of water from sinks, washers, and toilets. The Bureau of Sanitation (BOS) is responsible for operating and maintaining one of the world's largest wastewater collection and treatment systems. Over 6,500 miles of sewers serve more than four million residential and business customers in Los Angeles, as well as 29 contracting cities and agencies. These sewers are connected to the City's four wastewater and water reclamation plants, which process a daily average of 550 million gallons.

Wastewater treatment operations (processes) are very energy intensive. Such operations and their related buildings consume the second largest amount of electricity among City departments, and generate 12.9% of all indirect greenhouse emissions. Wastewater operations and buildings are ranked fifth among City departments in natural gas usage.

Lead Agency Bureau of Sanitation (BOS) of the Department of Public Works (LADPW)

Opportunity

The BOS can employ direct action/s to reduce energy usage, including: a) investigate and test modifications to treatment *processes* that could reduce wastewater volume, electricity, and/or natural gas usage; or increase the production of biogas, which is used to produce electricity; and b) research the availability of more energy-efficient treatment equipment.

The Hyperion Treatment Plant (HTP) will begin a pilot project to determine the feasibility of processing food waste from Santa Monica and Los Angeles area restaurants. Initially 200-5,000 gallons per day of food waste will be injected into a digester and the resulting production of gas (biogas) will be monitored. Injection amounts will increase as more restaurants are brought on board. A test protocol will be developed in January 2008, and the six-month pilot project is tentatively scheduled to begin in September 2008. The City of Riverside is currently processing food waste, and has reported that with the same mass, grease produces 3 times more biogas than primary sewage sludge. If the HTP pilot project is successful, the existing gas handling facility may need to be expanded. The co-benefits of food waste processing include increased electrical production, landfill diversion, and shorter waste hauling trips.

Table 16. E12 Implementation Steps

BOS has begun replacing lights in the Hyperion Treatment Plant's galleries with more energy efficient fluorescent lights equipped with motion sensors. The actions under this measure have been incorporated into departmental plans and budgeting. BOS will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation.

Milestone	Completion Date	Quantity of Measure
Launch a pilot project to determine the feasibility of processing food waste from Santa Monica and Los Angeles area restaurants.	September 2008	Volume of biogas generated.
Replace Na (Sodium) lights with fluorescent T5 lights equipped with motion sensors in the galleries at HTP.	December 2010	

Measure Evaluation

Bulb replacement emissions reductions will be included in a future version of this document. The emission reductions can be estimated for the installation of motion sensors in the galleries. Assuming that 1,000 high-pressure sodium lamps at 177W each are equipped with motion sensors, and that the motion sensors reduce the daily usage of each bulb from 24 hours to 4 hours, the total energy saved can be estimated.3 The 2004 LADWP CO2 emission factor was used to estimate the associated Council-Controlled emissions that could be avoided. The result remains sensitive to the actual human motion (or lack thereof) in the galleries.

Quantity of bulbs	1,000
HPS Lamp Wattage	177
Total HPS Wattage	177,000
Usage of each bulb (hrs/day)	24
Usage with motion sensors installed (hrs/day)	4
Energy saved by installing motion sensors (kWh/yr)	1,292,100
Emissions avoided (MT CO2/yr)	**800**

The amounts of biogas that can be produced from these “fuels” were estimated by HTP at 1-2 and 6 cubic feet per gallon, respectively. The amount of power that can be produced from the biogas varies across different power generators. In 2007, Scattergood produced approximately 52 net kWh per 1,000 cubic feet of biogas4. Applying this factor to the volume of biogas provides a mechanism to estimate the annual electricity produced by the pilot project, which would be the amount of electricity displaced from the grid. Finally, the 2004 LADWP CO2 emission factor was used to estimate the associated Council-Controlled emissions that could be avoided. Similar calculations were made to estimate the amount of annual CO2 emissions avoided after increasing the food waste volumes to the maximum capacity of the pilot plant.

Food waste	FOG	
Initial waste volume (gal/day)	5,000	9,000
Potential Biogas Yield (cf/gal)	1.5	6
Potential Biogas Production (cf/day)	7,500	54,000
Potential energy production (kWh/day)	388	2,795
Electricity displaced at initial rate (MWh/yr)	141.7	1,020.2
Waste volume at maximum capacity (gal/day)	12,000	12,000
Electricity displaced at maximum capacity (MWh/yr)	340.1	1,360.3

Total electricity displaced by food waste and FOG, at initial rate (MWh/yr)	1,162
Total electricity displaced by food waste and FOG, at max. capacity (MWh/yr)	1,700
Emissions avoided, *initial rate* (MT CO2/yr)	**700**
Emissions avoided, *max. capacity* (MT CO2/yr)	**1,000**

GOAL: Help Angelenos be energy misers

Action E13	Distribute two compact fluorescent light (CFL) bulbs to each of the 1.4 million households in the City.

To reduce energy consumption and related carbon dioxide emissions, the Los Angeles Department of Water and Power (LADWP) will purchase 2.4 million compact fluorescent light bulbs (CFLs) and distribute two bulbs to each of the City's 1.2 million households. Each 20-watt CFL produces the same amount of light as a traditional 75-watt incandescent bulb. For further information, please refer to www.LADWP.com

Lead Agency	Los Angeles Department of Water and Power (LADWP)
Other Agencies	Bureau of Sanitation (BOS) of the Los Angeles Department of Public Works (LADPW)

LADWP has determined that manufacturing and distribution of the CFLs is best achieved by contracting with a producer and a distributor through a competitive bidding process. There may be significant opportunities for partnerships with nonprofits, neighborhood councils, and community groups in the public education effort pertaining to the installation and proper disposal of the bulbs. The Take it Back disposal plan could involve multiple retailers as partners.

Opportunity

Residential lighting is one of the largest energy consumption sectors in Los Angeles, and thus offers a major opportunity for energy efficiency. Everyone wins when consumers choose compact fluorescent bulbs over incandescent bulbs: the consumer saves money, the utility generates less power, and carbon emissions from power generation are reduced.

The LADWP has identified two distinct opportunities for a program that distributes free CFLs to City residents. Residents will use less energy by installing the LADWP provided bulbs, and will be more likely to purchase additional CFLs in the future. The end goal is nothing short of a market transformation in which CFLs replace incandescent bulbs as the majority of bulbs in use in Los Angeles. This goal will be facilitated by the implementation of a subsequent LADWP program that is designed to reduce the local retail price of CFLs.

Challenges

Three primary challenges must be confronted and mastered: the logistics of manufacturing and distribution; public education; and proper disposal of the bulbs. Regarding distribution, LADWP will need to ensure that a small bag containing two CFLs and the education brochure is hung on the doorknob of every house and apartment in Los Angeles. One particular challenge will be gaining access to secured apartment buildings. Another challenge will be limiting theft or diversion of the free bulbs, which will be labeled with the LADWP logo to prevent commercial re-sale.

The public education challenge encompasses two separate messages: encouraging both the installation of the bulb and its proper disposal. CFLs contain a trace amount of mercury and should therefore be separated from household trash in the same manner as batteries. This will require a shift in consumer behavior and collaboration with the California Take it Back Partnership.

BOS and LADWP are evaluating establishment of a "Take It Back" partnership capable of handling CFLs in this volume. Because CFLs can last several years, there will be adequate time to develop the necessary

partnership. The only retail stores known to take back CFLs at this time are IKEA and an ACE hardware in West Los Angeles that has previously partnered with BOS. If the CFLs are to be collected by BOS at its SAFE centers (for **s**olvents, **a**utomotive and **f**lammable products, and **e**lectronics) and mobile collection events, BOS will incur a substantial cost.

Table 17. E13 Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. LADWP will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation. If most residents install and use the free CFLs, the City will reduce energy consumption by 127 gigawatt-hours in the first year, reducing carbon emissions from power generation by 70,000 metric tons.

Milestone	Completion Date	Quantity of Measure
Award of contracts, manufacture of bulbs.	12/2007	Number of CFL bulbs distributed.
Public education campaign.	5/2008	
Distribution of bulbs.	6/2008	
Measurement and verification.	9/2008	
Take it-Back Plan implementation.		

Measure Evaluation

The near-term opportunity in energy savings is enormous and cost effective. While LADWP's entire suite of energy efficiency programs saved 67 gigawatt-hours of electricity in fiscal year 2006-2007, the CFL bulb program is projected to save 127 gigawatt-hours in the first year. Furthermore, the CFL bulb program will save energy at a very low cost per kilowatt-hour. While energy efficiency programs are considered cost effective at an expense of less than four cents per kilowatt-hour, the CFL bulb program will cost less than one cent per kilowatt-hour.

The program will be evaluated based on the meeting the milestones identified and a review of the actual unit cost of implementing the program per kilowatt-hour saved.

GHGs Reduced:

Calculations of potential greenhouse gas reductions for this program use 2004 LADWP electricity emissions factors. The emission reduction level is dependent on the assumptions for hours/per day of bulb use and thus calculating a range of use levels. The use level of approximately 2.25 hours/day corresponds to the stated electricity savings the City has cited. The Department of Energy calculates savings using a 6.7-hours/day savings. Using a 20 Watt CFL bulb over an incandescent bulb of 75 Watts, 55 Watts are saved per bulb.

Number of bulbs	2,800,000
DWP estimated daily use level (hrs)	2.25
DOE estimated daily use level (hrs)	6.7
Savings per bulb (W)	55
Range of Emissions avoided (MT CO_2/yr)	**78,000-232,000**

Action E14	**Increase the level and types of customer rebates for energy efficient appliances, windows, lighting, and heating and cooling systems.**

Through implementation and aggressive promotion of existing non-residential energy efficiency programs in LADWP's service territory, energy consumption and related GHG emissions will continue to be reduced.

The current rebate programs include Commercial Lighting Efficiency Offer (CLEO), Chiller Efficiency Program (CEP), Refrigeration Program, New Construction Program, Customer Performance Program (CPP), Small Business Direct Install (SBDI) program, and the Thermal Energy Storage (TES) program. The annual savings goal of these collective efforts is 25 megawatts of demand reduction and 140 gigawatt-hours of energy savings.

Lead Agency Los Angeles Department of Water and Power (LADWP)

Other Agencies Department of City Planning (Planning)

LADWP will work closely with professional organizations, chambers of commerce, contractors, and vendors to promote energy efficiency and encourage businesses to retrofit with new efficient technologies. Partnerships with national organizations such as the EPA's Energy Star Program and the U.S. Green Building Council (USGBC), which established the Leadership in Energy and Environmental Design (LEED) Green Building Rating System, will be critical in promoting efficiency. ADWP worked with the Department of City Planning and other City agencies to develop the Green Building Standards for new construction that will promulgate sustainable design in new private sector buildings meeting a size threshold. The Green Building Program was approved by the Mayor and City Council on April 22, 2008.

Opportunity

Non-residential customers consume over two-thirds of the electrical energy used in Los Angeles, and therefore represent an enormous opportunity for additional electricity conservation. Everyone wins when non-residential customers replace or retrofit to more energy-efficient equipment: the consumer saves money, and the utility generates less power, so GHG emissions from generation are reduced. Although some of these customers have already upgraded energy-using systems in their facilities, continued technology advancements offer additional savings opportunities for nearly all customers. Some of the upfront costs of efficiency upgrades can be offset by incentives provided through LADWP's Non-Residential Energy Efficiency Programs.

The LADWP has identified energy-saving opportunities for office buildings, grocery stores, industrial and manufacturing facilities, and other non-residential facilities. These savings can realized through programs that encourage the replacement of old, inefficient equipment with newer energy-efficient models. The CLEO program has been the most active, but all of the efficiency programs offer excellent rebates. The goal is to show non-residential customers that energy retrofits and replacements are cost-effective from a business perspective, and provide them with a better understanding of the beneficial environmental impacts that also result from energy savings.

Challenges

The primary program challenges are: adequate staff to meet with customers, vendors, and contractors in order to communicate the benefits of the programs; rebate amounts that are adequate to motivate customers to act; and the availability of vendors to perform the retrofit/installation work. New staff has

been budgeted for the July 2007 through June 2008 fiscal year; upon hiring, they will be trained so they can effectively market the various technologies and programs. Rebate levels have been increased and will continue to be evaluated for their effectiveness in motivating customer action. Also, LADWP will offer to small businesses, typically a historically hard-to-reach market sector, a direct installation program that provides easy access to vendors.

Table 10. E14 Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. LADWP will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation.The CLEO, CEP, New Construction, CPP, and Refrigeration programs will continue to be offered to LADWP's non-residential customers. The SBDI, DSM Bid, TES, and RCx, will be launched, either as pilot or full programs, during the fiscal year.

Milestone	Completion Date	Quantity of Measure
CLEO	On-going	Reduced demand (in GWHr/year).
CEP	On-going	
New Construction	On-going	
CPP	On-going	
Refrigeration	On-going	
SBDI	2/2008	
TES	7/2008	

Measure Evaluation

The programs will be evaluated as identified milestones are met, and through a review of the actual unit cost per kilowatt-hour saved and the magnitude of GHG reductions from each program.

Milestone	Energy Savings (in Gigawatt Hours)
CLEO	67.6
CEP	3.7
New Construction	3.6
CPP	12.3
Refrigeration	11.2
SBDI	30.3
TES	TBD

Action E15	Increase the distribution of energy efficient refrigerators to qualified customers.

To facilitate energy conservation among customers who receive low-income rate assistance (Rates 06 and 86), LADWP intends to offer up to 50,000 new energy-efficient refrigerators, in exchange for the customers' older, less-efficient refrigerators. Expansion of the exchange program to Affordable Housing multi-family dwellings in Los Angeles is also being considered.

Lead Agency Los Angeles Department of Water and Power (LADWP)

Other Agencies SCPPA (Southern California Public Power Authority)

The LADWP has partnered with the SCPPA (the Southern California Public Power Authority, an association of municipally owned utilities) for this initiative and was able to negotiate favorable rates with the vendor, the Appliance Recycling Company of America (ARCA), to implement the program.

Opportunity

As a general rule, and except for seasonal air conditioner use, the refrigerator is the largest energy-consuming appliance in the home. Today, all household appliance manufacturers offer very energy-efficient models. The Low Income Refrigerator Exchange Program is offering to assist the segment of LADWP's customer base that can least afford to replace old energy-guzzling appliances with more efficient ones. The projected energy savings yield from the distribution of the 50,000 units is 37.5 gigawatt hours. The Affordable Housing sector, where housing units are frequently equipped with refrigerators that are more than 10 years old, represents additional energy-saving opportunities.

Challenges

The public education component— effectively communicating the refrigerator exchange program to the targeted customer group— represents the biggest challenge.

Table 19. E15 Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. LADWP will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation.

Milestone	Completion Date	Quantity of Measure
LADWP Board approval of agreement.	4/2007	Number of refrigerators distributed.
Identify eligible LADWP customers.	4/2007	
Purchase inventory of refrigerators.		
Schedule mailing of notices.	On-going	
Schedule exchanges.		

Measure Evaluation

As milestones are reached, the program will be evaluated to determine the actual unit cost per each kilowatt-hour that is saved, and the magnitude of associated GHG reductions. An estimated 37.5 gigaWatts of electricity will be saved/50,000 refrigerators.

Action E16	Create a fund to "acquire" energy savings as a resource from LADWP customers.

To expand energy saving opportunities, the establishment of a fund was proposed that would reward LADWP customers for additional conservation efforts. Such efforts will reduce the amount of electric energy generated by fossil-fueled electric power plants, which will in turn reduce greenhouse gas emissions.

Lead Agency Los Angeles Department of Water and Power (LADWP)

Other Agencies EnvironmentLA (ELA)

During the Climate LA community engagement, LADWP Energy Efficiency staff and ELA will identify partnership opportunities to engage customers in identifying new energy savings/DSM programs.

Opportunity

The intent of this action is the acquisition of energy efficiency savings through collaborative programs (with other local municipal agencies) and through a variant of the competitive bidding process, all at a cost below DWP's generating cost. Funding for these actions (the "fund") has been established in the FY 08-09 budget.

The collaborative programs will include efforts targeting residential and business customers. The bid program, often referred to as a DSM bid, typically consists of third parties identifying the replacement or upgrade of a specific end use within a particular customer segment and proposing a program to achieve the specified savings at a specified price. A DSM bid will often target opportunities outside of our existing energy efficiency programs or included in our program but using a different approach.

Overall costs are reduced because the savings are being acquired below the cost of generation. Participating customers' costs are reduced due to their purchase of less energy that would be the case had the energy savings measures not been undertaken in their facilities.

Challenges

The primary challenges are adequate staff to meet with customers and vendors and evaluate their energy saving ideas, and funding for rebates in amounts that would be sufficient to motivate customers to act—save energy.

Table 20. E16 Implementation Steps

Milestone	Completion Date(s)	Quantity of Measure
Program designs.	8/08, 9/08, 2/09	
Program approvals.	9/08, 10/08, 5/09	
Program implementation.	10/08, 11/08, 6/09	

Measure Evaluation

This measure will be evaluated by several criteria, including LADWP customer participation, compliance with identified milestones, and the type, cost effectiveness and magnitude of GHG reductions from any new demand-side efficiency programs.

2.2 Focus Area: Water

Goal: Decrease per capita water use

Action W1	**Meet all additional demand for water resulting from growth through water conservation and recycling.**
Action W2	**Reduce per capita water consumption by 20%.**
Action W3	**Implement the City's innovative water and wastewater integrated resources plan that will increase conservation, and maximize use of recycled water, including capture and reuse of stormwater.**

These actions will reduce the amount of electric energy used for water pumping and water treatment, thus leading to reduced greenhouse gas emissions from fossil-fueled electric power plants. In addition to the above measures, The City will continue to evaluate emerging issues and strategies for reducing GHG emissions relating to water and will incorporate findings into future versions of this document. This includes low-impact development measures and innovative market-based incentives.

Since 1902, LADWP has provided the residents and businesses of Los Angeles with a reliable and adequate supply of water. One of the greatest challenges is ensuring that water is available for all of the City's needs. Though Los Angeles' population and economy have grown steadily, its water supply has not. LADWP can help balance its commitment to the environment, and its mission to ensure a reliable water supply for its customers, by increasing water conservation and recycling, and enhancing partnerships with environmental groups and other water agencies.

At the Los Angeles Convention Center, for example, reduced flow diaphragms for toilet and urinal flush valves, low-flow faucets, motion sensor supported hand washing stations, and landscaping specifically designed to thrive with reduced irrigation have reduced water requirements.

To meet its goals and fulfill its obligations to the next generation of Angelenos, the Mayor's Office and LADWP developed the "*Securing LA's Water Future*" plan, which is an aggressive, multi-faceted approach to developing a locally sustainable water supply.

The actions under this measure have been incorporated into departmental plans and budgeting. LADWP will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation.

The plan includes a set of key short-term and long-term strategies to secure our water future, such as:

Short-Term Conservation Strategies

1. Enforcing prohibited uses of water – For the first time since the early 1990's, LADWP will begin levying fines and sanctions against water abusers to eliminate waste and increase awareness of the need to conserve water.
2. Expanding the list of prohibited uses of water – Possible new prohibited uses include:
    - Further restrictions on watering landscape
    - Prohibit landscape watering during rain

- Prohibit washing/rinsing vehicles with a hose when the hose does not have a functioning self-closing nozzle attached or allowing the hose to run continuously.

3. Extending outreach efforts – Some activities include:
    - Step up communication with ratepayers to promote water conservation (e.g. bus placards, LADWP vehicles placards, newspapers, radio, television)
    - Outreach to Homeowner Associations and Neighborhood Councils
    - Train LADWP field staff as well as field staff from Public Works, Recreation and Parks, and other appropriate City Departments in identifying and reporting prohibited uses of water
    - Ramp up marketing of water conservation incentive and rebate programs.
4. Encouraging regional conservation measures – Work with MWD to encourage all water agencies in the region to adopt water conservation ordinances which include prohibited uses and enforcement.

Long-Term Strategies

1. Increasing water conservation through reduction of outdoor water use and new technology
2. Maximizing water recycling
3. Enhancing stormwater capture
4. Accelerating clean-up of the groundwater basin
5. Expanding groundwater storage

The long-term strategies listed above are in alignment with the Water/Wastewater Integrated Resources Plan (IRP) approved by the City Council and Mayor in November 2007. The IRP was a stakeholder driven process led by the Department of Public Works Bureau of Sanitation and LADWP. More detailed description of the long-term strategies is provided below.

Long-Term Strategy 1: Increasing Water Conservation through Reduction of Outdoor Water Use and Technology

Replacing water-guzzling hardware ensures the City can count on saving a predictable amount of water each year. LADWP's residential ultra low flush toilet (ULFT) replacement program enjoyed 16 productive years, resulting in an estimated conversion of 90% of toilets in LADWP's service area. Together, the Toilet Rebate Program and the Toilet Exchange Program replaced nearly 1.3 million water-wasting toilets with ULFTs, making the City's conservation effort one of the most successful in the nation.

The low-flush toilets alone continue to save Los Angeles more than 14 billion gallons of water each year—enough to fill the Rose Bowl about 56 times.

The residential toilet replacement programs were ended in December 2006 due to market saturation and the demonstrated effectiveness of the City's "retrofit on resale" ordinance, requiring ultra-low-flush toilets and low-flow showerheads in all residential properties prior to resale. With limited remaining indoor conservation opportunities, LADWP is focusing more resources on technology to reduce outdoor water use. Watering lawns and other outdoor water uses make up about 30% of all water used by all customers and 40% by single-family residential customers. From a long-term perspective, significant opportunities exist in cutting back on water that is wasted outdoors, including the installation of smart sprinkler systems and drought-tolerant landscaping.

Additional conservation programs will be aggressively pursued, such as programs to encourage planting with California native drought tolerant plants and expansion of gray water reuse systems. Stormwater capture and reuse can result in water savings with inclusion of rain barrels or cisterns through 2030.

Following are new and continuing water conservation programs as well as goals and benchmarks designed to measure their progress through 2030.

Residential Smart Sprinkler Systems

Smart sprinkler systems improve water efficiency on any landscape. They are already used in parks and golf courses around the City, and it is now time to extend this innovative technology to residences and homes throughout L.A.'s neighborhoods.

Goal: Install 5,250 smart sprinkler controllers per year, with a total of 63,500 by 2020.

Water Savings: 4,962 AFY by 2030

Action Plan: LADWP will begin to provide smart controllers and installation services free of charge to qualifying residential customers. Program plans include the installation of 2,500 controllers in the first year of program, moving to 5,250 controllers per year on a sustained basis. The program is scheduled to launch in early 2009.

Background: Weather-based Smart Irrigation Controllers ("smart sprinklers") represent new technology that adjusts irrigation schedules based on local weather conditions. They are the cornerstone of future residential conservation efforts to curb outdoor water use; they will save water, reduce runoff and cut green waste in the future.

Modeled on the successful toilet replacement program, the residential smart sprinkler initiative will employ local non-profit organizations – under LADWP management – to install these systems, educate customers on how to use the sprinklers and perform irrigation system assessments. They will also provide other services, such as property leak detection (via water meter check); installation of indoor water conservation devices (showerheads and aerators); and promotion of other LADWP conservation programs l such as the Clothes Washer Rebate and Energy Efficiency Programs.

Benchmarks:

Fiscal Year	Number of controllers per year	Cumulative Water Savings (AFY)
2008-09	2,500	112
2009-10	3,500	269
2010-11	5,000	493
2011-12	5,250	728
2012-15	5,250	1,434
2015-20	5,250	2,610
2020-25	5,250	3,786
2025-30	5,250	4,962

Conservation Rebates and Incentives

Goal: Increase participation in Water Conservation Rebate and Incentive Programs

Water Savings: 48,457 AFY by 2030

Action Plan: LADWP is continuing to expand rebates and incentives for homeowners and business owners to encourage them to purchase water-saving technology.

High Efficiency Clothes Washer Program. LADWP increased the rebate offered for residential high efficiency clothes washers from $150 to $250. LADWP will further expand the program through "Point of Purchase" rebates, offering customers an instant rebate when they buy the appliance from a Los Angeles retailer. Since the program was launched in 1998, more than 60,000 water-saving clothes washers have been installed in Los Angeles residents' homes through the program.

Commercial Rebate Program: Water conservation rebates and incentives were increased significantly in 2007 to offset the costs of replacing water-wasting toilets and urinals with high efficiency models, among other measures. The current rebates offset most or all of the total replacement cost (including installation). LADWP will increase program promotion to raise awareness of these significant financial incentives, resulting in increased program participation.

Since this program's inception, more than 32,800 toilets have been replaced by commercial, industrial and institutional customers, and LADWP is working to implement a grant-funded Cooling Tower program for commercial customers.

Several examples of increased incentive amounts include:

- High efficiency toilet (from $205 to $300)
- High efficiency urinal (from $200 to $400)
- Cooling tower pH control (from $1,900 to $3,000)
- Smart irrigation controller (from $630 to $1,000 per acre controlled)
- Technical Assistance Program (TAP) incentives (from $1.25/ per thousand gallons saved/$50,000 cap to $1.50 per thousand gallons saved/$100,000 cap)

High Efficiency Urinal Programs: In June 2007, the Los Angeles Department of Building and Safety gave approval for the installation of certain models of water-free urinals. Offering perhaps the greatest potential for quick implementation is the replacement of standard urinals with high efficiency urinals (0.5 gallon per flush (gpf) or less, including no-flush). Recent changes in the Los Angeles Building Code now provide for the installation of completely water-free urinals. The following actions are designed to boost installation of these urinals:

- Rebates have been increased up to $400 for the retrofit of existing urinals with waterless urinals.
- LADWP has gained commitment from several high visibility customers who will be retrofitting with waterless urinals; promotion of these installations will help raise awareness in the business community.
- Retrofit of the existing urinals in LADWP's downtown headquarters, known as the John Ferraro Office Building.
- LADWP is marketing these rebate programs to increase participation.

The GSD is currently piloting 50 water free urinals and 10 ultra low flow (1/8 gpf) urinals in city buildings. Ultra low flow urinals achieve 87% of the water savings achieved with water free units without the objectionable odors and increased maintenance costs associated with the water free urinals. The BOE and GSD have partnered with the PW Board of Commissioners and are planning the installation of 47 ultra low flow urinals in the new LAPD police Administration Building.

Additional Water Saving Efficiency Measures and Programs: As part of our ongoing effort to encourage customers to adopt passive water conservation measures --measures that can help customers conserve water on a daily basis without thinking about it-- in their homes and businesses, LADWP will continue to distribute water-saving bathroom and kitchen faucet aerators and shower heads free-of-charge. LADWP also plans to add rebates for products such as high-efficiency dishwashers and synthetic turf for residential customers to help increase their daily conservation efforts.

LADWP is closely monitoring technological advancements in water conservation, such as the recent improvements in the irrigation industry. LADWP will add these new technologies to its menu of conservation information, services and rebates as more water-saving products become available.

Benchmarks:

- Commercial, Industrial, and Institutional Programs
    - Rebates – Estimated Water Savings: 38,870 AFY by 2030

      Includes the following programs:
        - High Efficiency Toilets (includes dual flush)
        - High Efficiency Urinals (includes waterless)
        - High Efficiency Coin/Card Operated Clothes Washer
        - Smart Irrigation Controllers
        - Sprinkler head Rotating Nozzle Retrofit
        - Water Brooms,
        - Pre-rinse Spray head
        - Cooling Tower pH and Conductivity Controllers
        - Steam Sterilizer Retrofit
        - Connectionless Food Steamer
        - X-Ray processor Recirculation System
        - Dry Vacuum Pump

Fiscal Year	Cumulative Water Savings (AFY)
2007-08	845
2008-09	1,820
2009-10	2,795
2010-15	9,620
2015-20	19,370
2020-25	29,120
2025-30	38,870

Synthetic Turf – Estimated Water Savings: 708 AFY by 2030

Fiscal Year	Number of acres per year	Cumulative Water Savings (AFY)
2009-10	3	17
2010-15	6	52
2015-20	6	363
2020-25	6	536
2025-30	6	708

Aerators – Estimated Water Savings: 257 AFY by 2030

Fiscal Year	Number of aerators per year	Cumulative Water Savings (AFY)
2007-08	500	2
2008-10	2,500	26
2010-15	2,500	83
2015-20	2,500	141
2020-25	2,500	199
2025-30	2,500	257

Residential Programs:

High Efficiency Washers – Estimated Water Savings: 5,404 AFY by 2030

Fiscal Year	Number of washers per year	Cumulative Water Savings (AFY)
2007-08	6,800	229
2008-10	7,000	699
2010-15	7,000	1,875
2015-20	7,000	3,051
2020-25	7,000	4,227
2025-30	7,000	5,404

Showerheads – Estimated Water Savings: 2,314 AFY by 2030

Fiscal Year	Number of showerheads per year	Cumulative Water Savings (AFY)
2007-08	1,500	25
2008-09	4,000	91
2009-10	5,000	173
2010-15	6,500	708
2015-20	6,500	1,243
2020-25	6,500	1,778
2025-30	6,500	1,314

Aerators – Estimated Water Savings: 787 AFY by 2030

Fiscal Year	Number of aerators per year	Cumulative Water Savings (AFY)
2007-08	3,000	8
2008-09	8,000	31
2009-10	10,000	59
2010-15	13,000	241
2015-20	13,000	423
2020-25	13,000	605
2025-30	13,000	787

High Efficiency Dishwashers – Estimated Water Savings: 52 AFY by 2030

Fiscal Year	Number of dishwashers per year	Cumulative Water Savings (AFY)
2009-10	250	1
2010-11	500	2
2011-15	1,000	13
2015-20	1,000	26
2020-25	1,000	39
2020-30	1,000	52

Synthetic Turf – Estimated Water Savings: 66 AFY by 2030

Fiscal Year	Number of square feet per year	Cumulative Water Savings (AFY)
2009-10	10,000	1
2010-11	15,000	3
2011-15	25,000	17
2015-20	25,000	33
2020-25	25,000	50
2020-30	25,000	66

Targeting City Parks and Large Landscapes

Goal: Retrofit three City parks per year over five years with smart irrigation controllers and upgraded distribution systems; and install smart irrigation controllers at City parks under a grant-funded program.

Water Savings: 70 AFY by 2011

Action Plan: LADWP has already begun targeting public parks for water use efficiency measures through the City Park Irrigation Efficiency Program. Kicking off this initiative, City officials identified three City parks with inefficient irrigation systems, leaks, and runoff problems. The City began work to repair and replace distribution systems and install smart sprinkler systems. The first parks include Victory Memorial Grove and Lilac Terrace in Elysian Park, Arroyo Seco Park, and Mt. Carmel Recreation Center. Work is expected to be completed at these parks in 2008.

> **Benchmark:** LADWP to work with Los Angeles City Recreation and Parks Department to retrofit 3 parks per year.

Proposition 50, Chapter 7, Los Angeles City Park Irrigation Efficiency Program

Funding Total: $1,140,970

Funding Source: State Department of Water Resources (DRP): $362,000

Funding Source: MWD, LADWP and DRP (in-kind services): $778,970

Description: Weather-based irrigation controllers will be installed in all designated parks. Four parks will have new irrigation systems installed and 11 parks will have sprinkler head replacements for the rotors.

CD-3 Reseda North New System
CD-4 Pan Pacific Park (South) Head Replacement
CD-5 Bad News Bears (Westwood Park) Head and Backflow Replacement
CD-5 Palms Rec Center New System
CD-6 Rhodes Greenbelt Head Replacement

CD-6 Slavin Park Head Replacement
CD-7 Carey Ranch Head Replacement
CD-8 Exposition Park Rose Garden Head Replacement
CD-11 Palisades Park (upper) New System
CD-12 Chatsworth Park South New System
CD-12 Dearborn Park Head Replacement
CD-12 Wilbur Tampa Park Head Replacement
CD-13 Elysian Valley Rec Center Head Replacement
CD-14 Evergreen Park Head Replacement
CD-14 Yosemite Park Head Replacement

Proposition 50, Chapter 7, Large Landscapes – 40 Controllers

Funding Total: $204,000

Funding Source: State Department of Water Resources: $101,000

Funding Source: LADWP and DRP (In-kind service): $103,000

Description: This project will install 40 smart irrigation controllers at the following parks by the fall of 2008.

CD-1 Sycamore Grove Park
CD-1 San Pasqual Park
CD-4 Griffith Park Recreation Center & Pool
CD-5 Cheviot Hills Recreation Center
CD-8 Martin Luther King Recreation Center
CD-9 Harvard Recreation Center
CD-10 Jim Gilliam Recreation Center
CD-11 Del Rey Lagoon
CD-15 Point Fermin Park and Lighthouse

Action by Public Agencies

Goal: Improving water efficiency at all City Department facilities. LADWP provides incentive funding and technical assistance to City Departments for the installation of high efficiency urinals and smart irrigation controllers, and helps them identify other opportunities to improve water use efficiency.

Water Savings: Estimated to save at least 10% from existing use, totaling as much as 1,888 AFY in water savings.

Action Plan: Government agencies in Los Angeles use approximately 50% of their water outdoors. LADWP will advise City Departments on reducing their outdoor water use through retrofitting inefficient sprinkler systems, checking timers, installing weather-based smart sprinklers at City facilities, and replacing inefficient indoor plumbing fixtures.

LADWP will assist City Departments and other public agencies in leveraging incentive funds to retrofit their facilities. The Public Sector Conservation Incentive Program, offered through MWD in conjunction with LADWP, provides up-front incentives for public agencies to purchase water-efficiency technology.

Large landscape customers can also better track outdoor water use and save money by installing a dedicated large landscape meter, which allows customers to more easily identify outdoor water efficiency. This will result in water savings by providing customers with water use information that is otherwise combined with domestic consumption.

Taking the lead in this effort, all urinals at LADWP headquarters have been retrofitted to reduce use no more than one-half gallon per flush.

Raising Awareness

Goal: Increase water conservation awareness to achieve water savings.

Action Plan: LADWP has proposed $2.3 million in the fiscal year 2008-09 budget for a general awareness campaign, water conservation program outreach, and school education programs and materials.

Background:

Ongoing conservation awareness is crucial to sustained conservation achievements.

In the past year LADWP has already taken a number of steps to heighten awareness of the critical water shortage and the need to conserve and reduce water use, including:

- Reinstated the "Drought Busters" to provide a visible presence in the community, respond to inquiries and complaints about wasting water, and educate the public regarding the prohibited uses. Drought Busters are equipped with door hangers, brochures and other water conservation literature, as well as water-saving hardware (including low-flow showerheads and faucet aerators) to provide to the public. Since Drought Busters was re-introduced, the program has responded to nearly 1,000 reports of water leaks or other prohibited water uses.
- Spent over $300,000 on radio and print advertisements promoting water conservation and publicizing prohibited water uses. Among other steps, this effort involved publishing four-page advertising inserts in the *Los Angeles Times*, the *Daily News*, and *La Opinion*, and placing ads in English, Spanish, Chinese, and Korean.
- Provided information on the LADWP website about water conservation programs currently available, those planned for the future, and tips for conservation.
- Printed messages to promote water conservation and programs on bill inserts.
- Displayed posters and banners promoting water conservation and water efficiency programs at all LADWP Customer Service Centers, as well as offered water saving hardware (i.e. low-flow shower heads and aerators for faucets) to walk-in customers at the centers.
- Provided training to Customer Contact Center and Commercial Resource Center employees to establish uniformity of information disseminated to ensure water conservation awareness and promotion of LADWP's efficiency programs.
- Promoted a toll-free phone number—1-800-DIAL DWP—for people to report water waste to the Customer Contact Center.

Additional water conservation actions will include:

- Conduct outreach to Neighborhood Councils to promote water conservation.
- Distribute table tent cards for Los Angeles area restaurants citing the importance of water conservation and indicating that water will only be served upon request.
- Produce door hangers for Los Angeles area hotel room restrooms encouraging water conservation and asking patrons to consider using their towels more than once.
- Develop static cling signage to be affixed upon bathroom mirrors in government and public buildings throughout Los Angeles, asking people to not let the water run unnecessarily.
- Update water conservation literature for website posting and for distribution at community events and public meetings.
- Increase water conservation promotion at community events, especially those involving LADWP.

- Expand water conservation awareness education programs for Los Angeles Unified School District students.
- Disseminate print and radio advertisements to heighten awareness about conservation measures and highlight funding incentives available to both residential and commercial customers.
- Place conservation awareness signage on LADWP vehicles.

Enhancing Conservation through Review of New Developments

Goal: Ensure specifications for the Los Angeles Green Building program include water efficiency measures.

Water Savings: The Green Building Program can yield significant water savings through water conservation measures.

Action Plan: LADWP will continue working with the City's Green Building Team to pursue desired changes in local codes and standards to promote water efficiency in new construction projects and major building renovations.

Potential measures include:

- Enhancing irrigation requirements (subject to the City's Landscape Ordinance). This may include smart irrigation controllers and landscaping using a specified plant palette.
- Improving plumbing fixture requirements. This would include high efficiency toilets (1.28 gallons per flush or less, includes dual flush) and urinals (0.5 gallons per flush or less, includes no flush urinals).
- Installing high efficiency restroom faucets (1.0 gallon or less per minute, public restrooms – 0.5 gallons or less per minute self closing faucet) and high efficiency showerheads (2.0 gallons or less per minute).
- Prohibiting multiple showerhead systems (multiple showerheads within a single shower stall).
- Requiring individual metering for all dwelling units and commercial spaces, along with separate metering or sub-metering for all landscapes of 5,000 square feet or more.

LADWP Green Building Policy: LADWP's Green Building Policy, approved in 2006, includes a water conservation element. In order to be eligible for energy efficiency incentives under LADWP's performance-based new construction incentive program, a project must achieve at least one LEED point for water conservation.

Review and Comment on Environmental Impact Reports: LADWP will begin reviewing and providing written comments on all Environmental Impact Reports (EIRs) for new development in the City. The comments will include LADWP's recommendations for incorporating water conservation measures, and identify existing available incentive programs. In addition, all developments of 500 units or more must demonstrate that they have an adequate water supply. LADWP will issue a water supply assessment for those large developments.

Strategy 2: Maximizing Water Recycling

Goal: Increase the total amount of recycled water used in the City of Los Angeles six-fold by 2019 – expanding from the current 1% to 6% of annual water demand.

Water Savings: 50,000 AFY by 2019

Background:

As the City's imported water supply becomes more critical, so does the need to develop local, sustainable water resources. LADWP, in partnership with the Department of Public Works Bureau of Sanitation (BOS),

has long worked toward expanding the use of recycled, highly treated wastewater. The BOS is responsible for the City's wastewater treatment. Four plants produce a total of 463 million gallons per day (mgd), or 518,560 AFY, of highly treated wastewater.

Los Angeles has used recycled water since 1979 for irrigation and industrial purposes at locations such as Griffith Park, Mount Sinai and Forest Lawn Memorial Parks. Since the early 1990s, the City of Los Angeles has constructed numerous projects that replace potable water with treated wastewater for irrigation, industrial, seawater barrier, and environmental beneficial purposes. In the San Fernando Valley, the City uses recycled water from the Donald C. Tillman Water Reclamation Plant for golf courses, environmental beneficial reuse to the Los Angeles River, Lake Balboa, the Wildlife Lake, and the Japanese Gardens.

The 6.5-acre Japanese Garden at the Tillman Plant uses approximately 4,500 acre-feet of recycled water per year. In 1991, the Tillman Plant began serving recycled water to the adjacent 11-acre Wildlife Lake. The following year the 27-acre Lake Balboa opened when it was served with recycled water. Approximately 25,750 acre-feet of recycled water pass through these lakes annually. The recycled water from the Japanese Garden and the two lakes flow into the Los Angeles River where the water provides additional environmental benefits. These bodies of water are home to native plants and animals and over 200 bird species, including flocks of migrating geese.

On the Westside, recycled water from the Hyperion Treatment Plant provides irrigation and industrial uses in the City of Los Angeles and surrounding communities through sales to the West Basin Municipal Water District. Recycled water service to Loyola Marymount University was re-established in 2007, while Westchester Golf Course and the Playa Vista development are anticipated to come on-line in 2008.

In the Harbor area, the Terminal Island Water Reclamation Plant supplies recycled water to the Dominguez Gap Seawater Intrusion Barrier to protect drinking water aquifers and to LADWP's Harbor Generating Station for cooling the generators.

In the Los Angeles-Central City, the LA-Glendale Water Reclamation Plant supplies recycled water to Griffith Park, Forest Lawn Memorial Park, Mount Sinai Memorial Park, Universal Studios, and Lakeside Golf Course.

Retail sales of recycled water increased from 2,400 AFY to 4,300 AFY from fiscal years 2005-06 to 2006-07—an 80% increase. Much of the increase was due to the Terminal Island Advanced Wastewater Treatment Facility coming online in February 2006, providing 2,200 AFY of even higher level, advanced treated wastewater as a seawater intrusion barrier for the Dominguez Gap Seawater Barrier.

2007-08 Fiscal Year Recycled Water Usage – City of Los Angeles

		Million Gallons per Day			Acre-Feet per Year		
		Sales	Environ-mental	Other	Sales	Environ-mental	Other
Hyperion							
	In-plant Use			7.5			8,400
	West Basin Municipal Water District			36			40,320
	DWP Customers	0.3			350		
Donald C. Tillman							
	In-plant Use			2.2			2,460
	Japanese Gardens		4			4,500	
	Lake Balboa and Wildlife Lake		23			25,750	
	LA River *(Sum of the above)*		27				
	DWP Customers	0.2			150		
Los Angeles-Glendale							
	In-plant Use			0.7			780
	DWP Customers	1.4			1,600		
	City of Glendale Irrigation & Power Plant			1.3			1,450
Terminal Island							
	In-plant Use			0.3			340
	Dominquez Gap Barrier	2.1			2,400		
	TOTALS:	4	27	48	4,500	30,250	53,750

NOTE: Values are approximate

The City of Los Angeles current potable water demand is approximately 670,000 AFY. About 520,000 AFY of wastewater is treated by the Bureau of Sanitation's (BOS) four wastewater treatment plants: Hyperion, Donald C. Tillman, Los Angeles-Glendale, and Terminal Island. These wastewater treatment plants provide approximately 90,000 AFY, or 17% of their total output, of recycled water for beneficial uses. These include water sales to LADWP customers to displace the need for potable water (such as for irrigation and industrial uses, and for the Dominquez Gap Seawater Intrusion Barrier); environmental enhancements for lakes, gardens, and other wildlife areas; in-plant operations at the BOS wastewater plants; and regional uses through the West Basin Municipal Water District.

Action Plan:

Develop Recycled Water Master Plan: LADWP and BOS will prepare a detailed Recycled Water Master Plan that will outline the steps and costs of boosting our recycled water level to 6% of total demand for the City. The Master Plan will provide a blueprint for reaching this goal by expanding the existing recycled water pipeline system and using recycled water for groundwater replenishment.

Increase Recycled Water for Irrigation and Industrial Use

LADWP is aggressively working to expand recycled water for nonpotable uses. In fiscal year 2007-08, LADWP expects recycled water sales to increase to about 4,500 AFY. Woodley Golf Course and Loyola Marymount University began recycled water deliveries in October 2007. LADWP's Valley Generating Station and the Balboa, Encino and Westchester Golf Courses are expected to begin recycled water deliveries by July 2008.

LADWP's current Water Recycling Capital Budget provides funding for 21 projects that will increase recycled water deliveries from 4,500 AFY to 19,350 AFY by 2014, adding more than 106,300 feet of new pipe and saving potable water for nearly 31,000 households throughout the City.

Potential customers in future years include several parks (Taylor Yard, Elysian, Branford, Woodley, and Balboa parks); Harbor and Scattergood Generating Stations; Hansen Dam and Van Nuys golf courses; oil refineries in the Harbor area; LAX cooling towers; schools in the Sepulveda Basin, the Los Angeles Zoo, and the Playa Vista development. Under the City's Water/Wastewater Integrated Resources Plan, 30,250 AFY of treated water will continue to be used to support habitat in the Japanese Gardens, Lake Balboa, the Wildlife Lake and the Los Angeles River.

Use Recycled Water for Groundwater Replenishment

Advanced treated recycled water can be sent to spreading basins to percolate underground and become part of the City's groundwater system for later use. This process – also termed groundwater replenishment– is a proven alternative for expanding locally produced, safe, high-quality drinking water. The process has been successfully implemented in Orange County, Australia, and Singapore, and is being considered in other U.S. and worldwide locations.

In 1990, LADWP began developing what was known as the East Valley Water Recycling Project, designed to deliver tertiary treated recycled water from the Donald C. Tillman Water Reclamation Plant for groundwater replenishment in the Hansen Spreading Grounds located in the San Fernando Valley. The full project was never implemented and LADWP focused on using the Tillman Plant and related facilities to deliver recycled water for irrigation and industrial uses, rather than pursuing groundwater replenishment.

The critical water shortage facing Los Angeles today makes it imperative that the City revisit this strategy, understanding that this initiative will require extensive public education, as well as thorough discussion and vetting through a public process. The public acceptance and technological feasibility of Orange County's groundwater replenishment program demonstrates that this is a viable, long-term water supply solution.

Initiate Stakeholder Planning Process*:* LADWP will engage stakeholders from the Water/Wastewater Integrated Resources Plan (IRP) process in analyzing alternatives necessary for maximizing recycled water. These alternatives include implementing groundwater recharge with advanced treatment in the San Fernando Valley as well as expanding the purple pipe system to supply recycled water for irrigation and industrial uses.

Upgrade Tillman Wastewater Treatment Plant: Groundwater replenishment will require upgrading the Tillman Plant with state-of-the-art, advanced treatment capability similar to the Orange County Water District's recently implemented Groundwater Replenishment System, which has received widespread support. Advanced treatment would be constructed at the Tillman Plant, and the highly treated wastewater would be piped to spreading basins for groundwater recharge.

Pursue All Possible Funding Sources: The City will actively seek all available sources of grant funding to offset costs from expanding its use of recycled water.

Benchmarks:

- Recycled Water Master Plan
    - Develop Scope of Work – Summer 2008
    - Award contract – early 2009
    - Complete Master Plan – Winter 2011
- Stakeholders Planning Process
    - Initiate stakeholder process – February 2009
- Recycled Water Pipeline Installation
    - 2007-08 – 10,400 feet
    - 2008-09 – 10,700 feet

- 2009-10 – 27,900 feet
- 2010-11 – 23,300 feet
- 2011-12 – 22,600 feet
- 2012-13 – 11,400 feet

Total 106,300 feet of new pipe by 2013

- New Recycled Water Customers
  - 2007-08 – 6
  - 2008-09 – 8
  - 2009-10 – 1
  - 2010-11 – 10
  - 2011-12 – 2
  - 2012-13 - 10

Total 37 new customers by 2013

- Acre-Feet per Year of Recycled Water
  - 2007-08 – 4,500 AFY
  - 2008-09 – 8,000 AFY
  - 2009-10 – 8,750 AFY
  - 2010-11 – 9,250 AFY
  - 2011-12 – 9,650 AFY
  - 2012-13 – 15,350 AFY
  - 2013-14 – 19.350 AFY
  - 2014-15 – 22,480 AFY
  - 2015-16 – 25,610 AFY
  - 2016-17 – 28,740 AFY
  - 2017-18 – 31,870 AFY
  - 2018-19 – 50,000 AFY (15,000 AFY from groundwater replenishment)

Strategy 3: Enhancing Stormwater Capture

Goal: Increase groundwater recharge by retrofitting the Big Tujunga Dam and other large-scale projects through cooperative efforts with the Los Angeles County Flood Control District and other agencies.

Water Captured: Minimum of 20,000 AFY on average

Background:

The San Fernando Groundwater Basin is the City's primary local water source, providing approximately 11% of the total water supply. However, the Basin is experiencing a decline in groundwater levels that threaten its long-term sustainability. One of the key factors impacting the local groundwater supply is increased urbanization over the last several decades. As more and more pavement covers the Earth, urbanization decreases the amount of open land that provides natural groundwater recharge.

To address this situation, LADWP is moving forward with several stormwater capture projects with the goal of increasing long-term groundwater recharge by a minimum of 20,000 AFY. LADWP, in partnership with the Los Angeles County Flood Control District and other agencies, is in various stages of stormwater enhancement planning and projects. The following are the large-scale projects that are expected to be completed or in construction within the next five years:

Big Tujunga Dam – San Fernando Basin Groundwater Enhancement Project: On September 18, 2007, the LADWP Board approved Agreement No. 47717 to provide $9 million to the Los Angeles County Flood Control District for the construction of the Big Tujunga Dam Project – an effort to seismically

retrofit the dam, increase its water storage capacity, improve its reliability as a supply source, enhance flood protection measures, and green the environment.

The restoration of the dam is conservatively estimated to result in the additional capture and recharge of 4,500 AFY at the Hansen and Tujunga Spreading Grounds, and more in wet years. The project will make structural improvements to Big Tujunga Dam to restore its historical retention capacity of 6,000 acre-feet; currently the dam is restricted to 1,500 acre-feet of storage capacity.

- Schedule: In construction; scheduled to be completed by December 2010
- Budget: $100 million of which LADWP is providing $9 million
- Resources: Los Angeles County Flood Control District is the project manager
- Potential Water Savings: Capture an additional 4,500 AFY of stormwater on average, up to 10,000 AFY or more in extremely wet years.

Sheldon-Arleta Project – Cesar Chavez Recreation Complex Project Phase I:

On December 19, 2006, the Board of Water and Power Commissioners approved Agreement No. 47448 to provide up to $5.25 million to the City of Los Angeles Department of Public Works for the construction of the project (the total project cost is about $9 million). The project will upgrade the methane gas extraction system and allow increased methane recovery at the Sheldon-Arleta Landfill that is necessary to allow the full use of the adjacent Tujunga Spreading Grounds. Currently, the spreading grounds are restricted to an operating capacity of 50 cubic feet per second (cfs) or 20% of the full operating capacity of 250 cfs.

- Schedule: In construction; scheduled to be completed by late-2008
- Budget: $9 million of which LADWP is providing $5.25 million
- Resources: Los Angeles Department of Public Works is the project manager
- Potential Water Savings: Capture of an additional 6,000 to 10,000 AFY of stormwater

Hansen Spreading Grounds Enhancement Project: LADWP has entered into Agreement No. 47739 to share the costs of the construction of the Hansen Spreading Grounds Project with the District. The project will increase the capacity and efficiency of the spreading grounds by: 1) combining and deepening the existing basins, and 2) installing and building a new rubber dam, intake structure, control house, and upgrading the telemetry system. The Los Angeles County Board of Supervisors approved the agreement on March 11, 2008, and the LADWP Board of Commissioners approved it on April 1, 2008.

The District has completed the design and specifications for the project and is prepared to move forward upon execution of this agreement. Construction is tentatively scheduled to commence in mid-2008 and be completed within 18 months. The project is conservatively estimated to result in the additional capture and recharge of approximately 1,200 AFY at the Hansen Spreading Grounds.

- Schedule: Scheduled to go into construction in summer 2008; completion expected within 18 months
- Budget: Up to $15 million; LADWP is providing up to $7.5 million, with remaining costs covered by the LA County Flood Control District
- Resources: Los Angeles County Flood Control District is the project manager
- Potential Water Savings: Capture of an additional 1,200 to 3,000 AFY of stormwater

Tujunga Spreading Grounds Enhancement Project: This project proposes to deepen the spreading basins, increase their storage capacity, replace the existing diversion structure with two diversion structures, and add remote automation of the operating structures.

- Schedule: Planning and design 2008-09; construction in 2010
- Budget: $1.3 million for design; $24 million for construction (LADWP funded)
- Resources: LADWP will be the project manager
- Potential Water Savings: Capture of an additional 8,000 to 12,000 AFY of stormwater

Pacoima Spreading Grounds Enhancement Project: This project proposes to deepen the spreading basins, increase their storage capacity, replace existing diversion structure, and add remote automation of the operating structures.

- Schedule: Planning and design 2008-09; construction in 2011
- Budget: $1.3 million for design; $20 million for construction (LADWP may provide some funding for this project)
- Resources: Los Angeles County Flood Control District will be the project manager
- Potential Water Savings: Capture of an additional 1,500 to 3,000 AFY of stormwater

Development of Additional Projects: LADWP is a participant in the proposed Sun Valley Neighborhood Retrofit Project led by the Los Angeles and San Gabriel Rivers Watershed Council and TreePeople. The project will enhance an entire block to capture stormwater, reduce flooding and water pollution, and add green space. Additional projects such as this will need to be considered to further enhance the capture of stormwater.

Strategy 4: Accelerate Clean-Up of the San Fernando Groundwater Basin

Goal: Clean up the contaminated San Fernando Groundwater Basin to expand groundwater storage and the ability to fully utilize the City's groundwater supplies

Reduction of Imported Water: Up to 87,000 AFY – LADWP's annual allocation of San Fernando Valley groundwater supplies.

Background: Groundwater is the primary source of local water supply for the City of Los Angeles, historically providing as much as 107,000 AFY. In the past, groundwater supplied as much as 30% of the City's water supplies during drought years. While local groundwater has historically provided Los Angeles with a high-quality, reliable water supply, existing groundwater contamination in the San Fernando Basin has impacted LADWP's ability to fully utilize this valuable resource.

The primary contaminants of concern include trichloroethylene (TCE), perchloroethylene (PCE), nitrates, perchlorate, hexavalent chromium, and emerging contaminants. To date, over 47% of LADWP's production wells in the San Fernando Basin have been removed from service due to contamination issues. With the discovery of new contamination sites and the migration of existing contaminant plumes, it is expected that more of LADWP's production wells will be curtailed, thereby forcing LADWP to increase dependence on imported supplies.

LADWP is advocating strongly for the United States Environmental Protection Agency (EPA), Los Angeles Regional Water Quality Control Board, and the California Department of Toxic Substances Control to identify and hold the responsible parties accountable for cleaning up the Basin. LADWP is also pursuing a parallel track to explore other administrative or legal remedies available to expedite cleanup, including the pursuit of monetary compensation for water lost due to contamination and the resulting pumping limitations.

Recognizing the urgency and importance of this work, LADWP is working with government and elected officials to expedite the San Fernando Basin groundwater clean up. This effort will be costly, and could reach $500 million to $1 billion. To fund clean-up activities, LADWP will need to hold polluters accountable, and actively seek state and federal funding.

Action Plan: Cleaning up the San Fernando Groundwater Basin is a massive undertaking that will transform one of the City's key water sources. The effort will require investment and commitment from across L.A., and the LADWP will work to ensure that this Basin remains a consistent, stable and reliable resource for years to come.

Work with Regulatory Agencies and Governmental Officials: LADWP will continue to encourage the EPA to develop a long-term, comprehensive solution for existing and emerging contamination issues in the Basin. In addition to the EPA, LADWP will work with the Los Angeles Regional Water Quality Control Board and the California Department of Toxic Substances to find and hold polluters accountable for cleaning up the Basin.

Groundwater System Improvement Study (GSIS): LADWP will conduct a comprehensive groundwater study for the Basin. This study is a necessary step to evaluate the groundwater quality in the Basin and recommend treatment options to maximize the utility of the groundwater supply.

- Schedule: Contract award in mid-2008; contract term is 6 years
- Budget: $10 million (LADWP funded)
- Resources: LADWP will serve as contract manager and administrator
- Benefit: Will provide vital information to develop a long-term strategy to remediate groundwater contamination in the San Fernando Basin.

Monitoring Well Drilling Contract: LADWP will install up to 40 new monitoring wells throughout the Basin to provide vital water quality information necessary for the Groundwater System Improvement Study.

- Schedule: Construction contract award in mid-2009; contract term is 2 years
- Budget: $7.5 million (LADWP funded)
- Resources: LADWP will serve as contract manager and administrator
- Benefit: The monitoring wells can be routinely sampled during and after the GSIS to provide vital information on groundwater contaminants and their concentration levels

Interim Wellhead Treatment: LADWP will install interim treatment for select wellheads in the Tujunga Well Field in order to maintain groundwater pumping production. An amount of $3 million has been included in the budget for this work.

Strategy 5: Expanding Groundwater Storage

Goal: Pursue opportunities to expand groundwater storage.

Action Plan: LADWP is investigating opportunities for increased storage of groundwater, creating a cost-effective, environmentally friendly reserve of water resources in case of extreme drought or other emergencies. Currently, the City has significant amounts of stored groundwater in the San Fernando Basin. However, contamination restricts the ability to effectively utilize this resource. As a result, it is critical for L.A. to invest in a long-term plan for expanding our storage capacity and ensuring a sustainable source for the future.

Explore Opportunities for Groundwater Storage Along the Los Angeles Aqueduct: As part of a proposed study of the impact of climate change on our water system, LADWP will examine opportunities for increased groundwater storage in the Owens Valley and the Antelope Valley. LADWP will also continue to engage in a groundwater rights adjudication process underway in the Antelope Valley.

Pursue Storage Project in Los Angeles County Water Basins: LADWP is investigating a groundwater conjunctive use storage project in the LA County groundwater basins. This project would enable LADWP to store significant amounts of water during periods of drought or emergency.

Los Angeles Aqueduct and California Aqueduct Interconnection: LADWP is planning to construct an interconnection between the Los Angeles Aqueduct and the California Aqueduct, located where the two aqueducts intersect in the Antelope Valley. The interconnection will allow for water transfers or exchanges, and could be used to help move water to facilitate groundwater storage opportunities. The design phase of the interconnection is almost complete. LADWP is waiting for a permit to build on land owned by the State Department of Water Resources (DWR). LADWP plans to begin construction in

2008. Note that this project will also result in net increase in renewable energy production through energy recovery facilities in the Los Angeles Aqueduct system.

Table 11. W1, W2, W3 Implementation Steps

Milestone	Completion Date	Quantity of Measure
See projects discussed above for milestones.		AFY Saved

Measure Evaluation

Reducing per capita water consumption by 20% would provide a significant savings in the electricity usage associated with residential supply services, and reduce associated greenhouse gas emissions. CO2 reductions will be calculated and reported on an annual basis. Future versions of this document will provide emissions reduction estimates from the water reduction milestones in this section.

2.3 Focus Area: Transportation

GOAL: Lower the environmental impact and carbon intensity of transportation

Action No.	Measure	Page
T1	Require 85% of City fleet to be powered by alternative fuels.	62
T2	Convert 100% of City refuse collection trucks and street sweepers to alternative fuels.	65
T3	Convert 100% of Metropolitan Transportation Authority (MTA) buses to alternative fuels.	69
	Convert 100% of City Department of Transportation (DOT) Commuter Express Diesel Buses to Alternative Fuel.	71

GOAL: Focus on mobility for people, not cars

Action No.	Measure	Page
T4	Complete the Automated Traffic Surveillance and Control System (ATSAC).	73
T5	Expand FlyAway shuttles serving Los Angeles International Airport (LAX) and other regional airports, and convert existing FlyAway buses to alternative fuels.	75
T6	Make transit information easily available, understandable, and translated into multiple languages.	78
T7	Increase the City employee participation in the rideshare program and increase subsidy for use of mass transit.	79
T8	Promote walking and biking to work, within neighborhoods, and to large events and venues.	81
T9	Expand the regional rail network.	

In addition to the above measures, The City will continue to evaluate emerging issues and strategies for reducing GHG emissions relating to transportation and will incorporate findings into future versions of this document. This includes parking and congestion pricing, biodiesel applications, taxi fleets, and other innovative market-based incentives.

GOAL: Lower the environmental impact and carbon intensity of transportation

Action T1	Require 85% of City fleet to be powered by alternative fuels.

To reduce both air pollution and greenhouse gas emissions, City Departments will continue to acquire alternative fuel and advanced technology vehicles to replace those powered by conventional fuels. Mayor Villaraigosa has set an 85% alternative fuel goal for the City's passenger sedan vehicle fleet excluding emergency response vehicles. Since 2000, when the City adopted its Clean Fuel Policy, the City's alternative fuel fleet has grown by an average of over 20% per year.

Lead Agencies
- Department of General Services (GSD)

Other Agencies
- Los Angeles Department of Water & Power (LADWP)
- Los Angeles World Airports (LAWA)
- Port of Los Angeles (POLA)
- EnvironmentLA (ELA)

Vehicle ownership and operational control varies on a departmental basis. Operational departments own and operate their own vehicles. The Department of General Services (GSD) procures and maintains vehicles for municipal (Council-controlled or non-proprietary) departments, except the Police and Fire departments. The proprietary departments (POLA, LAWA and LADWP) procure and maintain their own vehicles. EnvironmentLA (ELA) chairs the Interdepartmental Alternative Fuel Taskforce (IAFT), which is a group of fleet managers from all City departments that have fleet vehicles. Through the IAFT, ELA provides technical information, identifies grant opportunities, and assists departments with grant applications for alt fuel vehicle projects. ELA also informs fleet managers as to developing regulatory requirements.

Opportunity

With the advent of alternative fuel and/or advanced technology vehicles, several City departmental fleets have been able to transition away from reliance upon conventionally-fueled vehicles, as described in the following section.

- **Passenger Sedans**: The City's sedan fleet has moved quickly to fuel-efficient vehicles. Based on a December 2007 survey, the City's sedan fleet now includes over 1,330 gasoline-electric hybrid cars, the predominant vehicle type in this fleet in both the municipal and proprietary departments.
- **Airport Vehicles**: The Los Angeles World Airports (LAWA) fleet at Los Angeles International Airport (LAX) is over 70% alternative fuel/advanced technology vehicles, and includes terminal shuttle buses, refuse collection vehicles, street sweepers, sedans, and other vehicle types. The overall airport fleet for all airports (LAX, Ontario, Van Nuys, Palmdale) is 63% alternative fuel/advanced technology vehicles.
- **Port of Los Angeles Vehicles:** Excluding emergency response vehicles, over 68% of the vehicles owned by the Port (POLA; also called the "Harbor Department") operate on CNG, electricity, or hybrid electric technology, including both heavy-duty and passenger vehicles.
- **Department of Water & Power Sedans:** The LADWP passenger sedan fleet numbers 435 vehicles. A total of over 285 sedans or 66% are alternative fuel or hybrid vehicles.

- **Police and Security Bicycle Patrols**: The patrol functions of six City departments (Police, Fire, Transportation, General Services, Recreation and Parks, and Los Angeles World Airports) have replaced approximately 330 conventional patrol vehicles with approximately 500 zero emission patrol bicycles. The bicycles are used by emergency medics, police officers, park rangers, parking enforcement officers, and airport, zoo and general security officers. Interest in bicycles is expanding to other City patrols.

In addition to the special fleets noted above, GSD is working with operational departments to test a new hybrid aerial truck, possibly diesel-electric, that is expected to be available in mid- to late-2008. The Los Angeles Department of Water and Power (LADWP) is also testing three demonstration plug-in hybrid vehicles, which are achieving an estimated maximum of 95 mpg (miles per gallon).

Challenges

There are several challenges associated with replacing conventional vehicles with alternative fuel and advanced technology models:

- Higher cost: The Cost differential between a conventional vehicle and alternative fuel model ranges from $3,000 to $50,000 per vehicle, with the exception of heavy duty hybrids, which can have a cost differential of $50,000.
- Limited funds: While desirable, accelerating the routine vehicle replacement schedule of 7-9 years, and/or purchasing cleaner vehicles that exceed air quality standards, strains departmental budgets. The funding needed for the Department of General Services' (GSD) vehicle replacement program is approximately $30 million per year.
- Alternative fuel availability, affordability, and market fluctuations: There are limited supplies of liquefied natural gas fuel, and no local sources, leaving the City vulnerable to market fluctuations and subject to rising fuel transportation costs.
- Siting and development of maintenance facilities and fueling stations: Siting of these facilities within a cost-effective proximity to vehicle storage locations and work areas/routes is a challenge. Use of natural gas fuels requires special, more expensive, fueling stations, as well as substantial modifications to existing indoor maintenance buildings.
- Training: The need for specialized technical training to ensure safety for maintenance and fueling personnel and vehicle operators.
- Biofuels: Although biodiesel (which is derived from biogenic sources) and ethanol are classified as alternative fuels by the US Department of Energy (DOE), the benefits of their use are still being evaluated by California regulatory agencies. The South Coast Air Quality Basin, which encompasses all of the City of Los Angeles, and portions of Los Angeles, Riverside, and San Bernardino counties, and all of Orange County, consistently ranks highest in the nation for ozone levels above the federal health standards. According to state and regional air quality regulators, biofuels may contribute to ozone formation. Therefore, these agencies are extremely cautious with regard to new fuels. It should be noted that the City owns flexible fuel vehicles (primarily sedans) that can run on either gasoline or E85, which is a mixture of 85% ethanol and 15% gasoline. The flexibility of these vehicles will allow the City to respond quickly as these fuels, and associated fuel dispensing equipment, become more readily available and are approved for wide use in this area.

Table 12. T1 Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. GSD, LADWP, LAWA and POLA will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation. The following table identifies the vehicle purchase implementation schedules for vehicle types that currently have available alternative fuel/advanced technology models.

Vehicle types approaching 85% in next few years	Overall Fleet Size (on-road vehicles)	% Alternative Fuel/Adv. Technology *	Schedule (Fiscal Year basis)	Vehicles needed to reach 85% goal	Additional Goal
GSD passenger sedans	1,350	78%	85% in 2008/2009	94	100% in FY 2009/2010
LADWP passenger sedans	435	66%		85	-
All airport vehicles combined	1,034	63%	85% in 2011/2012	228	100% in FY 2015/2016 for LAX (subset of 772 vehicles)
Port non-emergency vehicles	114	68%	85% in 2011/2012	20	-

Measure Evaluation

Progress toward the 85% alternative fuel/advanced technology vehicle goal is tracked for vehicle types for which alternatives exist. As technology and fuel availability advance, new options will be considered for demonstration testing. Overall, the success of this goal can be measured by the number of applicable alternative fuel/advance technology vehicles purchased, and by quantifying the CO2 emissions reduced through the use of these vehicles.

GHGs Reduced

For 2006, tailpipe emission reductions resulting from use of the City's alternative fuel/advanced technology fleet were modeled by the University of California at Riverside in January 2007, and estimated to be 12,400 metric tons of C02. This represents an approximate 5 MT of CO2 reduced per vehicle per year. Using the 5MT C02 reduction per year per vehicle multiplied by the alternative fuel vehicles needed to achieve the 85% goals results in the overall emissions reduction estimates below.

Alt fuel vehicles needed to reach 85% targets	427
Average annual MT Co2e reduction per alt fuel fleet vehicle	5
Emissions avoided (MT CO_2/yr)	**2,000**

Action T2	Convert 100% of City refuse collection trucks and street sweepers to alternative fuels.

To reduce the use of conventional diesel fuel, reduce greenhouse gas and toxic air pollutant emissions, the City will continue to acquire solid resources collection vehicles (for refuse, dead animals, yard trimmings, and commingled recyclable materials) and street sweeper vehicles that are fueled by natural gas, an alternative fuel. As of December 2007, there were more than 700 solid resources collection vehicles in the City's Bureau of Sanitation fleet. By the end of Fiscal Year 2007/2008 (July 1, 2008), 309 vehicles (or about 44%) will be alternative fuel vehicles that operate on liquefied natural gas (LNG), or a combination of LNG and a small quantity of ultra-low sulfur diesel (which is used for vehicle ignition). As of December 2007, there were 162 street sweeper vehicles in the City's Bureau of Street Services fleet; 87 of these (or about 54%) will run on compressed natural gas (CNG) by the end of Fiscal Year 2007/2008 (July 1, 2008). In addition, the City's Department of General Services has constructed three large, state-of-the-art natural gas fueling facilities to service these vehicles. A fourth smaller station is located in the harbor area.

Lead Agency	Department of General Services (GSD) Los Angeles Department of Public Works Bureau of Sanitation (BOS) Bureau of Street Services (BOSS)
Other Agencies	Bureau of Engineering (BOE) EnvironmentLA (ELA)

GSD constructs, maintains, retrofits, and operates fueling stations and maintenance facilities for most municipal or Council-controlled City departments, including the Bureau of Sanitation (BOS) and the Bureau of Street Services (BOSS). BOS and BOSS own and operate their own vehicles, which are the solid resource collection vehicles and street sweepers, respectively. BOS also finances the construction of fueling stations and provides fueling personnel, while BOE assists with the design and engineering of the stations. The Department of General Services (GSD), BOS, and other departments, partner with EnvironmentLA (ELA) to apply for grant funding to offset the costs of alternative fuel infrastructure development and alternative fuel vehicle purchases. In addition, GSD, BOS, and BOSS work closely with vehicle manufacturers to ensure that new models meet City operational requirements.

Opportunity

Conventional transportation fuel is a major contributing factor to air pollution and greenhouse gases (CO_2). As alternative fuel technology continue to be refined, the City will be able to substantially reduce the air emissions associated with providing the collection and sweeping services to the community.

- **Solid Resource Collection Vehicles**

As of July 1, 2008, the City's Bureau of Sanitation will own and operate 309 refuse collection vehicles (RCVs) that operate on LNG or a combination of LNG and diesel. These are used to collect trash and recyclable materials. According to "Greening Garbage Trucks: Trends in Alternative Fuel Use, 2002-2005," by James S. Cannon of Inform, Inc., the Bureau of Sanitation's fleet, is the largest municipally-owned alternative fuel solid resources collection fleet in the nation.

- **Street Sweepers**

As of July 1, 2007, the City Bureau of Street Services owned and operated 54 street sweepers that are powered by CNG. By June, 2008, this number increased to 87 CNG sweepers, representing 54% of the current Bureau sweeper fleet. This is among the nation's largest municipally owned alternative fuel sweeper fleets.

Challenges

Attainment of the 100% alternative fuel goal will depend upon the availability of necessary funding, alternative fuel engines that meet operational requirements, and the needed fueling and maintenance facilities, as well as adequate fuel supply, additional staff (dedicated fuelers, mechanics, and supervisors), and new employee training. LNG fuel supply interruptions have occurred in the past, as current suppliers are few in number and located out of state. GSD and BOS are exploring options for additional sources of LNG supplies; GSD is in the process of forming a working group that would address LNG supply issues.

- For the solid resources collection fleet, three key challenges exist. The first two are the need to construct a LNG fueling station, and upgrade the existing maintenance facility, at the North Central Maintenance Yard, by 2010, to support the conversion of approximately 130 heavy-duty diesel powered vehicles located at this station. Funding for these projects has been allocated. Third, a West Los Angeles alternative fueling station must be established and activated to serve as the base for the last 116 diesel collection vehicles that will be converted to alt fuel. It typically takes 5 to 7 years to establish a fueling station such as this, and another 6 months to complete performance and safety evaluations. BOS is also exploring the possibility of establishing an off-site LNG fueling station for the solid resources collection vehicles of the West Los Angeles District, separate from the existing vehicle garage and maintenance location.
- It is anticipated that 14 diesel street sweepers will not be converted to alternative fuel because of their special work duty requirements. They require mobile tanker re-fueling that cannot, at present, be accomplished with alternative fuel. With the exception of these 14 sweepers, the balance of the sweeper fleet is currently scheduled for conversion by FY 2011/2012, which will result in a street sweeper fleet that is 91% alternative fuel.

Table 13. T2 Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. GSD, BOS, and BOSS will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation. If infrastructure development continues as planned, the street sweeper fleet will achieve a 91% alt fuel rate by 2011/2012. The solid resources collection fleet will convert as many vehicles as possible by the same date. The anticipated vehicle purchase implementation schedule is described in the following table.

Benchmark or Milestone[1]	Completion Date[1]	Quantity of Measure	Total Alt. Fuel Used/Year[4] mm = million gge = gasoline equivalent gallons
Current CNG Street Sweepers	FY 07/07	54 CNG Sweepers	0.23 mm CNG gge
33 more CNG Street Sweepers	FY 07/08	87 CNG Sweepers	0.37 mm CNG gge
15 more CNG Street Sweepers	FY 08/09	102 CNG Sweepers	0.43 mm CNG gge
15 more CNG Street Sweepers	FY 09/10	117 CNG Sweepers	0.50 mm CNG gge
20 more CNG Street Sweepers	FY 10/11	137 CNG Sweepers	0.58 mm CNG gge.
11-25 more CNG Street Sweepers	FY 11/12	148-162 CNG Sweepers[2]	0.69 mm CNG gge (162)
Current LNG SR Collection Vehicles	FY 06/07	294 LNG Collection Vehicles	2.2 mm LNG gallons
15 more LNG SR Collection Vehicles	FY 07/08	309 LNG Collection Vehicles	2.7 mm LNG gallons
96 more LNG SR Collection Vehicles	FY 08/09	405 LNG Collection Vehicles	3.7 mm LNG gallons
80 more LNG SR Collection Vehicles	FY 09/10	485 LNG Collection Vehicle	4.5 mm LNG gallons
109 more LNG SR Collection Vehicles	FY 10/11	594 LNG Collection Vehicle[3]	5.6 mm LNG gallons
110 more LNG SR Collection Vehicle[3]	FY 11/12	704 LNG Collection Vehicles[3]	6.7 mm LNG gallons

Notes:

1. The above schedule is based on information from GSD (in 1/2008) and from BOS (in 3/2008).
2. The last 14 CNG sweeper purchases may not occur due to mobile fueling requirements.
3. Purchase of the last 116 solid resources collection vehicle purchases is dependent upon timely completion of a West LA fueling station. It takes 5-7 years to build a new station, and an additional 6 months to complete a performance and safety evaluation. BOS is also exploring the option to establish an off-site LNG fueling station for its collection vehicles at its West Los Angeles Yard.
4. Based on a December 2006 U.S. Department of Energy, Energy Information Administration (EIA) survey of departments. This included mileages and fuel economies for calendar year 2006 (which were projected into the future, as vehicle numbers increase), and BOS vehicle fuel use estimates, as provided in March 2008. Fuel usage is used to calculate the GHG emission associated with operation of these vehicles. Fuel tank and transfer venting may be another source of emission that can be studied in the future.

Measure Evaluation

The success of this goal can be measured by the number of alternative fuel vehicles purchased, the amount of conventional fuels displaced by alternative fuels, and the reduction in associated greenhouse gas emissions.

GHGs Reduced

In calculating the emissions savings from this action, the City will estimate the total increase in alternative fuel use per year (CNG and LNG). The difference between the metric tons (MT) of carbon dioxide (CO2) associated with displaced fuel (conventional diesel) use and with alternative fuel use is calculated. Only the engine combustion or "tailpipe" emissions were calculated, not the life-cycle emissions associated with alternative fuel transport, storage, and use. The calculations assumed a reduction in fuel economy that is often associated with alternative fuel vehicles.

Table 14. T2 Emission Factors Used

Emission	
Diesel emission factor (kg CO_2/gal)	9.96
LNG emission factor (kg CO_2/gal)	4.37
CNG emission factor (kg CO_2/gge)	6.86

The emission factors above were based on assumed fuel economies of generic heavy-duty diesel vehicles (3 mpg) and CNG/LNG vehicles (2.2 mpg). (RMA, 2007)

Amount of additional LNG to be used in City's refuse collection trucks (gal/yr)	6,700,000
Amount of additional CNG to be used in City's street sweepers (gge/yr)	690,000
Diesel RCV fuel economy (mpg)	2.1
LNG RCV fuel economy (mpg)	1.02
Diesel sweeper fuel economy (mpg)	3.8
CNG sweeper fuel economy (mpgge)	2.99
RCV Diesel to be displaced by LNG (gal/yr)	3,254,000
Sweeper Diesel to be displaced by CNG (gge/yr)	542,921
AFV emissions (MT CO_2/yr)	34,012
Displaced diesel emissions (MT CO_2/yr)	37,820
BOSS sweeper & BOS RCV emissions avoided (MT CO_2/yr)	**3,800**

Action T3-Metro	Convert 100% of Metropolitan Transportation Authority (Metro) buses to alternative fuel.

The Los Angeles County Metropolitan Transportation Authority (Metro) Annual Report for 2007 estimated that a fleet of 2,500 buses would be mostly converted to 100% alternative fuel (alt fuel) by fiscal year 2009/2010. This conversion would reduce conventional fuel consumption and emissions of greenhouse gases (GHG) and other air pollutants. Estimates from the South Coast Air Quality Management District (SCAQMD) indicate that natural gas engines produce less greenhouse gas than conventional diesel engines, and substantially less particulate matter (PM), nitrogen oxides (NOx) and carbon monoxide (CO). For further information on the Metro bus fleet goals, please contact Metro Media Relations at 213-922-2700 or visit www.metro.net.

Lead Agency	Office of the Mayor of Los Angeles (a member of the Metro Board)
Other Agencies	Metro Board Members (elected officials from the Los Angeles County cities of Duarte, Glendale, Long Beach, Los Angeles, and Santa Monica; appointees of the Mayor of Los Angeles, including members of the State Assembly; and all 5 members of the Los Angeles County Board of Supervisors)

The Metro Board is a working group of 13 local officials and private citizens who oversee this unique agency that serves as the regional transportation planner and coordinator, designer, builder, operator, and funding partner for Los Angeles County transit projects. Metro's core mission is to ensure the continuous improvement of an efficient and effective transportation system for Los Angeles County. The City of Los Angeles influences the direction of Metro, as the Mayor will be serving as the Board's Chair for fiscal year 2009, and has 3 board appointees including one Los Angeles City Councilmember.

Opportunity

The transportation sector, through the combustion of transportation fuels, is one of the largest sources of air pollution and greenhouse gas emissions, both locally and statewide. Metro has implemented many environmental firsts for the transit industry. Years ahead of regulation, Metro operates the largest compressed natural gas (i.e., lowest carbon content fossil fuel) bus fleet in North America and the second largest green fleet in the world. With 97% of its bus service now operating on CNG, the Metro fleet is a successful model for other bus fleets operators throughout the region, state and nation. Metro expects to achieve 100% CNG operation in the next 12-24 months.

In terms of its own operations, Metro has installed solar photovoltaic arrays that currently generate over 850 kilowatts of renewable energy. A similar project that will produce one megawatt of renewable energy is currently in construction (the largest in the transit industry). In addition, Metro has incorporated sustainability design elements in the construction and upgrades of various bus divisions, transit oriented developments, administration buildings and for the Metro Orange Line transit/bike/pedestrian parkway.

The Metro Board of Directors recently adopted the 2008 Metro Sustainability Implementation Plan for fiscal year 2009. The plan outlines the four key areas the agency will work on to incorporate sustainable mobility projects, programs and policies to further the agency's environmental leadership and partner with the cities, special districts and key stakeholders in the County:

- *Metro and Countywide Greenhouse Gas Emissions and Climate Change Management* which consists of developing and measuring the agency's GHG emissions footprint, and monitoring, coordinating and providing input into the various local, regional, state and federal organizations

developing Climate Change policy.

- *Energy Sustainability Initiatives* which include energy conservation initiatives; planning, feasibility studies, and installation of additional solar panels at various bus and rail divisions; and exploration of other renewable resources and partnerships with energy providers;
- *Development of Sustainability Design Guidelines* that will be used to incorporate and implement core sustainability elements into Metro design and construction activities for linear projects (i.e., rail, busway, or road related projects);
- *Development and Implementation of Sustainable and Environmental Management Systems* that include the development of a Sustainability Information Management System (SIMS) pilot study for Division 10 and an additional Environmental Management System (EMS) pilot implementation through a Federal Transit Administration assistance program.

Challenges

Metro is making plans to operate CNG buses from all bus operating locations. One division (Division 6 in Venice) cannot accommodate CNG fueling, and Metro is making arrangements to fuel vehicles for this location off-site. Funding is a key challenge, as traditional sources are not keeping up with demand. In order to implement the longer-term strategies, Metro is exploring various options including but not limited to new transportation fees and taxes and public-private partnerships to achieve the long-term climate change objectives.

Table 15. T3 Implementation Steps

The actions under this measure have been incorporated into Metro plans and budgeting. Metro will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation.

Milestone	In-Service Date	Quantity of Measure
Current alternative fuel (alt fuel) bus count	FY 2007/2008	2,500 alt fuel buses
Purchase 260 more alt fuel (CNG) buses*	FY 2008/2009	2,550 alt fuel buses*

*According to a memo dated April 17, 2008, the Metro has executed a contract for the purchase of 260 CNG buses to cover scheduled vehicle replacement requirements by FY 2009/2010. This table assumes a progressive delivery until 2009/2010 to fulfill the Metro goal of 100% alt fuel for their fleet of 2,500 buses. Metro also plans to start retiring some of our oldest first generation CNG buses.

Measure Evaluation

For this measure, the amount of diesel fuel used in FY08 was used as a benchmark to estimate the GHG emission reductions resulting from the conversion to a CNG fleet. This amount of fuel and the diesel and CNG fleets' fuel economies were provided by a MTA representative. The GHG emissions due to the diesel fleet, the amount of CNG needed to replace the diesel fleet, and the estimated CNG fleet emissions are shown below. The GHG benefit can be realized as the emissions from the CNG fleet minus the emissions from the diesel fleet.

Emissions from current diesel fleet	
Diesel fuel consumption in FY08 (gal/yr)	1,440,000
Diesel emission factor (kg CO2/gal)	10.15
Emissions from Diesel fleet (MT CO2/yr)	14,616
Quantity of CNG fuel needed to replace diesel fleet	
Diesel Fleet fuel economy (mpg)	3.3
Annual miles served by diesel fleet (mi)	4,752,000
CNG Fleet fuel economy (mi/therm)	2.0
CNG fuel required to replace diesel fleet (therms)	2,376,000
Estimate of CNG emissions	
CNG emission factor (kg CO2/therm)	5.31
Emissions from CNG fleet (MT CO2/yr)	12,617
Emissions avoided by replacing Diesel fleet w/CNG fleet (MT CO2/yr)	**2,000**

Action T3-DOT	**Convert 100% City Department of Transportation (DOT) Commuter Express diesel buses to alternative fuel.**

Conversion of City buses to alternative fuel will reduce air pollution and greenhouse gas emissions.

Lead Agency Department of Transportation (DOT)

Other Agencies EnvironmentLA (ELA)

DOT and ELA are working together to identify funding for the purchase of alternative fuel buses and opportunities to test newer technologies.

Opportunity

The DOT operates several bus transit services that eliminate individual automobile trips, including Commuter Express, Community and Downtown DASH, and CityRide. These services reduce vehicles miles traveled (VMT) by private vehicles, fuel consumption and the associated CO2 emissions, by offering individuals alternatives for both commuting and intra-city trips. All 206 DASH buses have been converted to propane several years ago and 101 Commuter Express buses have been refurbished to low sulfur diesel and have had diesel particulate traps installed. In addition, there are now 3 CNG buses in the Commuter Express fleet. The CityRide vehicles use ultra-low emission gasoline engines. The primary opportunities include the conversion of all 101 diesel Commuter Express buses to compressed natural gas (CNG) over the next five to six years. The Commuter Express fleet would total 104 CNG buses once the conversion has been completed.

Challenges

The primary challenge is the additional cost associated with the purchase of the alternative fuel vehicles. Thus DOT and ELA will continue to research funding for alternative fueled vehicles.

Table 16. T3-DOT Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. DOT will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation.

Milestone	In-Service Date	Quantity of Measure
2007 CNG Commuter Express Bus fleet.		3 CNG Commuter Express Buses
Replace 17 more Commuter Express Buses from diesel to CNG.	FY 2008/2009	20 CNG Commuter Express Buses
Replace 24 more Commuter Express Buses from diesel to CNG.	FY 2010/2011	44 CNG Commuter Express Buses
Replace 24 more Commuter Express Buses from diesel to CNG.	FY 2011/2012	68 CNG Commuter Express Buses
Replace 33 more Commuter Express Buses from diesel to CNG.	FY 2012/2013	101 CNG Commuter Express Buses

Measure Evaluation

This measure can be evaluated by the reduction in air pollution and greenhouse gas emissions achieved by replacing transit buses to CNG and ultra low emission gasoline, and the number of passengers carried annually by each service, which translates into fewer single occupancy vehicles on the road.

GHGs Reduced

Roughly 30 MTCO2e/yr reduction can be expected per bus replacement. If the remaining 97 buses are replaced by FY 2012/2013, then an annual GHG reduction of about 2900 MT CO2e/yr can be expected from thereon.

Commuter Express diesel buses to be converted	97
Annual miles accumulated for diesel buses	3,372,600
Gallons diesel used	1,088,000
Miles accumulated for 3 CNG buses	106,449
GGE of CNG used	31,307
CNG fuel economy (mpgge)	3.4
Annual MT Co2e reduction per bus conversion	30
Commuter Express emissions avoided (MT CO_2/yr)	**2,900**

GOAL: Focus on mobility for people, not cars

Action T4	Complete the Automated Traffic Surveillance and Control System (ATSAC).

This action reduces vehicle emissions that result from idling at intersections. By reducing vehicle stops, delays and travel time through improved traffic signal timing, vehicles can travel a longer distance at a consistent rate of speed, improving fuel economy. Thus, the ATSAC system results in reduced air pollution and greenhouse gas emissions. Emissions are reduced through decreased incidences of idling, acceleration and incomplete fuel combustion. ATSAC implementation began in June 1984.

Lead Agency Department of Transportation (DOT)

Other Agencies Office of the Mayor

Opportunity

By minimizing vehicle stops and other traffic delays, total travel and idling time and vehicle emissions, including CO2, are reduced. The DOT's Automated Traffic Surveillance and Control (ATSAC) System is a state-of-the-art computer traffic signal system that enhances traffic flow on City streets. ATSAC monitors traffic conditions and adjusts traffic signal timing accordingly; it also recognizes unusual traffic conditions and implements special purpose short-term signal timing changes, and identifies signal equipment malfunctions.

By the first quarter of Fiscal Year 2006/2007 (July-September, 2006), ATSAC had been installed at a total of 3,242 intersections. In addition to ATSAC, the Adaptive Traffic Control System (ATCS) will also be utilized. ATCS is an upgrade from ATSAC and enables further enhancement of traffic flow through real-time adjustments based on additional sensor data. During the latest count taken during the January to March 2008 quarter, an additional 1,175 intersections are scheduled to be completed with either ATSAC or ATCS.

Challenges

The primary challenge is the cost associated with the installation and maintenance of the system. State funding has been requested and programmed to help complete the planned installations. Each installation project must be approved by the State as it comes up for final State review.

Table 17. T4 Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. DOT will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation. DOT is in the process of mapping the intersections with ATSAC and identifying those still requiring completion.

Milestone	Completion Date
Install ATSAC and ATCS at 58 intersections	March '08
Install ATSAC and ATCS at 636 intersections	June '09
Install ATSAC and ATCS at 481 intersections	June '11

Measure Evaluation:

The near-term opportunity for reducing greenhouse gas emissions is significant. This measure can be evaluated by the reduction in vehicle idling time and the number of intersections with ATSAC.

GHGs Reduced

An ATSAC Evaluation Study conducted in June 1994 provides an estimate of emissions avoided on arterial streets, based on data collected from the speed and delay studies. Average vehicle fuel economies have changed little in California since that time (according to the CEC's 2007 Integrated Energy Policy Report). The percentage of alternatively fueled vehicles has increased, but the model did include a 5% year projected decrease in vehicle emissions based on potential technology improvements. Each intersection was estimated to reduce annual CO2 emissions by 229 MT/yr. The City has already completed 3,242 of 4,417 intersections and successful full ATSAC implementation would result in a further annual Community-Wide emissions reduction of 269,075 tons of CO_2. This is a substantial reduction potential, however, there is much uncertainty involved in the estimate.

Total reductions from program implementation (MT CO_2/yr)	1,005,461
Reductions already achieved as of May '07 (MT CO_2/yr)	736,386
Remaining Community-Wide emissions reductions available (MT CO_2/yr)	**269,075**

Action T5	**Expand FlyAway shuttles serving Los Angeles International Airport (LAX) and other regional airports, and convert existing FlyAway buses to alternative fuels.**

FlyAway shuttles that provide transit service to LAX from several Los Angeles locations reduce the number of private vehicles traveling to the airport. FlyAway stations also provide convenient passenger pick-up and drop-off locations and parking. The first LAX FlyAway shuttle began operating from Van Nuys in 1975. In March 2006, Los Angeles World Airports (LAWA) began offering FlyAway service from Union Station in downtown Los Angeles; service from Westwood, on the UCLA campus, was added in June 2007. In 2006, the Van Nuys and Union Station shuttles tallied over 1 million passengers, the equivalent of eliminating about 2,500 daily vehicle trips and 167 tons of criteria air pollutants. (The Clean Air Act requires EPA to set standards for six air pollutants that are commonly found all over the US. They are particle pollution (or particulate matter—PM), ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead. These pollutants are harmful to health and cause property damage.)

Lead Agency Los Angeles World Airports (LAWA)

LAWA reviews passenger origin and destination studies to help identify sites where there's high demand for shuttle services. LAWA meets regularly with the Los Angeles County Metropolitan Transit Authority (MTA) and other regional transportation providers to discuss regional transportation needs. For example, LAWA holds regular meeting with UCLA Transportation Services to discuss operational, traffic flow and marketing issues concerning the Westwood FlyAway bus terminal. LAWA is also networking with the Westside Transportation Network to market this service to area community groups and businesses.

Opportunity

Los Angeles's transportation sector contributes about half of all local greenhouse gas (GHG) emissions. Providing additional convenient options to air travelers can decrease the number of vehicle trips to and from LAX, thereby decreasing associated GHG emissions. Since the commencement of the Union Station FlyAway service, LAWA has been studying other potential sites, including locations in Long Beach, Norwalk, El Monte, Anaheim and other areas. In addition, LAWA is investigating the use of alternative fuels, such as CNG, for its buses.

Challenges

The primary challenge associated with expanding this program is funding. When evaluating expansion opportunities, LAWA must optimize operational logistics to ensure long-term viability of the new services. While FlyAway services save travelers money, passenger fees do not cover all service costs. Identifying new locations for the service involve negotiations with landowners, which can be lengthy. The goal is to provide a convenient service at a reasonable cost, for a relatively large number of travelers. Converting FlyAway shuttles to alternative fuel is more difficult than for other bus fleets, because the FlyAway shuttles are “coach” buses with luggage storage areas under the passenger seating which conflicts with the fuel tank location. LAWA is also exploring different bus styles that are reconfigured to provide secured storage luggage compartments and passenger seating in the same area.

Table 18. T5 Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. LAWA will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation. LAWA staff will continue negotiations for possible Long Beach locations and with the identification of additional potential sites in the greater Los Angeles area. These sites will be evaluated for a number of factors, including cost and availability, local demand for the service, and the potential to reduce total vehicle trips to LAX.

Milestone	Completion Date	Quantity of Measure
Implement 6 additional FlyAway sites.	2015	# of FlyAway passengers or private vehicle trips avoided.

Measure Evaluation

As new FlyAway service is brought on line, the number of shuttle passengers is tracked daily. With passenger statistics, the number of vehicle trips and miles reduced and/or avoided, and GHG emissions reduced, can be calculated. The cost effectiveness of the FlyAway service varies by site, as it is determined by the lease or property purchase amount, cost of any required property improvements, and demand for the service.

GHGs Reduced

Convert existing flyaway buses to CNG

	Union Stn	Westwood	Total
Number of Trips, daily	88	82	170
Distance of each Trip (mi)	19.5	12.3	
Annual route mileage (mi)	626,340	368,139	994,479
Actual miles/yr	642,400	230,461	872,861
Diesel fuel consumption (gal/yr)	116,976	41,904	158,880
Diesel fleet fuel economy (mpg)	5.49	5.50	
Current Diesel fleet size	6	6	12
Diesel buses removed	0	-6	-6
CNG buses added	4	8	12
Annual number of CNG Trips	4,380		
Miles/yr CNG Buses	85,410	368,139	453,549
Diesel gallons displaced	15,552	66,938	82,490
Emissions reduced by displaced diesel (MT CO_2/yr)	158	679	837
Fuel Economy of CNG mid-size buses (mpgge)	5.0	5.0	5.0
CNG fuel projection (gge/yr)	17,082	73,628	90,710
Emissions added by new CNG buses (MT CO_2/yr)	117	505	622
Emissions Reduced (MT CO_2/yr)	**41**	**174**	**215**

Expand flyaway shuttles serving Los Angeles International Airport

Proposed Flyaway Site	Miles/yr[1]	Miles/trip[1]	# of trips	Pass/yr[1]	Gallons/yr[10]
Long Beach	928,195	18	50,445	504,454	539,648
Norwalk	889,505	21	42,357	423,574	517,154
El Monte	391,645	33	11,868	118,680	227,701
El Monte 2	317,915	33	9,634	96,338	184,834
Universal City	373,760	26	14,375	143,754	217,302
Pasadena	368,265	28	13,343	133,429	214,108
Irvine	279,225	42	6,648	66,482	162,340
Total	**3,548,510**		**148,671**	**1,486,711**	**2,063,087**

Total estimated CNG-use (gge/yr)[1]	709,702
Municipal emissions *added* (MT CO_2/yr)[1]	**5,000**
Citywide emissions *reduced* (MT CO_2/yr)	**18,000**

Action T6	**Make transit information easily available, understandable, and translated into multiple languages.**

Lead Agency	Department of Transportation (DOT), Metropolitan Transportation Authority (MTA)
Other Agencies	City of Los Angeles Personnel Department (Personnel); EnvironmentLA (ELA)

A DOT partnership with the Personnel Department and ELA will enable DOT to determine in which additional languages transit information should be provided. The MTA renewing its partnership with DOT would increase opportunities for transit information to be accessed.

Opportunity

Los Angeles traffic is a major source of greenhouse gas emissions. Facilitating access to transit information increases the likelihood of transit use, which can reduce single occupancy vehicle trips and help alleviate traffic congestion, and most importantly, reducing associated greenhouse gas emissions.

Challenges

The primary challenge associated with this goal is funding for the development of brochures, flyers, and revisions to Web sites to disseminate transit information. Translation services will also be required. According to an Arbitron study, 86% of Los Angeles County bus commuters speak English as a first or second language. Spanish is the second most commonly spoken language, and persons of Hispanic/Latino origin or descent account for over half (52%) of riders. Given these facts, system-wide Spanish-language information and signage makes sense. The benefit of providing information in Armenian, Chinese, Korean, Thai, and other languages, in targeted geographic areas, should be evaluated. But providing information in additional languages may not suffice: the Literacy Network of Greater Los Angeles estimates that 1.8 million Los Angeles County adults lack the skills to read street signs. Mexico City's subway offers maps with hieroglyphics, not text, for the illiterate; this type of signage could be useful in Los Angeles as well.

Table 19. T6 Implementation Steps

Determine which types of transit information need to be more widely promoted or disseminated. Determine the benefits (cost-effectiveness, increased ridership) of providing information in additional languages.

Milestone	Completion Date	Quantity of Measure
Task force created to discuss strategies.		New signage; an increase in ridership.

Measure Evaluation

Progress on this measure can be evaluated after the Task Force has been established and implementation milestones have been established.

GHGs Reduced - Potential GHG reductions cannot be quantified at this time.

Action T7	Increase the City employee participation in the Rideshare program and increase subsidy for use of mass transit.

Employee rideshare programs are intended to reduce the number of single-occupant vehicle trips associated with commuting to the workplace. These programs help reduce traffic, as well as reducing the air pollutants from personal vehicles. The City's rideshare program has many components, and provides incentives to those employees who use an alternative method of commuting. The City's main Employee Rideshare Program pays a nontaxable monthly subsidy of up to $50 per month to employees who commute to work via public transit (bus, commuter train or light rail), offers free parking to those who carpool with another City employee, and subsidizes participation in commuter vanpools. The subsidy amount is determined by the Joint Labor Management Committee on Commute Options and Parking and is incorporated into the employee benefits package. The City has encouraged increased participation, resulting in more than a 14% increase over the last two years. In 2008, the City received "Diamond Awards" for its rideshare programs from the local metropolitan transportation authority.

Lead Agency Joint Labor Management Committee on Commute Options and Parking

Other Agencies Personnel Department, City of Los Angeles
Los Angeles World Airports
Los Angeles Department of Water & Power

The City and the Port of Los Angeles share a component of the overall rideshare program. LAWA and LADWP oversee separate components of the program. There are opportunities to partner with the Mayor's Office, City Councilmembers, City union representatives, and the Department of General Services (GSD) to identify methods for increasing funding to the City's main Rideshare Trust Fund, while keeping costs down.

Opportunity

Traffic congestion wastes fuel and time and is a major source of greenhouse gas emissions. The increasing congestion and gasoline costs present opportunities to attract more employees to the Rideshare program. The annual Rideshare survey is one mechanism for determining what types of additional incentives would attract and retain new participants. The Joint Labor-Management Committee on Commute Options and Parking (JLMC-COP) is looking into potential new sources of funding for the City's main program.

Challenges

The main Rideshare program is intended to be self-funding – that is, revenues from City employee parking lots are put into the program to fund the transit subsidies and other incentives. The number of parking spaces available to City employees, and the associated revenue, are both declining. Other challenges include maintaining a cost neutral program while identifying funds to cover an increased transit subsidy and increased program marketing, and sustaining Mayor and Council support. Increases in the vanpool program would require leasing additional vans.

Implementation

The JLMC-COP is considering various ways to increase revenues to the Rideshare Trust Fund to allow additional marketing of existing services and to explore opportunities to increase the transit subsidy and/or add vans to the vanpool program. Some options include increasing the parking fees for City employees, requiring parking fees for employees at Hyperion Treatment Plant and Port locations, and identifying potential public funding opportunities.

Table 209. T7 Implementation Steps

Milestone	Completion Date	Goal
Joint Labor Mgmt Committee negotiates special parking MOU	September 2008	Bring additional revenues to program
Begin implementation of additional revenue programs	Sept-Dec 2008	
Personnel Dept begins additional marketing of rideshare programs & JLMC-COP sets new participation goal	March 2009	
Evaluate increased participation/need for additional measures	Sept 2009	

Measure Evaluation

GHGs Reduced - About 14.6% (or 7,319) of all City employees, including proprietary departments, now participate in the Rideshare program. Using a composite number based on the methodology outlined below, each participant results in a roughly 3 MTCO2 equivalent reduction. Increasing participation by 1% across all categories (about 500 employees), the City could reduce emissions by 1,500 $MTCO_2$ Eq.

Employee Participation (FY 06-07)	
Vanpool	2,264
Carpool	1,247
Transit/Bike/Walk	3,808
Total Participation	7,319
Total Employees	50,000
Participation Rate	14.6%

Methodology

Vehicle fuel consumption for three classes—single-occupancy vehicles (SOVs), vanpools, and carpools—were converted into CO2 (carbon dioxide), N2O (nitrous oxide), and CH4 (methane) emissions, with passenger-vehicle factors provided by EPA 2006. To estimate fuel consumption, vehicle miles traveled (VMT) were estimated for non-participants (SOVs), vanpools, and carpools. Once VMT were estimated, annual fuel consumption was calculated based on assumed fuel efficiency. This estimated fuel consumption was then converted to energy units, then to potential carbon, then to emitted carbon, then to MTCO2 Eq. as outlined above. Vehicle mileage was multiplied by N2O and CH4 emission factors and converted to MTCO2 Eq. to estimate non-CO2 emissions. In selecting the non-CO2 factors, all vehicles were assumed to have air pollution control equipment equivalent to a low emissions rating. Total emissions were then calculated by summing across all gases and all employee groups for each scenario. Increases in public transit usage were assumed to cause no increase in public transit GHG emissions under the assumption that the transit system has existing capacity to handle the additional riders.

Action T8	**Promote walking and biking to work, within neighborhoods, and to large events and venues.**

Agencies City of Los Angeles Personnel Department (Personnel); Department of City Planning (Planning); EnvironmentLA (ELA); Mayor's Office; Los Angeles City Council Offices; Library Department (Library); Department of Recreation and Parks (RAP); Community Development Department (CDD); Los Angeles Housing Department (LAHD); Port of Los Angeles (POLA aka "Harbor Department")

A partnership among the offices and departments listed above is crucial for locating funding sources to create an effective outreach campaign targeting Los Angeles residents and businesses.

The Port of Los Angeles (POLA) began the Waterfront Red Car Line (WRCL) to provide safe, reliable, enjoyable, and environmentally friendly transportation for the thousands who visit the San Pedro Waterfront each year. The current 1.5-mile route is now more of a tourist attraction than a commute alternative. But extension of WRCL service into the Wilmington area and to Cabrillo Beach in San Pedro is expected to result in a higher level of utilization as public transportation, reducing single-occupancy local vehicle trips and therefore reducing GHG emissions. As part of the Waterfront Development Project (described below), the Port is currently preparing development plans for the Waterfront Red Car Line to become part of an integrated transportation system for the waterfronts of Wilmington and San Pedro.

Opportunity

Los Angeles traffic is a major source of wasted fuel and time, and while much emphasis is placed on the burden of long commutes even short commutes and non-work trips contribute heavily to congestion. Local trips which are typically less than five miles or less in distance account for 80% of non-work related trips. With the growing obesity rates, both people and traffic would be better served if more residents walked and biked whenever possible. Promoting these alternate modes of travel will reduce the carbon emissions associated with single occupancy vehicles (SOVs). As described in Action Items LU1 and LU2 in this document, the City is promoting high-density and mixed-use housing close to major transportation arteries. Such developments will also support the advancement of Action Item T8, by improving accessibility for those who wish to walk and bike to work. The Metropolitan Transportation Authority (MTA) now offers ticket discounts and other perks to customers who take transit to entertainment venues and events.

Challenges

For bicycling, the underlying challenge is the reduction of barriers to greater utilization of bicycles for both personal transportation and recreation, with particular emphasis on bicycling as a commute option. This requires further development of bicycle riding infrastructure, such as bike lanes, and the improvement of existing infrastructure. An effective outreach campaign, coupled with programs to make bicycling safer, will facilitate achievements in this arena. Funding is the common challenge for all these elements.

Table 21. T8 Implementation Steps

The first task is to identify funding for development of the bike/walk campaign strategy, and then for implementation. Other departments and community groups must be enlisted to provide assistance.

Milestone	Completion Date
Task force created to discuss strategies.	TBD

Successful attainment of this goal will require partnerships with a large number of entertainment and sports event organizers. Capturing accurate and meaningful data may be difficult and could require surveys. The MTA has partnered with major venues to provide ticket discounts for transit users. Typically, baseline information is needed to determine whether the incentive resulted in increased transit use. Entertainment venues will need to capture (or provide) parking statistics to establish baselines prior to implementation of outreach programs. A variety of incentives, financial and other, will likely be required. The City must assure that it qualifies for and receives the maximum amount of state, federal, and private funding for bikeway construction, bikeway maintenance, and bicycle safety education.

Measure Evaluation

The near-term opportunity for reducing greenhouse gas emissions is very difficult to estimate. An increased number of pedestrians and bicyclists on Los Angeles streets, and reduced vehicle miles traveled, will be the primary indicators of success.

GHGs Reduced The potential reduction in GHG emissions cannot be quantified at this time.

Action T9	Expand the regional rail network.

The Metro rail and busway system offers 73.1 rail miles and 78 stations in service over covered by the Blue, Green, Red, Purple, Gold and Orange lines for an estimated average weekday boardings of 308,653 people. New bus service using dedicated traffic lanes are being introduced starting with the 14-mile exclusive San Fernando Valley Metro Orange Line.

Metro recently completed a cost/benefit study of its funding for Metrolink. The study provided an analysis of the subsidy allocation formula for Metrolink operations. Metrolink station will seek changes in the formula to better correlate Metro's subsidy with Los Angeles County resident ridership. Such a change in the formula would reduce Metro's share of operating subsidy to Metrolink. Metro could reinvest these savings to increase service on high productivity Metrolink lines.

The Metrolink system provides high-speed, long-distance regional commuter rail service traveling at a system average (including stops) of 41 mph over 512 route miles. Metrolink carries an average of 43,500 passenger trips and removes an average of 24,500 auto trips each weekday.

Agencies Metropolitan Transportation Authority (MTA), City of Los Angeles Chair and Board of Directors Members

The City of Los Angeles has an excellent opportunity to influence the future of the regional rail network since the Mayor recently became the Chair of the MTA Board. The City also has three appointees on the Board including one Councilmember.

Opportunity

Expand the County's Light Rail System. The Eastside Extension of the Metro Gold Line is scheduled to open to Atlantic and Pomona Boulevards in 2009. The first segment of the Exposition light rail line to Culver City will open in 2010. This will expand the Metro Rail network to over 80 stations covering nearly 88 miles. Phase II of the Exposition Line could add an additional seven miles. A transit alignment along Crenshaw Boulevard is also planned that could be light rail or bus rapid transit. The Strategic Unfunded Plan includes a number of other rail projects that could be considered if additional funding becomes available. These projects have conceptual alignments and costs that could be the subject of further study to determine their feasibility, alignment and cost. In all, Metro planning calls for investments to expand the Metro Rail system by another 32 miles.

The Draft 2008 Plan will help Metrolink continue to deliver high quality commuter rail service by maintaining the commitments of the 2001 LRTP. This plan provides $3.3 billion of total expenditures of which $2.288 billion is Metro's subsidy, including approximately $50.3 million per year for operations, and $22.5 million per year for rehabilitation. The funding amounts for capital vary by year, but on average the plan includes $14.9 million per year for expansion capital through 2030. As part of the Strategic Unfunded Plan element, Metrolink is seeking $225 million in additional funding to implement service expansion and safety enhancements. To increase service levels, Metrolink will need to purchase rolling stock, expand the Eastern Maintenance Facility, and construct or upgrade sidings and crossovers to increase speed. Parking needs at the stations are a responsibility of local jurisdictions, and are an eligible use for Call for Projects funds. In spring 2008 the Metro Board will consider a 10-Year Plan of specific capital projects for Metrolink. Funding for the projects will be allocated as part of the annual budget adoption process, consistent with the Draft 2008 Plan.

Metro Transitways will include a project along Wilshire Boulevard that proposes exclusive, peak hour access to buses, subject to approval by cities. Transitways in the San Fernando Valley (north/south alignment) and along Crenshaw Boulevard could be implemented as funding becomes available.

Challenges

The 2003 Short Range Transportation Plan focuses on the phasing of transportation improvements through 2009 that will help put together the pieces of our mobility puzzle. The Plan relies on performance-based modeling to identify the best solution for each mobility challenge. In total, $19.3 billion is needed to fund this Plan's transportation priorities through 2009. These include the costs of operating the current system and funding new transportation solutions.

Table 31. T9 Implementation Steps

The first task is to identify funding for development and expansion of the rail system, and then for implementation. Other agencies and community groups must be enlisted to provide assistance.

Milestone	Completion Date
Metro Gold Line Eastside Light Rail Transit (LRT)	**2010**
Exposition LRT Phase I	**2010**
Exposition LRT Phase II	**2016**
Crenshaw Boulevard Corridor	**2025**
Metrolink subsidy	**2005-2030**
Peoplemover to LAX	**2030**
Rail rehabilitation and replacement	**2005-2030**

2.4 Focus Area: Land Use

GOAL: Create a more livable city

GOAL: Create a more livable city

Action LU1	Promote high-density housing close to major transportation stops.

Promoting higher density housing in areas close to transportation stops is an important component of the City's General Plan. Higher density housing with good access to transit helps accommodate the City's growing population and helps relieve traffic congestion, by increasing ridership on public transit. This policy is incorporated in several Elements of the General Plan, including the Framework Element, Housing Element, Land Use Element, which includes the 35 Community Plans, and the Transportation Element. This policy has been implemented through such citywide ordinances as the Residential Accessory Services (RAS) zone, the TFAR ordinance, and other special ordinances targeted to the downtown.

Lead Agency	Department of City Planning (Planning)
Other Agencies	Los Angeles Housing Department (LAHD), Community Redevelopment Agency (CRA)

The Department of City Planning (Planning) has worked cooperatively with the Los Angeles Housing Department (LAHD,) the Community Redevelopment Agency (CRA), and other departments to update the City's Housing Element which reinforces these higher density policies.

Opportunity

The promotion of higher density housing in proximity to transit is a long-term strategy that integrates land use, housing, transportation, and environmental policies that complements and maximizes the region's transit system. Many studies have demonstrated the trip reduction benefits of increased housing density when coupled with adjacent access to a mix of uses.

Challenges

The scarcity of land for development often necessitates the demolition of existing smaller or under-performing structures, which can be controversial. Adjacent communities often voice concerns about potential traffic impacts, changes to neighborhood scale and character, and increased densities that result from new residential development. These issues must be addressed through outreach and education about the community-wide benefits.

Table 22. LU1 Implementation Steps:

The actions under this measure have been incorporated into departmental plans and budgeting. Planning will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation.

Milestone	Completion Date	Quantity of Measure
Update Housing Element.	September 2008	# of units
Integrate land use transportation policies into Community Plans that are under revision	December 2010	12 Community Plan updates
Adopt citywide Density Bonus Ordinance that provides additional incentives for the development of affordable housing close to major transportation arteries		

Measure Evaluation

This strategy will help reduce vehicles miles traveled and the associated CO2 emissions, and improve quality of life. Anticipated increases in transit ridership can be translated into reduced or avoided single occupancy vehicle miles traveled (VMT), and reductions in greenhouse gas emissions can be extrapolated from that. Success will depend upon implementation of the appropriate elements of the General Plan (Framework, Housing, Land Use, and Transportation elements), as well as education and outreach about the benefits of locating housing near transit

GHGs Reduced Potential reductions in GHG emissions resulting from this item cannot be calculated at this time.

Action LU2	Promote and implement transit-oriented development.

Transit-oriented development (TOD) is a land use strategy to accommodate new growth efficiently, strengthen neighborhoods, and expand choices and opportunity by capitalizing on transportation assets to stimulate vibrant, compact, diverse, accessible, and sustainable neighborhoods.

Lead Agency	Department of City Planning (Planning)
Other Agencies	Los Angeles County Metropolitan Transit Authority (Metro); Department of Transportation (DOT); Community Redevelopment Agency (CRA)

TOD development requires collaboration by numerous public and private sectors. Planning's institutional partners include Metro, CRA, DOT, the Los Angeles Department of Public Works (LADPW), and the Department of Building and Safety (DBS). Chambers of commerce, the development community, and residents and their representatives on the Certified Neighborhood Councils are also essential to successful implementation of TODs.

Opportunity

Transit Oriented Districts (TODs) represent opportunities for creating cohesive, vibrant, walkable communities where fragmented, auto-dependent corridors now exist. TODs are a positive alternative to low-density traditional land use patterns that typically segregate housing, jobs and neighborhood services from one another. In contrast, TODs cluster these community elements in close proximity, so a greater portion of trips can be made by transit, bike, or on foot. Metro is developing two initiatives that will expand our current partnerships around TODs; the Sustainable Mobility Corridors policy and Sustainable Mobility Transit Boulevards. The objective of the Sustainable Mobility Corridors is to optimize transportation services to increase throughput and safety, while reducing energy, VMT and emissions. The Sustainable Mobility Transit Boulevards will encourage the development of transit-supportive land uses, smart parking and high quality road design standards.

Challenges

The main challenge to the successful implementation of the TOD strategy is community acceptance. TOD plans involve zone changes and intensification of development in areas served by rail and fixed route transit. Educating the general public about the principles of TOD, potential benefits, appropriate applications, and short-term impacts, is critical to successful implementation.

Implementation

The actions under this measure have been incorporated into departmental plans and budgeting. Planning will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation. After securing local transit funds, Planning hired two consultant teams to produce TOD plans and market studies for seven rail stations that are part of the Metropolitan Transit Authority's (MTA's) planned Gold Line Eastside Extension and the new Exposition Light Rail Line. Upon completion of the studies, station area plans will be incorporated into the New Community Plan Revision Program. Other implementation tools include Specific Plans and zoning changes.

Transit-Oriented Districts (TODs) will help reduce vehicle miles traveled (VMT) and associated greenhouse gas (GHG) emissions, and improve quality of life. Successful implementation will require enforcement of

the appropriate elements of the General Plan, including the Framework, Land Use, and Transportation elements. Success is also dependent upon education/outreach about the Density Bonus Ordinance and Residential Accessory Services (RAS) zone to contractors, traditional and non-profit housing developers, regional governments, and employers.

Table 23. LU2 Implementation Steps

Milestone	Completion Date	Quantity of Measure
Finalize consultants' contracts.	8/2008	Station area plans
Conduct public outreach including workshops.	9/2008	
Approve station area plans.	3/2009	

Measure Evaluation

Greater livability is the primary benefit of a TOD. Anticipated increases in transit ridership can be translated into reductions in vehicle miles traveled, and reductions in greenhouse gas emissions can be extrapolated from that. Many studies demonstrate the trip reduction benefits of increased density.

GHG Reductions

Potential reductions in GHG emissions resulting from this item cannot be calculated at this time.

Action LU3	**Make available underutilized City land for housing and mixed-use development.**
Action LU4	**Make available underutilized City land for parks and open space.**
Action LU6	**Make available underutilized City land within 1500 feet of transit for housing and mixed-use development.**

In addition to the City buildings and facilities that could be evaluated for their potential as housing or mixed-use developments, there are about 500 City-owned parcels totaling approximately 11 million square feet, that are vacant or could be declared “surplus” properties and used to accommodate the housing and open space needs of the City’s growing population.

Lead Agency Department of City Planning (Planning); General Services Department (GSD); Los Angeles Department of Public Works (LADPW); Los Angeles Housing Department (LAHD): Department of Recreation and Parks (RAP); Library Department (Library); Department of Transportation (DOT)

Other Agencies Port of Los Angeles (POLA; aka "Harbor Department")

This proposal would require a highly synchronized and collaborative interdepartmental effort. In addition, site-specific projects will require the participation of numerous stakeholders, including local homeowner groups, Neighborhood Councils, business associations, and other entities. The Bureau of Engineering (BOE) of the Los Angeles Department of Public Works (LADPW) has assessed specific sites and prepared remedial action plans to bring the sites to residential or recreational standards.

The Port’s waterfront redevelopment projects in San Pedro and Wilmington total over 500 acres. The projects focus on infrastructure improvements, expansion of the Port’s existing cruise program, the creation of open space, and enhanced public access to the waterfront via pedestrian linkages and extension of the Waterfront Red Car Line. Approximately 77 acres will extend the California Coastal Trail, create an integrated system of passive and active open spaces, event spaces, paths, and promenades that offer recreational opportunities and also connect the community to the waterfront.

Opportunity

The City can leverage the value of its real estate assets, whether developed and unimproved lands, to further Smart Growth policies such as improving access to transportation, strengthening job/housing linkages, reducing vehicle trips, providing non-traditional open space such as linear networks, and parkland that is built upon freeway covers.

Parks and green space enhance the quality of life and reduce the environmental impact of our built environment. The City has a database of all property that it owns; the departments of City Planning (Planning) and Recreation and Parks (RAP) can evaluate all vacant property for its potential as parks or open space. If now-vacant land is planted with trees, there will be some greenhouse gas (GHG) reduction benefit, with the greatest benefit to be realized after the trees reach maturity.

Challenges

Identifying public priorities and coordinating the financing for the development of vacant or underutilized properties are the most significant challenges.

Table 24. LU3/LU4/LU6 Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. Planning will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation.

Milestone	Completion Date	Quantity of Measure
Establish City working group to identify and evaluate publicly owned land.	6/2008	# of residential units developed at transit stations; square feet of park and open space developed.
Prioritize opportunities to transform underutilized City land.	12/2008	
Establish fund and develop one to three City properties.	12/2010	

Measure Evaluation

GHGs Reduced The potential reduction in GHG emissions cannot be quantified at this time.

Action LU5	**Clean up brownfields sites for community economic revitalization projects and open space.**

The Los Angeles Brownfields Program will remove environmental barriers to development at 25 or more underutilized properties, by December 2009. For additional information about the Program, please refer to www.lacity.org/ead/labf.

Lead Agency	EnvironmentLA (ELA) Community Redevelopment Agency (CRA)
Other Agencies	Los Angeles Community Development Department (CDD); Mayor's Office; Department of City Planning (Planning); Department of Recreation and Parks (RAP); Bureau of Engineering (BOE) of the Los Angeles Department of Public Works (LADPW); Port of Los Angeles (POLA; also called "Harbor Department")

The Los Angeles Brownfields Program is a well-established partnership of City departments including the Mayor's Office, EnvironmentLA (ELA); Community Redevelopment Agency (CRA); Los Angeles Community Development Department (CDD); and the Office of the Chief Legislative Analyst (CLA). Other departments such as Recreation and Parks RAP), the Bureau of Engineering (BOE), the City Attorney, and City Planning are involved on a site-specific basis. The Program has also partnered with outside organizations such as U.S. EPA, CalEPA, and local community-based organizations (CBOs).

Brownfield remediation will occur at several locations in San Pedro, including a Superfund site that will be converted into a park, and the Westways tank farm, which will be remediated for future institutional or commercial uses, such as a maritime research center. In Wilmington, two large oil storage tanks will be removed and the property remediated to prepare for use as a future park. Vegetation and trees will be planted when these sites are converted for recreational uses; plants sequester or remove carbon dioxide from the atmosphere.

Opportunity

Brownfields are a tremendous resource—open space in the urban core—available for redevelopment as projects, many of which confer public benefits. Each brownfield site that is successfully redeveloped can result in improved utilization of existing infrastructure, such as transit, and a concomitant decrease in vehicle trips. Brownfields can also be turned into urban parks, thereby expanding our urban forest.

Challenges

Environmental concerns can be a barrier to brownfields redevelopment, although the perception of risk (about previous site uses) may not reflect the actual risk. It can also be difficult to identify brownfields, as some have transient uses and businesses. If the desired end use of an existing brownfield is open/green space, obtaining funding for the additional cleanup that is required, and for acquisition, development, and operating costs, can be difficult.

Implementation

The actions under this measure have been incorporated into departmental plans and budgeting. Environment LA, in its role on the Brownfields Team, will seek to meet existing milestones and evaluate the need to establish additional milestones during implementation. The Brownfields Program has a caseload of about 50 active projects and recently completed an inventory of 200 vacant lots in the Empowerment Zone, Enterprise Zones, and Renewal Community areas. This inventory provides the screening level environmental information necessary for assessing potential development opportunities. The Program will continue to assist its caseload sites in the removal of brownfield barriers and will distribute the inventory to property development interests. All sites will also receive sustainable development assistance.

Table 25. LU5 Implementation Steps

Milestone	Completion Date	Quantity o f Measure
Distribute lot inventory	2/2008	number of acres developed or used as open space.
Create long-term plan	8/2008	
Remove brownfields barriers at 20 small sites	12/2009	
Remove brownfields barriers at 5 large sites	12/2009	
Enable park development at 5 sites	12/2009	

To dissuade sprawl and the associated traffic congestion and GHG emissions, the City should encourage in-fill whenever possible. With the surge in downtown residential development and the resulting loss of some area light-manufacturing enterprises, prioritizing the revitalization of brownfields is critical. The City has a database of all property that it owns; coordination between City and regional economic development organizations, combined with anti-sprawl incentives, can facilitate in-fill development.

Measure Evaluation

This measure will be difficult to evaluate in terms of GHG emissions. It is hoped that in-fill development will reduce vehicle miles traveled, and/or increase transit use. For brownfields that are used as open spaces, the GHG estimates are more straightforward, as the carbon sequestration that occurs from tree planting can be quantified. In general, the revitalization of brownfields sites will not be a major source of GHG reductions, but there are important, concurrent environmental and community benefits.

GHGs Reduced Cannot be quantified at this time.

2.5 Focus Area: Waste

Goal: Shift from waste disposal to resource recovery

Action No.	Measure	Page
Action WsT1	Reduce or recycle 70% of trash by 2015.	95

In addition to the above measures, The City will continue to evaluate emerging issues and strategies for reducing GHG emissions relating to waste and will incorporate findings into future versions of this document. This includes conversion technology facilities and innovative market-based incentives.

Goal: Shift from waste disposal to resource recovery

Action WsT1	Reduce or recycle 70% of trash by 2015.

Assembly Bill (AB) 939, the California Integrated Management Act of 1989, mandated that cities, counties, and other agencies achieve a 50% solid waste diversion rate by 2000. Many California jurisdictions launched recycling programs in response to AB 939, but the City of Los Angeles had established its source reduction and recycling office prior to passage of AB 939.

The City has already achieved a 62% diversion rate (also called the *recycling rate*) through an extensive array of source reduction, buy-recycled, reuse, and collection programs, activities, policies, and technical assistance that are provided by the Bureau of Sanitation (BOS) of the Los Angeles Department of Public Works (LADPW) to business, industry, institutions, and single-family and multi-family dwellings.

Lead Agency Bureau of Sanitation (BOS) of the Department of Public Works (LADPW)

Other Agencies General Services Department (GSD), EnvironmentLA (ELA)

The LAUSD, business owners and managers, retail stores and chains, residents, apartment building owners and managers are all stakeholders in the Solid Waste Integrated Resources Plan process.

Current BOS collection programs include: residential and multi-family curbside collection for commingled recyclable materials; separated yard trimmings collection (for single family and some multi-family dwellings); free special collections (of bulky items, appliances, horse manure, bulky brush, weekend cleanups upon City Council request, and dead animal collection); used oil recycling centers; mobile household hazardous waste collection events; Christmas tree recycling; SAFE Collection Centers (for solvents, automotive products, flammables, and electronics); City Facilities collection program (see description below); retailer partnerships for the collection and recycling of batteries and other universal waste; construction and demolition (C&D) recycling program.

Related activities and programs include the backyard composting program; Green Yard trimming processing/mulching facilities (including the Griffith Park Composting Facility); mulch/compost giveaways; restaurant food waste recycling program; recycled-content construction product incentives program; business waste assessments and technical recycling assistance; Los Angeles Unified School District (LAUSD) recycling program (326 schools are now participating); and the Recycling Ambassador Program. Please see the BOS Web site at www.lacity.org/san for additional information about recycling and waste reduction programs.

The City Facilities Recycling Program (CFRP), operated by the Department of General Services (GSD), provides recycling services to an estimated 400 buildings. These encompass City-owned and leased locations, including libraries, police stations, fire stations, and most recently, City-managed construction sites. Fifteen of the sites are high-rise buildings. The CFRP collects and recycles books, confidential materials (from the Los Angeles Police Department, LAPD), cardboard, E-waste, eyewear (which is donated to Lion's Club), GAPS (glass, aluminum, plastics, steel), greeting cards (which are donated to Los Angeles Children's Museum), mixed paper, newspaper/magazines, rechargeable batteries (RBRC Program), white paper, and toner cartridges. CFRP also manages the CitiMAX Re-Use Program, which posts listings of available and wanted items and materials, to encourage re-use by City employees. In calendar year 2006, CFRP collected 2,081 tons of materials (mixed paper, 971 tons; E-waste, 286 tons; corrugated cardboard, 226 tons; white paper, 161 tons; burn box (confidential materials), 135 tons; newspaper, 130 tons; books, 93 tons; G.A.P.S., 60 tons; toner cartridges, 11 tons; rechargeable

batteries, 8 tons; greeting cards, .07 tons; eyewear, .005 tons). With litter reduction funding (SB332), CFRP offers free recycling at more than 200 special events each year (note: effective July 1, 2008, the CFRP will be operated by the BOS).

Opportunities

- RENEW LA, which was adopted by the City Council as the City's overarching waste management policy, established the goal of expanding the Multi-Family Recycling Program to 50% of the City's multi-family units by 2010.
- BOS was tasked with developing an aggressive outreach program to educate residents about how and what to recycle, and initiating an organic waste recycling pilot program.
- Source reduction and recycling programs not only conserve natural resources and landfill space, but also confer climate benefits.
- Manufacturing products from recyclables rather than virgin materials requires less energy and water.
- Methane is generated by the decomposition of materials in landfills. Although methane emissions are not yet quantified by the City, methane is a potent GHG that traps heat in the atmosphere at least 21 times as effectively as CO2.
- Landfill gas-to-energy systems are in operation at two of City-owned landfills (Toyon and Lopez Canyon). Additionally, the Los Angeles Department of Water and Power (LADWP) installed microturbines at Lopez Canyon in 2001; the turbines use landfill gas to generate electricity.

Challenges

Many challenges exist in meeting the overall goal. Budget limitations, the need for further public education and technical expertise, citing of facilities, and policy/regulatory barriers, all present certain challenges that the City must overcome. These will be further addressed in an annual review process.

Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. BOS will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation.

In FY 2007/2008 and 2008/2009, the Bureau of Sanitation plans to:

- Expand the BOS' successful Solvent, Automotive, Flammables, & Electronics (SAFE) Collection Center Program from six to eight permanent collection centers.
- Expand the Citywide program for multifamily recycling to households that are served by private waste haulers, and couple the expansion with a public education and outreach campaign.
- Expand recycling awareness and participation by the commercial and industrial sectors with an Annual Business and Environmental Forum showcasing recycled products and waste reduction/ recycling activities. The Forum will also host a Business and Environment awards ceremony recognizing businesses demonstrating environmental stewardship.
- Continue the expansion of the citywide program for the recycling of food and organic waste from Los Angeles restaurants, based on availability of funding, and recruit at least 425 restaurants to participate in the program by June 2008.

- Extend the Construction and Demolition (C&D) debris recycling policy to all private sector construction and demolition projects.
- In cooperation with the Los Angeles Unified School District (LAUSD), provide Blue Bin recycling and environmental awareness presentations to all LAUSD schools.
- Continue to develop partnerships with retail stores, nonprofits and other City departments, such as LADWP, to collect from City residents, free of charge, items such as alkaline batteries, SHARPS, fluorescent tubes, and expired medications.
- Partner in the Mayor's Million Tree Los Angeles Program by supplying mulch to residents for tree planting, and also provide those residents with home composting training and at-cost home composting units.
- Identify specific routes within the City where there is low recycling participation or high contamination levels in the blue and green bins. The routes will be visited by Recycling Ambassadors who will inspect and analyze the three curbside bins (including the refuse or trash bin) to identify possible contamination and/or improper bin usage. The Ambassadors will educate the residents about the importance of recycling and proper bin usage
- Evaluate and implement the residential food waste pilot program to assist in increasing solid waste diversion from landfills
- Identify municipal solid waste (MSW) processing technologies for implementation in 2010 that will increase landfill diversion in an environmentally sound manner and generate renewable energy, with an emphasis on options that are energy efficient, socially acceptable, and economical. The alternative technologies under consideration include advanced thermal recycling, pyrolysis/gasification anaerobic digestion, MSW composting, autoclaving, fermentation, among others. The Phase I Study was completed in 2005 and the report is available at http://www.lacity.org/san/alternativetechnologies.
- Develop and implement the Solid Waste Integrated Resources Plan (SWIRP) through a consensus building process with the community and stakeholders. SWIRP is a waste reduction strategy that will be implemented through the year 2025.
- BOS has already exceeded the milestone of making at least 335 presentations promoting recycling activities to approximately 9,150 students in FY 07-08. Through November 2007, BOS has made 425 presentations to LAUSD schools about the LAUSD Blue Bin recycling program. BOS is currently increasing its milestones to reflect its successful recruitment and outreach efforts.
- Increase solid waste recycling awareness in the commercial sector (on-going).
- LA Convention Center annually diverts and recycles over 733 tons (1.46 million lbs.) of goods and materials; its diversion efforts increased from 33.5% in 2004 to 49.8% in 2005. In October of 2007, LACC contracted for the recycling or composting of all landscaping green waste, except palm fronds. With the recent implementation of the Bureau of Sanitation's Food Waste Collection Program, which diverts food and food-soiled paper, LACC also anticipates the composting or recycling of 138,940 lbs. of food waste material that would have otherwise been destined for area landfills.

Table 36. WsT1 Implementation Steps

Milestone	Completion Date	Quantity of Measure
62% diversion rate.	2005	Tons disposed
Conduct at least 290 business waste assessments.	June 2008	
Implement recycling for at least 125,000 multi-family households. (As of November 2007, this program had been expanded to more than 150,000 multifamily units.)	June 2008	
Recruit at least 305 schools to participate in the LAUSD School recycling program. (As of November 2007, 326 LAUSD schools were already participating in blue bin recycling program.)	June 2008	
Implementation of Citywide Multifamily Recycling Program.	2008	
Develop a centralized data system to track the recycling activities in the City in order to meet the City's legal requirements.	FY 2007-2008	
Implementation of alternative technology facility to process post source-separated municipal solid waste for renewable energy generation.	2010	
Recycle 70% of trash.	2015	
Zero waste.	2030	

Measure Evaluation

The City's progress toward accomplishment of Zero Waste will be measured at the 2015/70% diversion mark. Estimating these reductions is difficult due to the large degree of uncertainty with the size and composition of the city's waste stream. Based on the methods and assumptions outlined below, achieving a 70% diversion rate percent would result in an estimated GHG reduction of 1,120,931 MTCO2 Eq per year over a period of 30 years. These GHG reductions occur from the average additional diverted waste tonnage compiled from data for 2002-2006. In the first year where 70% diversion is achieved, the estimated emission reduction is 656,704 MTCO2 Eq., and is driven primarily by the energy that is saved by producing each of materials such as glass, metals and other products from recycled inputs and not making products from virgin materials.

The U.S. EPA's WARM (Waste Reduction Model) was used to calculate the change in emissions due to increased diversion. WARM is used to calculate GHG emissions of baseline and alternative waste management practices—including source reduction, recycling, combustion, composting, and landfilling. A 2004 study (BOS, 2005) characterized the post-diversion waste stream for Los Angeles in August 2004. This study was based on 10 samples (truck loads), which were collected in one day and designed to represent the following six wastesheds: North Central (3 truck loads), West Los Angeles (3), East Valley (1), South Los Angeles (1), West Valley (1), and Harbor (1). It was then calculated that 21.1 percent of the current post-diversion waste stream would need to be diverted in order to reach the target of 70 percent total diversion. Data were entered into WARM such that in the baseline scenario, 100 percent of the post-diversion stream was landfilled, while in the target scenario, 21.1 percent of each material was either recycled (e.g. metals, paper, and glass) or composted (e.g. food scraps and yard trimmings). However, because approximately 18 percent of the post-diversion waste stream consists of non-divertable materials (i.e., textiles, hazardous waste, major appliances, etc.), the additional diverted waste tonnage needed to be adjusted upwards for those materials that can be recycled or composted to meet the target 70 percent diversion. As a result, 26.6 percent of eligible materials in the current post-diversion waste stream were either recycled or composted in the alternative scenario. It was assumed that landfilled material was placed in landfills with landfill gas-to-energy collection systems in place, operating at an assumed collection efficiency of 75 percent.

2.6 Focus Area: Open Space and Greening

GOAL: Unpave paradise / Create new paradises

Action No.	Measure	Page
OS/G1	Create 35 new parks.	100
OS/G2	Revitalize the Los Angeles River to create open space opportunities along the 32-mile corridor within the City of Los Angeles.	102
OS/G3	Plant 1 million trees throughout Los Angeles.	105
OS/G4	Identify opportunities to "daylight" streams.	110
OS/G5	Identify and develop promising locations for stormwater infiltration to recharge groundwater aquifers.	112
OS/G6	Collaborate and partner with schools to create more parks in neighborhoods.	100

In addition to the above measures, The City will continue to evaluate emerging issues and strategies for reducing GHG emissions relating to open space and greening and will incorporate findings into future versions of this document. This includes low impact development measures, additional community partnerships and innovative market-based incentives.

GOAL: Unpave paradise / Create new paradises

Action OS/G1 & OS/G6	Create 35 new parks or joint-use sites by 2010.

Los Angeles has lost many of the green spaces that historically provided Angelenos with recreational opportunities. Parks and their trees, shrubs and other vegetation help mitigate climate change impacts by absorbing CO2 and releasing oxygen into the atmosphere.

As envisioned by the Mayor, a plan released in the Fall of 2006 calls for the Department of Recreation and Parks (RAP) to provide recreational access through 35 new parks or joint-use sites within the next five years. One goal calls for the identification of at least 50% of the new park sites in high priority areas, to allow for an equitable distribution of recreational opportunities to all Angelenos. RAP responded by creating an implementation plan for site acquisition, planning and development, as well as a tracking system. The Plan's first step was accomplished when the Mayor directed all City departments to conduct an inventory of their land assets and report back about open space opportunities within their purview.

Lead Agency	Department of Recreation and Parks (RAP)
Other Agencies	General Services Department (GSD); Los Angeles Department of Water and Power (LADWP); Community Redevelopment Agency (CRA); and other landowners

There are significant opportunities for partnerships with City Departments that own surplus property that is suitable for transfer to RAP for park development. GSD has reported on its available parcels. There are also significant park and open space funding opportunities, which are described in detail in the Environmental Issues report that was presented to City Council on October 7, 2007. Funding sources that have been approved for parkland acquisition include Proposition 84, Proposition 40, Quimby, and Community Development Block Grant funding. RAP is also pursuing partnerships with non-profits and state and federal agencies to develop alternative funding sources for open space.

Opportunity

The benefits of this measure include increased green, open and recreational spaces, which will help create a healthier environment: vegetation absorbs CO2 and releases oxygen, and the new parks will also help improve air quality, as vegetation and trees filter and absorb particulate matter. Vehicle miles traveled may also be reduced, as some Angelenos will now have access to parks that are closer to their homes.

Challenges

The City needs to prioritize which areas it will target for open space development, given that funds are limited. An analysis of key community demographics, existing parks and recreational facilities, park land, and open space will be conducted in order to develop guidelines for establishing high priority areas where new parks would make the greatest impact. Other challenges include the continual change in priority listing for potential sites, and any environmental constraints associated with potential park sites. RAP is working with the Mayor's office to pursue several policy options that would increase the amount of open space in Los Angeles on a long-term basis. RAP is also working with City Council members to ensure the equitable distribution of parks across Council Districts.

Table 37. OS/G1 & OS/G6 Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. RAP will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation. RAP will create approximately 7 new parks per year, for a total of 35 parks by the year 2010. Currently, RAP is exceeding those goals. Individual park listings cannot be provided at this time, as prioritization study is still underway.

Milestone	Completion Date	Quantity of Measure
Property acquired/transferred.		Number of parks and acres
Park opened to public	2010	
Measurement and verification		

Measure Evaluation

The quantity of carbon sequestered in trees depends greatly on the tree species, the size of the trees at planting, tree mortality, and the timeframe. Carbon sequestration increases as the trees mature.

GHGs Reduced The GHG benefits cannot be quantified at this time.

Action OS/G2	Revitalize the Los Angeles River to create open space opportunities along the 32-mile corridor within the City of Los Angeles

The Los Angeles River flows for 51 miles through some the most diverse communities in Southern California, 32 miles of that stretching across the City of Los Angeles, from Canoga Park to Boyle Heights. The Los Angeles River Revitalization Master Plan (LARRMP), adopted by the City Council on May 9, 2007, intends to create an extensive "emerald necklace" of parks, trails, and bike paths through the heart of Los Angeles. The LARRMP recommends more than 240 projects, to be financed by federal, state, and local sources, over the next 20 to 50 years. The LARRMP was funded and produced by the Los Angeles Department of Water and Power (LADWP) and the Bureau of Engineering (BOE) of the Los Angeles Department of Public Works (LADPW), respectively, over a period of 20 months and at a cost $3 million.

The primary goal of the LARRMP is to revitalize the River by restoring some of its ecological functions. Where feasible, projects will enhance the creation and protection of habitat, floodwater retention, groundwater recharge, water quality, and other natural processes.

To oversee implementation of this massive effort, the Los Angeles City Council's Ad Hoc River Committee was established in June 2002. For further information, please refer to www.lariver.org.

Lead Agency	Bureau of Engineering (BOE) of the Los Angeles Department of Public Works (LADPW)
Other Agencies	Department of Recreation and Parks (RAP); Bureau of Sanitation (BOS) of the Los Angeles Department of Public Works (LADPW); Los Angeles Department of Water and Power (LADWP); Department of City Planning (Planning); and the Community Redevelopment Agency (CRA)

The LARRMP recommended the establishment of 3 new governance entities: (1) the River Authority, a cooperative agreement between the City and Los Angeles County for the River right-of-way, with the Army Corps of Engineers participating by means of a Memorandum of Understanding (MOU); (2) the River Foundation, a nonprofit organization tasked with raising funds to support the ongoing revitalization of the River; and (3) the River Revitalization Corporation, a nonprofit, nongovernmental organization tasked with implementing the LARRMP through land development and project management. The key City stakeholders include the Mayor's Office, the City Council Offices, BOE, CRA, Planning, and RAP.

Opportunities

The many benefits of this program include the expansion of green and open spaces within the City, the creation of additional native riparian habitats within the River corridor, connections with other habitat and species corridors outside the River area—to the Santa Monica and Verdugo Mountains, increased recreational space, which facilitates exercise and public health, and enhanced regional environmental educational opportunities.

River projects also support sustainability goals through their incorporation of stormwater management, groundwater recharge, and water conservation programs, and multi-benefit land uses. Newly created parks and their trees and shrubs help clean the air by filtering air pollutants. They also aid climate protection efforts by absorbing or sequestering CO2 and releasing oxygen into the atmosphere. And the reduction in impervious surfaces that will be achieved through green space expansion will not only improve water quality, but also enhance water infiltration, which can increase water supply and support the growth of vegetation. Collectively, all these elements will reduce the urban heat island effect.

Creation of the 32-mile River bikeway and transit-oriented development, in conjunction with implementation of the Plan-recommended River Improvement Overlay (RIO) district, is expected to increase opportunities for nonmotorized commuting. This would mean fewer cars on the nearby roadways and a commensurate reduction in automobile-generated greenhouse gases.

Challenges

The LARRMP is one of the largest projects the City has ever undertaken. The City has high hopes, but is aware of the immense challenges, including funding and implementation of the Plan's recommended three-tiered governance structure. Existing infrastructure near the River, such as highways and rail lines, may have to be relocated. Rapid private development of properties in or near the River corridor may limit opportunities for the public acquisition of these lands for open space use. The LARRMP has identified multiple high priority areas and projects where early funding resources can be focused to make the greatest impact.

Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. BOE will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation. Next steps include finalizing the establishment of the 3 new governance entities, which will involve determining the entities' leadership, functional and jurisdictional boundaries, powers, authority, influence, staffing, and financing.

- In June 2007, $25 million in Proposition O funds were approved for acquisition of the Taylor Yard G-2 site.
- In July 2007, the City Council endorsed a short-list of 13 priority River projects.
- In July 2007, $1.9 million was awarded to the West Valley Bikeway Project from the Proposition 50, "California River Parkways Program."
- In August 2007, the City partnered with the Mountains Recreation and Conservation Authority (MRCA) to submit a grant application for the Proposition 12 "Los Angeles River Parkways Program" for the Elysian Valley Bikeway Project. In early November, MRCA was awarded $536,519.
- In October 2007, the City submitted 3 grant applications for the next round of Proposition 50 funding for the Canoga Park Greenway, Los Angeles River Greenway Phase II, and North Atwater Park projects—an approximate total of $5 million. The City is also supporting the Trust for Public Land's application for $2.5 million of Proposition 50 land acquisition funds for the Taylor Yard G-2 site.
- In November 2007, the City submitted a $500,000 grant application to the State's A.B. 471 Environmental Enhancement and Mitigation program for the park portion of the Sunnynook River Park project.

Table 38. OS/G2 Implementation Steps

Milestone	Completion Date	Quantity of Measure
$1.9 million in Proposition 50 funding received.	July 2007	Acres of parks and green space added
AB 471 funding received.		
Bikeway projects completed.		
Taylor Yard G2 parcel completed.		
Other green spaces created.		
LA- RIO implemented.	December 2008	

Measure Evaluation

This is a long-term measure offering the significant benefits of expanded green and community space in a key area of the City. This measure is dependent upon funding for the implementation of each component.

GHGs Reduced

New parks will not directly reduce greenhouse gas emissions; instead, the vegetation and trees in the parks will absorb or sequester CO2 and release oxygen. Emission reductions estimates will be presented in a future version of this document.

Action OS/G3	Plant 1 million trees throughout Los Angeles.

The City of Los Angeles has a tree canopy cover of 21%, according to a recent survey, while the national average is 27%. In an effort to make Los Angeles greener, cleaner, healthier and more beautiful, the Mayor launched the "Million Trees LA" (MTLA) Initiative in September 2006. The initiative is rooted in the idea that natural processes can reduce pollution and transform our city into a sustainable, green city. The one million new trees will provide shade and reduce energy costs, clean the air, absorb the greenhouse gases that cause global warming, capture polluted urban runoff, improve water quality, provide homes for wildlife, and add beauty to our neighborhoods. The most sustainable trees—those that are native to the area and drought tolerant species—will be featured. The initiative is a cooperative effort among City of Los Angeles departments, community groups, businesses, and individuals. The program is administered by the Los Angeles Department of Public Works (LADPW), which created a Web site featuring an online reporting system for tracking tree planting efforts by all Initiative participants.

Three concurrent efforts are underway:

- City departments are planting trees on public property to restore parks;
- The City is forming public-private partnerships to plant large numbers of trees and to help fund the Million Trees LA Initiative; and
- Voluntary efforts are underway for individuals to participate.

Lead Agency	Mayor's Office, Los Angeles Department of Public Works (LADPW)
Other Agencies	Department of Recreation and Parks (RAP); EnvironmentLA (ELA); Los Angeles Department of Water and Power (LADWP); Community Redevelopment Agency (CRA); Department of Transportation (DOT); Los Angeles Housing Department (LAHD); the Bureau of Street Services (BOSS) and the Bureau of Engineering (BOE) of the Los Angeles Department of Public Works (LADPW)

The Los Angeles Department of Water and Power's (LADWP's) on-going program, "Trees for a Green LA," allows City of Los Angeles residents (and LADWP customers) who are homeowners to obtain free trees. LADWP also offers a nonresidential and multifamily-apartment program that helps residents form communities as they share planting and tree care tasks. Through an easy 20-minute online course or hour-long presentation at a neighborhood workshop, individuals are advised about the tree varieties that work best in their microclimates, and the best planting locations to maximize shading and lower energy use.

The Department of Recreation and Parks (RAP) and TreePeople and have joined forces to plant 300,000 trees over the next several years. RAP is the largest owner of open space and parkland in LA, overseeing nearly 400 parks that cover over 16,000 acres. Plantings have taken place at many key parks, including Harbor Regional Park in San Pedro, Griffith Park, and the Hansen Dam Recreation Area.

The Urban Forestry Division of the Bureau of Street Services (BOSS) of the Los Angeles Department of Public Works (LADPW) oversees the planting of about 4,500 street trees each year. The Bureau of Engineering (BOE) of LADWP is working on projects that support the Million Trees Initiative and has provided mapping expertise for the effort.

ELA is an integral part of the Mayor's Initiative and works to assist other departments with the tree plantings. ELA facilitates, hires, and oversees selected contractors to plant trees for a majority of City departments, including the Community Redevelopment Agency (CRA); Los Angeles Department of Water

and Power (LADWP); the Department of Transportation (DOT); and the Los Angeles Housing Department (LAHD). ELA also provides education to residents and secures funding to plant street trees.

The CRA has allocated $250,000 of Agency funds to support the Million Trees LA Initiative and increase the tree canopy along major commercial corridors within CRA project areas.

POLA's Tree Planting Program was initiated in January 2007 and will continue until 2010. While the initial goal was to distribute or plant 2,200 trees during the first year, the program flourished and has greatly exceeded initial expectations. As of September 2007, approximately 6,875 trees had been distributed. Of these, 2,014 were planted in public areas of the communities located around the Port, through the Port's Capital Maintenance and Improvement Program. It is anticipated that in 2007, about 7,179 trees will be distributed to the community, customers, and employees, or planted through the Harbor's Capital Maintenance and Improvement Program. The 2008 Tree Planting Program has already identified 4,865 trees for distribution at events this calendar year, and will continue to look for opportunities to expand distribution and planting.

For all housing projects that are built in conjunction with its Major Projects Division, LAHD's landscaping guidelines encourage the planting of trees. In addition, LAHD provides a free tree for all Homeownership and Single-Family Rehabilitation projects.

Hollywood/Los Angeles Beautification Team (H.LABT) will help plant 125,000 trees in City Council Districts 2 and 4 and in portions of Council District 13. H/LABT is a grassroots non-profit that works on a countywide basis implementing tree planting and other environmental projects, in partnership with community members.

Koreatown Youth & Community Center (KYCC) will help plant 50,000 trees in Council District 10. KYCC is a non-profit, community-based organization hat has been focused on serving the Koreatown and central Los Angeles communities since 1975.

Los Angeles Conservation Corps (LACC) will help plant 200,000 trees in City Council Districts 3, 6, 7, 8, 9, 11, and 15. The LACC has been the most prolific planter of public space trees in Los Angeles. Over the past 20 years, it has engaged more than 20,000 young people in environmental service projects, such as tree plantings, to improve the quality of life across Los Angeles.

North East Trees (N.E.T.) will help plant 200,000 trees in Council Districts 1, 12, and portions of Districts 13 and 14 over the next few years. North East Trees has developed the local leadership and community stewardship capacity necessary to ensure that the planted trees will be nurtured and so will substantially improve the quality of life in the participating neighborhoods.

TreePeople is helping the Department of Recreation and Parks (RAP) plant 300,000 trees on park property citywide, including wilderness areas. TreePeople staff and volunteers have planted over two million trees in on Los Angeles streets and school campuses, as well as in the mountains surrounding Los Angeles.

Opportunity

Planting trees combats climate change naturally, by absorbing carbon dioxide or CO2—the most prevalent greenhouse gas—and releasing oxygen. By providing shade and evaporating water through their leaves, trees also lower the ambient air temperature. Planting trees strategically to shade buildings is one of the easiest and most-effective methods of reducing energy use, which in turn reduces demand for electricity and the associated power plants emissions. Trees also beautify our parks and neighborhoods, reduce storm water runoff, and provide homes for wildlife.

Challenges

This on-going program has made substantial progress since its launch in late 2006. Counting and tracking the location of the trees as they are planted is challenging, given the number of groups, communities, and individuals that are involved. Tracking trees that are dead or in need replacement can be difficult. A database that is accessible to all partners is key to the Initiative's success, but requires funding for implementation.

Table 39 OS/G3 Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. MTLA will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation.

Milestone	Milestone Date	Quantity of Measure
Identify and approve specific funding objectives to support MTLA.	Ongoing	# of trees planted
Review commercial corridors that have been identified for tree plantings.	Ongoing	
Enter into contracts with service providers or purchase tree planting equipment.	Ongoing	
Conduct MTLA events to distribute trees to households.	Ongoing	
Create opportunities for tree planting in projects built in conjunction with LAHD's Major Projects division.	Ongoing	
ELA grant to plant 1,000 trees.	April 2009	1,000
ELA grant to plant 3,000 trees.	2011	3,000

Measure Evaluation

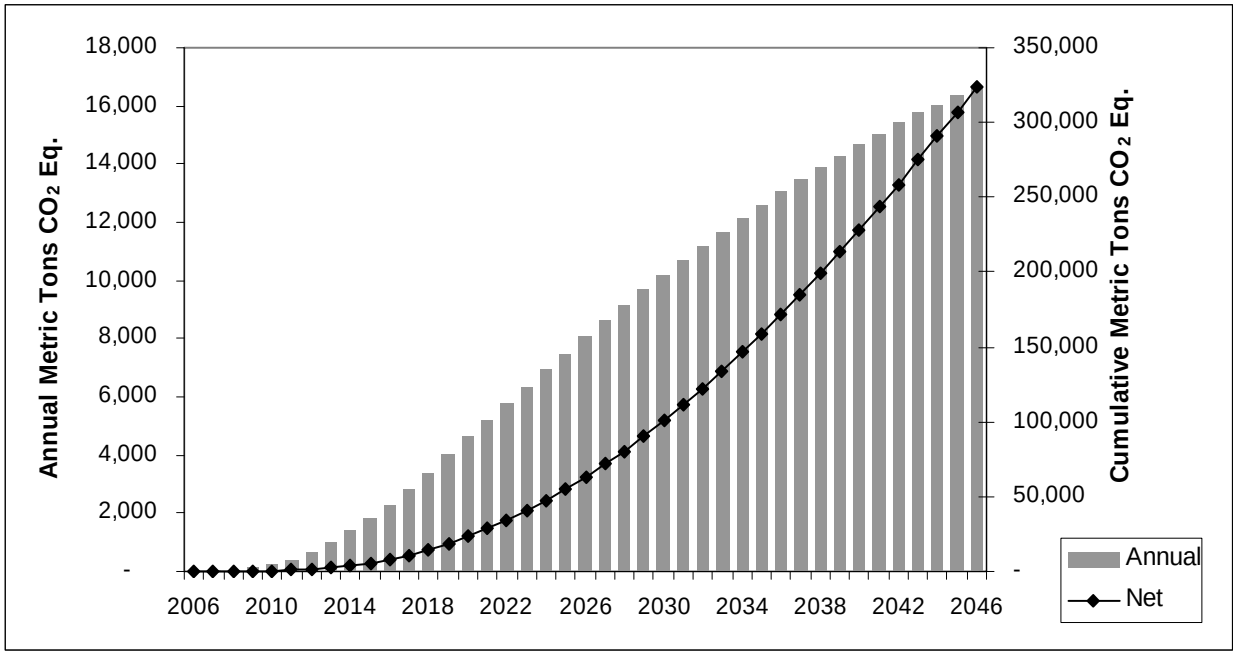
This is a long-term measure that offers the significant, concurrent benefit of greening the City. By providing shade, trees also reduce requirements for air conditioning and electricity, and thus reduce emissions from power plants.

GHGs Reduced

The quantity of carbon sequestered in these trees depends greatly on tree species selection, the size of the trees at planting, tree mortality, and the timeframe (carbon sequestration starts slow in trees, but increases as the trees mature). Assuming a ten-year planting schedule beginning in 2006, annual sequestration is just 12 $MTCO_2$ e (million tons of CO2 equivalent) in 2006, but reaches over 8,000 $MTCO_2$ e annually by 2026 and continues to grow. are presented below.

Table 26 – Annual and cumulative carbon sequestration from MTLA plantings

	Sequestration ($MTCO_2$ eq.)	
Year	Annual	Cumulative
2006	12	12
2016	2,300	8,134
2026	8,062	62,845
2036	13,064	171,987
2046	16,647	323,733



Annual and cumulative carbon sequestration from MTLA plantings

Methodology

This analysis used the methodology provided by the U.S. Department of Energy (DOE 1998). This methodology uses annual survival factors and annual carbon sequestration factors to calculate sequestration. For each calculation, the number of trees planted in year X is multiplied by the survival factor corresponding to the trees' age in that year to estimate the remaining trees from planting year X. Remaining trees are then multiplied by the annual carbon sequestration factors, which increase with age. This process is repeated for each tree-planting year and then for each year in which carbon sequestration is estimated. The total carbon sequestration from all tree-planting cohorts is then summed for each year, providing annual carbon benefits. Total carbon sequestered is also cumulatively summed for each year to provide total cumulative benefits.

The growth and survival factors vary by tree type (hardwood or conifer) and growth rate (slow, moderate, and fast). Estimates on the distribution of tree species were not available. It was assumed that trees would be distributed in equal proportion among the 57 species listed as part of the MTLA Initiative (USFS 2006). The distribution of these species is provided below. It is likely that actual distribution will differ from these values, so this assumption should be noted.

Tree Type	Growth Rate	# of Species	% of Total
Hardwood	Slow	4	7%
Hardwood	Moderate	26	46%
Hardwood	Fast	17	30%
Conifer	Moderate	3	5%
Conifer	Fast	7	12%

The next step is to assume a planting schedule. Based on discussions with ELA, a ten-year schedule was used, with 100,000 trees planted in each year beginning in 2006. ELA assumed that 10% of trees would be 15-gallon saplings, 30% would be 5-gallon saplings, 30% would be 1-gallon saplings, and 30% would be seedlings. This distribution of sizes was assumed to be equal for each tree type. The DOE methodology

assumes that all trees planted are 15-gallon saplings, but also provides guidance on how to adjust for trees less than this size. The planting year and quantity of trees smaller than the 15-gallon size are adjusted by a survival factor and age adjustment.

For example, it was assumed that 2,105 slow-growing hardwood saplings are planted each year for ten years (100,000 trees per year x 7% slow-growing hardwoods x 30% saplings). For hardwood saplings, the age correction factor is -6 years and the survival rate is 0.443. Saplings planted in 2006 would not reach age zero (the functional age of 15-gallon trees in the model) until 2012. At that time, the number of remaining trees would be 933, based on 44.3% survival. No carbon sequestration for these saplings is calculated until reaching "age zero" in 2012. In this case, the 2,105 slow-growing hardwood saplings planted in 2006 would be entered into the DOE methodology as 933 15-gallon trees planted in 2012. Increasing the proportion of 15-gallon trees planted would increase sequestration due to better survival and faster sequestration.

Uncertainties and Further Steps

Carbon sequestration in urban and suburban trees is difficult estimate without a monitoring and verification program; hence major sources of uncertainty exist in the above estimates. First, the tree species selection is likely to differ from the assumptions used above. Second, the planting schedule may also differ depending on budget and public participation. Third, the mortality rates are based on averages in urban and suburban settings. It is likely that some trees will benefit from increased attention while others may not. For example, trees planted in a resident's yard may benefit from individual care, while trees planted in high stress areas (along streets, for example) may not be as successful. Lacking any data specific to Los Angeles, this methodology is the best available given current resources. As more data becomes available, it can be plugged into the equations to update the estimates.

Action OS/G4	Identify opportunities to “daylight" streams.

Los Angles was once home to a vast network of natural streams and waterways, but development has caused many of these streams to be buried in culverts or pipes, covered by decks, filled-in, or diverted. The "daylighting" of streams"—bringing them to above ground channels again—has been identified as a strategy the City could employ to address new regulatory requirements pertaining to stormwater runoff. The ideal is to re-establish a waterway in its old channel, but with our dense urban environment, most daylighted streams will probably not function as they did originally. But daylighting still offers multiple benefits. These include improving water quality, managing runoff by expanding stream channel capacity, increasing recreational opportunities, and providing wildlife habitat. Liberated streams will also function as an educational tool for stream and environmental stewardship, a symbol of our natural history, an aesthetic community amenity, and they'll enhance our natural environment.

Lead Agency	Department of Recreation and Parks (RAP), Bureau of Sanitation (BOS) of the Los Angeles Department of Public Works (LADPW)
Other Agencies	Bureau of Engineering (BOE) of the Los Angeles Department of Public Works; Department of City Planning (Planning); North East Trees (N.E.T.)

- The Bureau of Sanitation (BOS) is the lead City department for stormwater issues. BOS, with assistance from the Department of Recreation and Parks (RAP), has submitted many of the grant applications for the daylighting of streams in strategic locations. Specific daylighting projects include the Hazard Park Wetland and Stream Restoration Project and the North Atwater Creek Restoration and Water Quality Enhancement Project. These projects will restore wetlands for stormwater runoff capture and treatment and provide habitat linkage to the LA River.
- RAP is the primary City department that owns, operates, and maintains the open space properties where the proposed daylighting projects will be implemented.
- The Bureau of Engineering (BOE) would likely be the City agency responsible for the design and construction of the proposed stream daylighting projects.
- North East Trees (N.E.T.) is conducting research and studies related to the Hazard Park Wetland and Stream Restoration project and will assist the City with implementation. The North Atwater Creek Restoration project is considered the lead project and corner stone of the City’s proposed LA River Revitalization Plan.
- The Ballona Creek Watershed Group is pursuing the daylighting of an historic stream at Lafayette Park.

Opportunity

In 2004, Los Angeles voters passed Proposition O to fund stormwater projects, which includes daylighting of Los Angeles streams. Several Proposition O projects that incorporate daylighting have been awarded to the City and will be implemented in parks throughout the City. Projects are being implemented by BOS and RAP, with assistance from BOE for development and construction of the proposed projects, and from other departments.

Challenges

The process of daylighting of streams is not a simple task and can present any number of challenges. Each project will require a team of planners, engineers, landscape architects, biologists, and citizens for planning and implementation. Many parks have large homeless populations, so daylighting raises safety and public health issues. Daylighting techniques are still in development and have therefore not been evaluated thoroughly. In addition, the proposed siting of such projects in park settings has yet to be evaluated, specifically from a maintenance perspective. RAP will need to rely upon BOS for support services. RAP will continue to work with BOS on project implementation and to resolve issues that may arise. Maintenance funding will continue to play a large role.

Table 27. OS/G4 Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. RAP will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation. Projects are in various stages of implementation.

Milestone	Completion Date	Quantity of Measure
Hazard Park Wetland and Stream Restoration		
North Atwater Creek Restoration		
Other Restoration and Enhancement Projects		
Measurement and Verification (monitoring).		

Measure Evaluation

The proposed projects will implement the City's innovative water and wastewater integrated resources plan, which is designed to increase conservation and maximize the capture and reuse of stormwater. The projects will restore historic creek beds and their associated wetlands so they can capture and treat urban stormwater runoff. No direct CO2 emission reductions will result, but indirect emission reductions will be achieved. This action can be evaluated by the number of proposed projects that are implemented, and through project compliance monitoring upon completion.

Action OS/G5	**Identify and develop promising locations for stormwater infiltration to recharge groundwater aquifers.**

Stormwater infiltration is a Best Management Practice (BMP) that mirrors the natural process of infiltration found in undeveloped (or natural) watersheds. Where site conditions allow, a portion of urban stormwater runoff can be managed through infiltration, to effectively increase the volume of water returned to the soil and reduce the volume of direct runoff to streams and sewers. Increased infiltration also improves flood protection and aids in meeting local water demand by helping to recharge (replenish) underground aquifers. As an added bonus, stormwater infiltration projects assist the City in meeting both dry and wet weather mandated Total Maximum Daily Loads (TMDLs) established for Los Angeles area receiving waters.

Lead Agency	Department of Recreation and Parks (RAP), Bureau of Sanitation (BOS) of the Los Angeles Department of Public Works (LADPW)
Other Agencies	Bureau of Engineering (BOE) of the Los Angeles Department of Public Works (LADWP), Department of City Planning (Planning), Department of General Services (GSD)

- The Bureau of Sanitation (BOS) is the lead department for stormwater issues. The Department of Recreation and Parks (RAP) owns the parks where the proposed projects will be implemented.
- The Bureau of Engineering (BOE) will be required to submit plans and specifications for the projects on park property.
- With proper approvals, the Department of General Services (GSD), Los Angeles Department of Water and Power (LADWP) and other departments may be able to make their surplus property available for other infiltration projects to replenish groundwater aquifers.
- LADWP, Los Angeles County, and FEMA (Federal Emergency Management Agency) will participate by restoring spreading grounds and retrofitting dams for increased capacity; both measures will result in substantial water conservation.

Opportunity

In 2004, voters of Los Angeles passed Proposition O to fund stormwater projects of this type. Numerous Proposition O projects have been awarded and will be implemented in parks throughout Los Angeles. The projects are being implemented by BOS and RAP, with assistance from BOE for project development and construction.

Challenges

Urban stormwater management techniques include the installation of capture and infiltration mechanisms, which are still in development and have therefore not been evaluated thoroughly. In addition, the proposed park settings have yet to be evaluated, specifically from a maintenance perspective. RAP will need to rely upon BOS for inspection and maintenance of the infiltration structures. RAP will continue to work with BOS on project implementation and to resolve issues that may arise. Maintenance funding will continue to represent a challenge. Lastly, City and public health officials need to develop criteria pertaining to the use of treated stormwater, in order to protect those who use these parks.

Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. LADWP and Public Works will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation. BOS currently has six stormwater infiltration projects for spreading grounds and dams, which are in various stages of implementation. All are water conservation projects of a significant size that focus on restoring the capacity and efficiency of spreading grounds, or on restoring the capacity of a dam.

BOS has also submitted a number of grant applications related to stormwater infiltration in strategic locations, primarily on RAP owned property that is already zoned for open space. RAP will assist with project implementation when these projects come on line.

Table 41. OS/G5 Implementation Steps

Milestone	Completion Date	Quantity of Measure
Cesar Chavez Project Phase I	December 2008	6,000-10,000 AFY
Hansen Dam Spreading Grounds Enhancement Project	December 2010	1,200-3,000 AFY
Big Tujunga-San Fernando Basin Groundwater Enhancement Project	December 2010	4,500 AFY
Tujunga Spreading Grounds Enhancement Project	December 2010	8,000-12,000 AFY
Pacoima Spreading Grounds Enhancement Project	December 2011	1,500-3,000 AFY
Strathern Pit Multiuse Project		
Measurement and verification (monitoring).		

Measure Evaluation

This measure implements the City's innovative water and wastewater integrated resources plan that is designed to increase water conservation and maximize the capture and reuse of stormwater.

GHGs Reduced

No direct emission reductions can be measured, but indirect emission reductions will be achieved. Measures can be evaluated by increases in AFY achieved, and by compliance monitoring upon project completion.

2.7 Focus Area: Green Economy

Goal: Create demand and catalyze growth of the green economic sector

Action No.	Measure	Page
GrE1	Leverage City policy, purchasing, and regulation, and deepen local university partnerships, to promote local research, development, and production of green technology and products.	115
GrE2	Strengthen global economic relationships to promote investment in Los Angeles' green sector and help local environmentally focused companies penetrate both local and foreign markets.	118
GrE3	Identify and promote locations for green businesses.	118
GrE4	Develop targeted programs to train residents of low and middle-income communities for jobs in the green economy.	118
GrE5	Collaborate with the private sector to offer effective incentives for the growth of local green businesses.	118
GrE6	Collaborate with local educational institutions such as universities, community colleges, and adult education programs to create more curricula that provide City residents with the skills and knowledge to work for competitive green businesses.	118

In addition to the above measures, The City will continue to evaluate emerging issues and strategies for reducing GHG emissions relating to the green economy and will incorporate findings into future versions of this document. This includes investment strategies, developing a green retrofitting sector, flexible work schedules and innovative market-based incentives.

Goal: Create demand and catalyze growth of the green economic sector

Action GrE1	**Leverage City policy, purchasing, and regulation, and deepen local university partnerships, to promote local research, development, and production of green technology and products.**

Lead Agency	Department of General Services (GSD), EnvironmentLA (ELA)
Other Agencies	Port of Los Angeles (POLA; also called "Harbor Department"), LA Convention Center (LACC)

GSD's Supply Services Division oversees supply chain functions (e.g., the procurement of equipment, supplies, and services). The four key components of the support functions are Supply Chain Management (inventory and contracting), SMS Support. Payment Services, and Supplier and Customer Relations. Through outreach and workshops, ELA assists businesses and City departments in minimizing and eliminate waste, and with environmental regulation compliance.

The POLA will present an Environmentally Preferable Purchasing Policy (EPPP) to its Board in 2008. In addition to the traditional concerns of price, performance and availability, the policy will require that whenever reasonable, the POLA will select the environmentally preferable products (EPP), such as Energy Star rated equipment, that have the least environmental and human health impacts. GSD currently operates under a similar policy.

LACC's public Food Services uses service ware products (such as plates and cups) made with natural ingredients including sugarcane or raw bamboo pulp, palm fiber, wheat or rice chaff, corn starch or savanna grass, that are biodegradable or can be composted.

Recreation and Parks has also begun to use waste-tire-derived playground surface materials thorough a State grant and will continue to use such products in the future.

Opportunity

Recognizing its role as a major purchaser of goods and services, the City will seek opportunities to support markets for environmentally preferable products through employee education; encourage pilot testing of new products; adopt innovative product standards and specifications; and embark on cooperative ventures with other jurisdictions. The environmental factors to be considered in selecting products include pollutant releases, waste generation, recycled content, energy consumption, depletion of natural resources, and potential impact on human health and the environment.

Challenges

The Department of General Services has received resources to complete Phase I of an Environmentally Preferred Purchasing (EPP) Program. As this program expands its planned activities, resources for a Phase II will be needed to further develop purchasing criteria and other elements of the program.

Table 28. GrE1 Implementation Steps

Milestones Phase I	Planned Date
Develop a comprehensive City of Los Angeles Environmentally Preferred Purchasing Policy and Statement.	**Completed**
Establish Environmentally Preferred Purchasing Program that will be housed in the General Services Department.	Completed
Identify EPP purchasing opportunities	Continuous
Develop written environmental specifications and contractual language for specifications or general terms and conditions. • Currently working with the City Attorney to develop EPP Ordinance language	Ongoing
• Explore establishment of a "green faith" environmental rating program for bid preferences. • Currently exploring the possibility of partnering with Green Seal to provide assistance in establishing a certification program.	July 2008
• Prepare an annual report documenting the City's efforts to buy more environmentally preferable goods and services.	September 2008

Table 29a. GrE1 Implementation Steps Requiring Additional Resources

Milestones Phase II	Planned Date
• Providing assistance to the Purchasing Agent in reviewing all existing annual requirements contracts to determine if they need to be amended to include environmental considerations.	• FY 09-10
• Train staff that issue blanket purchase orders, blanket purchase orders, bids and contracts to familiarize them with their responsibilities under the environmental purchasing policy.	• FY 09-10
• Develop metrics for measuring progress in implementing the goals of this policy with numerical goals of increasing the City's purchase of environmentally preferred products and reducing the usage of toxic products on an annual basis.	• FY 09-10
• Recommend ways to integrate adherence to the requirements of the environmental purchasing policy into all the General Manager's performance reviews.	• FY 09-10
• Establishing a recognition program to praise the efforts of individuals and departments that are most successful at implementing the goals of this policy.	• FY 09-10

Measure Evaluation

The greenhouse gas reduction benefits of this measure cannot be calculated at this time. But lifecycle assessments have documented reductions in air and water emissions and waste generation, and decreased energy and natural resource consumption, for recycled-content (and other environmentally preferable products), when compared to their conventional counterparts.

In future versions of this document, it may be possible to calculate the GHG reduction benefits for specific environmentally preferred products.

Action GrE2	**Strengthen global economic relationships to promote investment in Los Angeles' green sector and help local environmentally focused companies penetrate both local and foreign markets.**
Action GrE3	**Identify and promote locations for green businesses.**
Action GrE4	**Develop targeted programs to train residents of low and middle-income communities for jobs in the green economy.**
Action GrE5	**Collaborate with the private sector to offer effective incentives for the growth of local green businesses.**
Action GrE6	**Collaborate with local educational institutions such as universities, community colleges, and adult education programs to create more curricula that provide City residents with the skills and knowledge to work for competitive green businesses.**

The green sector has experienced unprecedented worldwide growth during the past few years. This rapid growth will support the City's long-term sustainability goals, strengthen its economy and increase its global competitiveness. "Green economy" is a loosely defined term and therefore encompasses a continuously evolving range of products, services, and technologies for energy generation and the management/treatment of air pollution, solid and hazardous waste, wastewater, and greenhouse gases. Experts anticipate that field will bring innovation and changes in our daily lives of similar magnitude to the information technology explosion over the last two decades. It is impossible to predict the future scope of the green sector economy, but we have adequate knowledge to begin laying the foundation for a vibrant green economy in Los Angeles through strategic policies and programs.

Lead Agency Mayor's Office

Other Agencies EnvironmentLA (ELA); Los Angeles Department of Water and Power (LADWP); Community Redevelopment Agency (CRA); Community Development Department (CDD)

Opportunity

With the Mayor's aggressive Green agenda providing the momentum, the City has the opportunity to support the rapid and sustainable development of the green economic sector through targeted, multi-pronged strategies. The opportunities are primarily two-fold: a) "green" existing businesses and industries and b) support the creation of new green businesses. As discussed above, the definition of "green sector" is continuously evolving, but the clean technology or "clean tech" industry is undoubtedly a critical component. In general, "clean tech" products and services must optimize the use of natural resources, have their genesis in an innovative or novel technology or application, and offer added economic value.

Challenges

Los Angeles must be dedicated in its efforts to ensure that a large portion of this developing economy will be locally based. The will require ongoing, coordinated, visible support from the Mayor's office, City Council and public and private sector economic development entities. City policies must be reviewed to

eliminate unintentional barriers. While public policy alone cannot guarantee a booming green sector economy, lack of attention would have a negative impact. A well-coordinated and visible commitment from the City will support the green sector economy by:

- Attracting and fostering startups;
- Encouraging venture capitalists to invest in local companies;
- Creating conditions for the development of a green sector cluster; and
- Training an appropriately skilled workforce.

It will be important to build institutional capacity within the City to oversee these initiatives.

Implementation Steps

In order to create the necessary competitive landscape, the City must leverage its efforts with the following deliberate strategies:

- **Leadership**: Build the necessary capacity to coordinate and lead City efforts.
- **Market Demand**: Create sufficient demand for green products and services.
- **Marketing**: Aggressively promote a coordinated green sector vision.
- **Investment**: Ensure sufficient access to capital and financing.
- **Regulations and Incentives**: Create a business-friendly environment for green sector companies.
- **Workforce Development**: Invest in workforce development programs that feed into the green industry.

The Mayor's office will work with the City Council and appropriate City departments to develop program implementation steps and timelines.

Measure Evaluation

These action items cannot readily be quantified for greenhouse gas reduction benefits, but can be evaluated by metrics such as the number of new "green" businesses established and new green jobs created.

2.8 Proprietary Departments

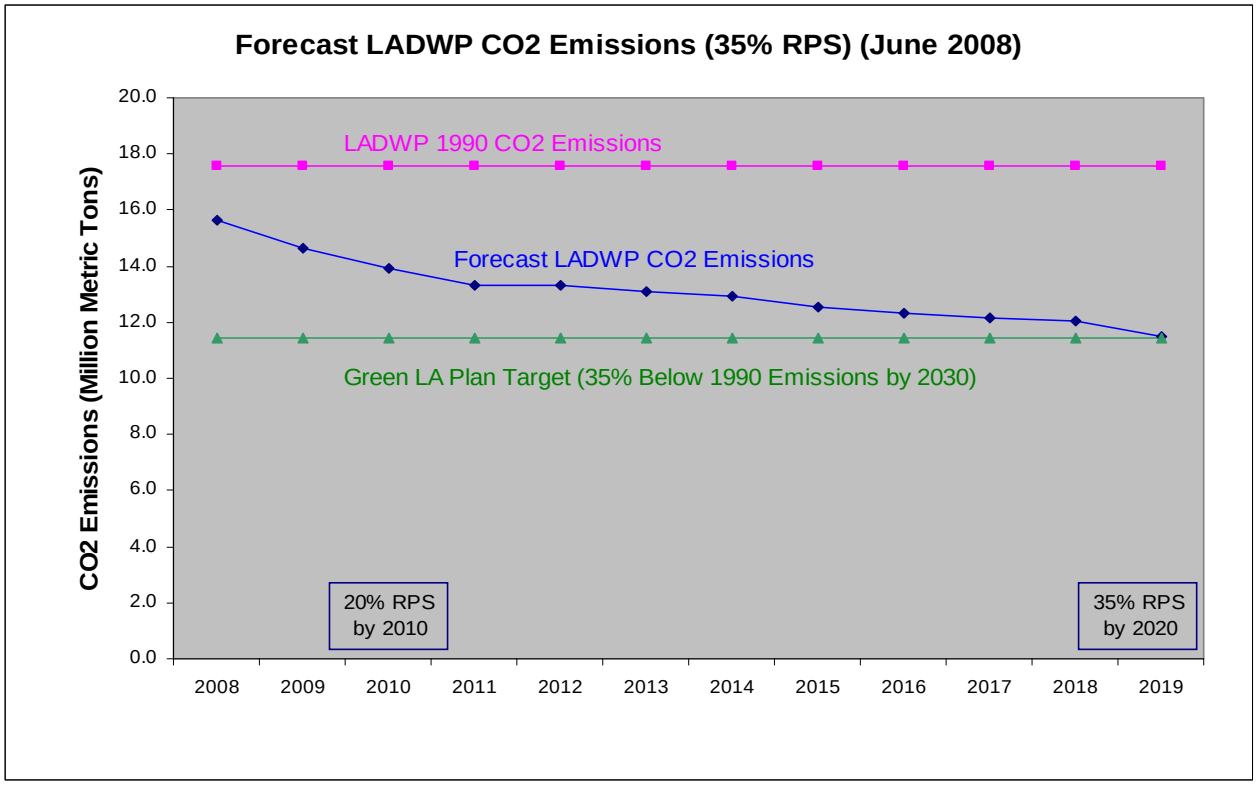
Department of Water and Power—Implementation Overview

In September 2002, LADWP became a charter member of the California Climate Action Registry, and has since reported and certified seven annual entity-wide greenhouse gas emissions inventories (2000 – 2006) with the Registry. LADWP was the first electric utility to report and certify its GHG emissions using the Registry's Power/Utility Reporting Protocol, which includes an efficiency or "carbon intensity metric" (pounds of CO2 emissions per megawatt-hour of electricity generated). This metric tracks changes in emissions intensity over time and provides a consistent basis for comparison among electric utilities. Between 2000 and 2006, LADWP's carbon intensity metric changed from 1407 lbs CO2/MWh to 1238 lbs CO2/MWh, which is a 12% improvement in efficiency. During that same time period, LADWP's CO2 emissions from owned and purchased generation decreased 11% from 18.4 to 16.3 million metric tons, a difference of 2.1 million metric tons.

On January 8, 2008, the Board of Water and Power Commissioners approved LADWP's 2007 Integrated Resource Plan (IRP). The 2007 IRP includes plans to increase renewable generation to 20% by 2010 and 35% by 2020 (see Action Items E1 and E2 in this document). It also includes re-powering four natural gas fired generating units at the Haynes and Scattergood Generating Stations (Action Item E4), which will improve efficiency by 15% to 35%. The new generating units will produce more electricity per cubic foot of natural gas burned, resulting in lower greenhouse gas emissions per unit of electricity generated.

Figure 3 below shows that LADWP's CO2 emissions are already below its 1990 baseline, and that LADWP is on track to achieve the Green LA Plan goal of reducing emissions 35% by 2030.

Figure 3. Forecast LADWP CO_2 Emissions (35% RPS by 2020) (June 2008)



The table below shows LADWP's forecast CO2 emissions and emission reductions resulting from the combination of Actions E1, E2, E3 and E4. Emission reductions shown are relative to 2008 and 1990 emissions, and reflect the projected increase in renewable generation, decrease in coal-fired generation, and efficiency improvements at LADWP's natural gas-fired power plants due to the re-powering projects.

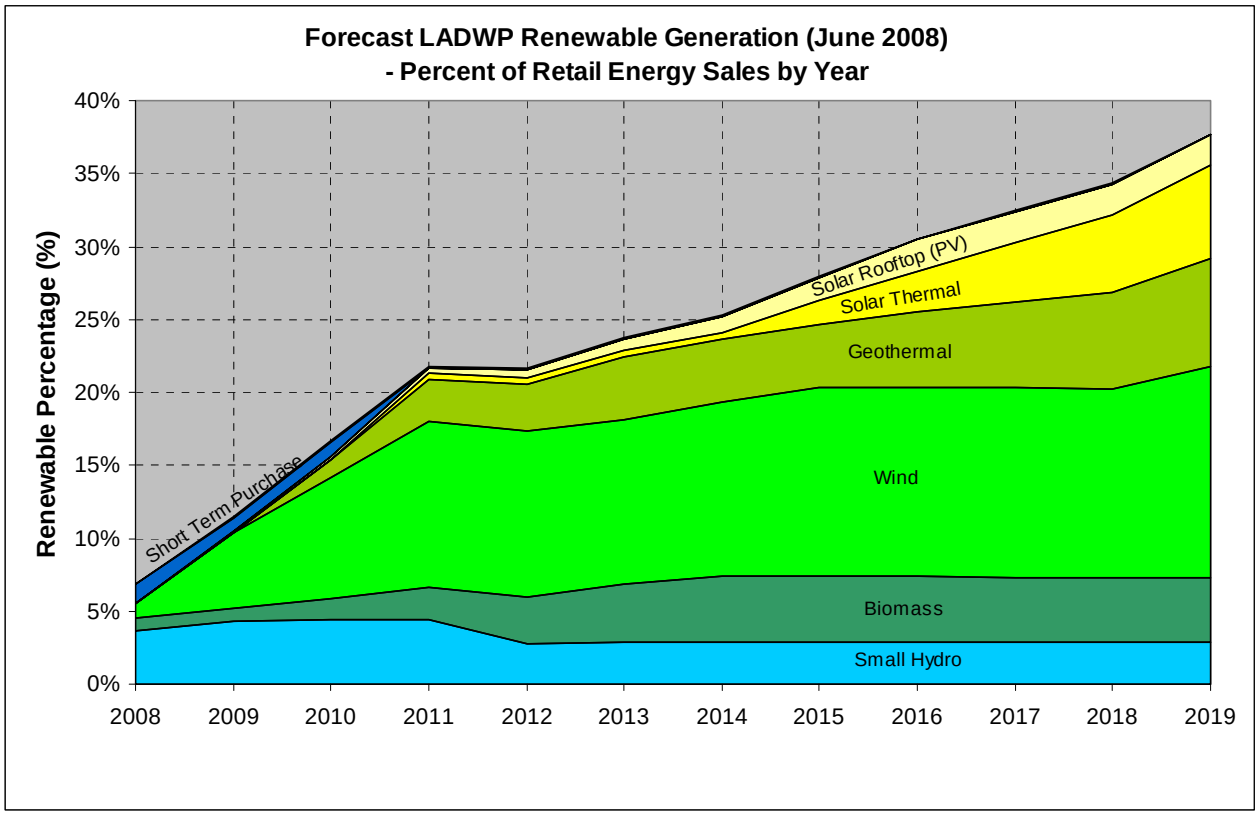
Forecast LADWP CO2 Emissions and Reductions (35% RPS by 2020) (June 2008)

Year	Forecast LADWP CO2 Emissions (million metric tons)	Reduction in Forecast LADWP CO2 Emissions relative to 2008 (million metric tons)	Reduction in Forecast LADWP CO2 Emissions relative to 1990 (million metric tons)
2008	15.6	-	1.9
2009	14.6	1.0	2.9
2010	13.9	1.7	3.6
2011	13.3	2.3	4.2
2012	13.3	2.3	4.2
2013	13.0	2.5	4.5
2014	12.9	2.7	4.6
2015	12.5	3.1	5.0
2016	12.3	3.3	5.2
2017	12.1	3.5	5.4
2018	12.0	3.6	5.5
2019	11.5	4.2	6.1

Note: LADWP 1990 Total CO2 emissions from owned & purchased generation ~ 17,574,296 metric tons

Figure 4 below shows the projected increase in renewable generation in LADWP's portfolio, and that the LADWP will achieve its IRP target of 35% energy sales from renewable generation by 2020.

Figure 4. Forecast LADWP Renewable Generation (June 2008)



In addition to investing in renewable generation, the LADWP is increasing funding for energy efficiency programs that will directly reduce its customers' energy consumption (Action Items E14 and E15). These programs include offering up to 50,000 new energy efficient refrigerators to replace customer's old units; installing thermal energy storage systems to shift air conditioning demand to the off-peak hours; and working with the Department of City Planning (Planning) to develop Green Building Standards that will promote sustainable design in all new buildings. The Green Building standards were adopted by the Mayor and City Council on April 22, 2008.

The LADWP's water conservation and water recycling programs reduce greenhouse gas emissions by reducing the amount of water that must be treated and pumped through the water distribution system, thereby reducing energy consumption and associated power generation emissions (Action Items W1, W2 and W3).

Energy efficiency and conservation programs implemented by the LADWP since 1990 have avoided or sequestered over 6.3 million tons of greenhouse gas emissions, as detailed in the following table:

Table 30. Energy Efficiency and Conservation Programs Implemented by LADWP

Years in Effect	Program	Description	Cumulative CO_2 Emissions Avoided or Sequestered (short tons)
Water Conservation			**4,218,537**
1991-2005	Water Conservation Program	Encourage customer water conservation with rebates for installing hardware (such as ultra-low-flush toilets and low-flow showerheads); a rate structure that rewards conservation; and public education.	Retrofits: 1,832,116 Behavior: 2,365,003 4,197,119
1999-2005	High efficiency clothes washer rebate	Rebates for purchase of energy efficient residential & commercial clothes washers.	21,418
Energy End Use			**969,027**
1999-2001	Neighborhood Bill Reduction Service	Provide free compact fluorescent light bulbs (CFLs); clean refrigerator condenser coils; distribute low-flow showerheads & aerators; and check for toilet leaks for residential low-income customers.	125,809
1999-2001	Commercial Refrigeration Tune-up	Free audits and tune-ups of refrigeration equipment for small commercial customers.	3,856
1999-2005	Refrigerator Replacement	Sale of high efficiency refrigerators at discounted prices to multi-family residential units and non-profit organizations that are LADWP customers, and removal & recycling of old refrigerators.	4,887
1999-2005	Commercial Lighting	Incentives for small commercial customers to install lighting equipment that exceeds Title 24 standards.	504,107
1999-2005	HVAC Replacement	Incentives for small commercial customers to install HVAC equipment that exceeds Title 24 standards. From 2000-2002, expanded to include residential HVAC units.	87,872
2000-2002	HVAC Tune-up	Low cost tune-ups of A/C equipment for commercial and residential customers.	17,510

Years in Effect	Program	Description	Cumulative CO_2 Emissions Avoided or Sequestered (short tons)
2000-2005	Chiller Replacement	Incentives for businesses and hospitals to install new high-efficiency water or air-cooled chillers that exceed Title 24 standards.	162,171
2002-2005	Consumer Rebates	Rebates to residential customers for the purchase & installation of Energy Star appliances, lighting, windows, and HVAC.	46,482
2004-2005	Refrigerator Retirement	Free pick-up and recycling of old spare refrigerators for residential customers.	8,361
2004-2005	CFL Distribution	Free compact florescent light bulbs (CFLs) to residential customers.	5,477
2000-2005	Energy Star Office Equip	Use of Energy Star office equipment (computers & monitors, printers, copiers and FAX machines**). NOTE: LADWP'S USE?**	2,494
Digester and Landfill Gas-to-Energy			**854,849**
1995-2005	Scattergood	Burn (combust) Hyperion wastewater treatment plant digester gas at Scattergood Generating Station to generate electricity.	844,853
2002-2005	Lopez Canyon	Burn Lopez Canyon landfill gas in micro turbines to generate electricity.	9,996
Recycling			**159,034**
1998-2005	Recycling Program	Recycling of paper, cardboard, metals and other materials from LADWP facilities.	159,034
Building Energy Efficiency Retrofits			**60,538**
1999-2005	John Ferraro Building Lighting Retrofit	Eliminated 50% of the light fixtures, replaced the remaining fixtures with energy efficient equipment, and installed automatic lighting controls in LADWP's corporate office building.	55,568
2001-2002	Cool Roofs	State-funded incentives to install Energy Star roofing product on commercial or multi-family residential buildings.	2,473
2001-2004	Reflective Window Film	Incentives to install reflective film on windows to reduce building solar heat gain and reduce A/C load.	1,947

Years in Effect	Program	Description	Cumulative CO_2 Emissions Avoided or Sequestered (short tons)
2004-2005	City Building Retrofit	Retrofit 37 City of Los Angeles facilities with energy efficient lighting.	550
Electricity Generation & Distribution System			**36,023**
1999-2005	Solar Power	LADWP has 2 solar generation programs: Customer systems (net metered) LADWP and City facilities (grid connected)	26,757
1996-2005	Energy Efficient Transformers	1,592 Energy Star transformers were purchased in 1995 & installed in LADWP's distribution system	9,266
Tree Planting (Urban Forestry)			**19,462**
1998-2005	Cool Schools	Planted 8,435 trees (cumulative) at Los Angeles Unified School District LAUSD) campuses.	6,206
2001-2005	Trees for a Green LA	Planted 38,618 trees (cumulative) at customer homes and in community areas.	13,256
Total CO_2 Emissions Avoided / Sequestered			**6,317,469**

Port of Los Angeles

Implementation Overview

As directed by the Green LA Plan, the Port of Los Angeles (POLA) developed an individual Harbor Department Climate Action Plan to examine opportunities to reduce GHG emissions from its operations. The Harbor Department Climate Action Plan is included in this document as Appendix D. The Port of Los Angeles is a department of the City of Los Angeles and is often referred to as the Los Angeles Harbor Department.

The Port of Los Angeles, Southern California's gateway to international commerce, is located in San Pedro Bay, 20 miles south of downtown Los Angeles. This seaport not only sustains its competitive edge with record-setting cargo operations, but is also known for its groundbreaking environmental initiatives, progressive security measures, and diverse recreational and educational facilities.

The Port is operated and managed under a State Tidelands Trust that grants local municipalities jurisdiction over ports and stipulates that activities must be related to commerce, navigation, and fisheries. A five-member Board of Harbor Commissioners (BHC), appointed by the Mayor and confirmed by the Los Angeles City Council, provides direction and establishes policy for the Port.

In March 2006, POLA joined the California Climate Action Registry (CCAR) and inventoried baseline GHG emissions for the City's Harbor Department for that year. This inventory required assessment of direct and indirect emissions from stationary and mobile sources that are under the Department's operational control. The completed inventory was verified by an independent third party in November 2007 and the results are presented in Appendix D. In March 2008, POLA became a Founding Member of The Climate Registry (the Registry), the national version of CCAR. It is anticipated that GHG reporting will transition from CCAR to the Registry beginning in 2009. POLA submitted its second GHG emissions inventory for 2007 to CCAR in June 2008. This inventory is expected to be verified by the third quarter of 2008.

As described in Appendix D, POLA has adopted several policies that support greenhouse gas reduction. These include:

- *Environmental Management Policy (February 2005).* Commits the Port to managing resources and conducting Port developments and operations in both an environmentally and fiscally responsible manner.
- *Green Building Policy (August 2007).* Establishes an aggressive green building program, including the achievement of a minimum LEED Gold rating for developments 7,500 square feet or greater that promotes responsible growth while implementing innovative and environmentally sustainable development.
- *Leasing Policy and Procedures (Amended November 2007).* Requires that all new leases include applicable Port environmental requirements including, but not limited to: air emission controls; water, stormwater and sediment quality; trash management and recycling; lighting and noise control and facility appearance; hazardous material management requirements; facility restoration and decommissioning requirements; and CEQA mitigation measures and reporting requirements.
- *Environmentally Preferable Purchasing Policy (March 2008).* Implements a process for establishing a baseline for all current Port purchases, researching environmentally preferable products to replace current items, and evaluating new products using various criteria.

The primary focus of the Plan (Appendix D) is to outline specific measures that have been or will be implemented in Harbor Department (municipal) operations in order to reduce GHG emissions. Each of these measures includes a ranking of an estimated high, medium, or low GHG reduction potential. Measures referenced as having an estimated high GHG reduction potential are:

- *10 mega-watt (MW) photovoltaic solar system*. A 1-MW system is targeted to be operational by February 15, 2009 at the Cruise Terminal Harbor Building. The design is complete and the remainder of the 9-MW system is in the planning stage and is targeted to be completed by 2013. The 10 MW system will offset approximately 17,000 metric tons of carbon dioxide equivalent annually, and help POLA meet Port electrification goals with local renewables.
- *Green Power Purchase*. POLA is working with LADWP to establish an agreement to purchase at least 20 percent green power.
- *Green Building (retrofits and new buildings)*. POLA will retrofit existing Harbor Department buildings to be more energy efficient. A Green Building Policy requiring LEED Gold certification is required for new developments such as the TraPac Container Terminal building and the proposed waterfront redevelopment projects in San Pedro and Wilmington.

Additional existing Harbor Department programs that have the potential to reduce GHGs include the use of alternative fuel vehicles, a tree-planting program, water conservation efforts, recycling, commute reduction, and public outreach. The Environmental Management Division plans to update the Harbor Department Climate Action Plan periodically as appropriate to include new measures.

In addition, staff recognizes that significant GHG emission reductions could be achieved through the modification of tenant operations. POLA is actively participating in the international C40 Climate Leadership Group, an alliance of the world's largest cities committed to tackling climate change. POLA's Executive Director, Dr. Geraldine Knatz, attended the C40 World Ports Conference in Rotterdam in July 2008. At the closing session of this conference, all 55 ports present endorsed the World Ports Climate Declaration, in which they actively committed themselves to reduce CO_2 emissions and improve air quality. In November 2008 a follow-up to the C40 World Ports Conference will take place at the Port of Los Angeles.

Tenant GHG emissions for mobile sources, including heavy-duty vehicles, ocean-going vessels, harbor craft, cargo handling equipment, and rail were inventoried for the first time in POLA's 2006 Port-wide Emission Inventory (July 2008). The Inventory allows Harbor Department staff to identify which mobile sources generate the most GHG emissions and track future year GHG reductions. Staff is working with tenants to build upon and expand the strategies contained in the Clean Air Action Plan (CAAP), and implement many of measures included in the Harbor Department Climate Action Plan. Section P1 of this document discusses CAAP strategies that have the potential to also reduce GHGs.

POLA is also working with regional planning groups to develop more efficient ways to move goods on a regional scale. In 2005, to reduce congestion, the PierPass Program extended hours of Port operation. Additional efforts include increased on-dock and near-dock rail with each train eliminating up to 270 truck trips. Other initiatives include empty container management programs, alternative/zero emission conveyance programs, and a potential Zero Emission Container Movement System (ZECMS) utilizing an "inland port" to reduce congestion and emissions**.**

Goal: Green the Port

Action P1	Fully implement the San Pedro Bay Ports Clean Air Action Plan (CAAP).

The Port of Los Angeles (POLA) is a "landlord port" that leases its property to tenants who, in turn, operate their own facilities. The Port does not operate the terminals, ships, yard equipment, trucks, or trains that move cargo. However, the Port is committed to accelerating efforts to reduce air pollution from these goods movement activities.

The San Pedro Bay Ports Clean Air Action Plan (CAAP) is the most comprehensive plan to cut air pollution and reduce health risks ever produced for a global seaport complex. On November 20, 2006, the Plan was jointly approved by the Port of Los Angeles Board of Harbor Commissioners and the Port of Long Beach Board of Harbor Commissioners. That historic vote commits both ports to an aggressive plan to reduce pollution by at least 45% in the next five years. The $2-billion CAAP addresses all tenant operations and all port-related emission sources — ships, trains, trucks, terminal equipment, and harbor craft — to significantly reduce health risks posed by air pollution.

Although the CAAP is a plan to reduce criteria pollutants and air toxics, several of the strategies also reduce GHG emissions. Per the Clean Air Act, criteria pollutants particle pollution (particulate matter—PM), ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead.

These strategies provide the preliminary foundation for a larger suite of measures that will comprise a Port-wide Climate Action Plan.

Lead Agency Port of Los Angeles (POLA; also called the "Harbor Department")

Other Agencies Mayor's Office, Community Redevelopment Agency (CRA)

The CAAP was created by the ports of Los Angeles and Long Beach with the cooperation and participation of the South Coast Air Quality Management District (SCAQMD), California Air Resources Board (CARB), and the Environmental Protection Agency (EPA). The Community Redevelopment Agency (CRA) will assist this effort by helping find locations for the necessary training sites.

Opportunity

The CAAP outlines specific measures to be implemented by 2011. The following measures have been identified as having the potential to reduce GHG emissions:

Ocean-Going Vessels (OGV)

- *OGV1: Vessel Speed Reduction (VSR) Program*. All ships within 40 nautical miles of Point Fermin will reduce speed to 12 knots. This measure will result in GHG reduction due to reduced fuel consumption.
- *OGV2: Reduction of At-Berth OGV Emissions*. Ships will use shore-power for electrical generation while at berth, rather than on-board auxiliary engines. This is known as Alternative Marine Power (AMP) and also referred to as "Cold Ironing." Shore-power that is generated by power plants generates fewer GHG emissions per kilowatt-hour of electricity than the on-board auxiliary engines. The California Air Resources Board (CARB) has listed AMP as a proposed statewide mitigation measure to reduce GHG emissions.

Harbor Craft (HC)

- *HC1: Performance Standards for Harbor Craft (HC)*. All HC will meet EPA Tier II or equivalent emissions standards. All previously repowered HC will be retrofitted with the most effective CARB-verified NOx and/or PM emission reduction technologies. When Tier III engines become available, all HC will be repowered with these new engines within 5 years. All tug boats will use shore-power while at their home fleeting location. Newer engines have electronic engine and fuel management systems that reduce fuel consumption by up to 20%. The use of AMP will also result in GHG reduction.

Railroad Locomotives (RL)

- *RL1: PHL Rail Switch Engine Modification*. All existing Pacific Harbor Line (PHL) switch engines will be replaced with Tier II engines equipped with 15-minute idling limit devices and retrofitted with diesel particulate filters (DPFs). Any new switch engine that is acquired after the initial PHL replacement will meet EPA Tier III standards or equivalent. The use of anti-idling devices will result in GHG reduction due to reduced fuel consumption. A demonstration of the hybrid diesel/electric "Green Goat" locomotive has recently been completed and a test of an LNG switcher is currently underway.
- *RL2: Existing Class I Railroad Operations*. All diesel-powered Class I switcher and helper locomotives will use ultra low sulfur diesel (ULSD) fuels, be 90% controlled for PM and NOx emissions, and will be equipped 15-minute idle restrictors. The fleet average for Class I long haul locomotives will be Tier III equivalent. The use of anti-idling devices will result in GHG reduction due to reduced fuel consumption.

- *RL3: New and Redeveloped Rail Yards*. Any new rail yard developed or significantly redesigned shall be required to operate with the cleanest available technology for switcher, helper, and long haul locomotives; utilize idling shut-off devices and exhaust hoods; use only ULSD or alternative fuels; and use clean vehicles and cargo handling equipment. The new and redeveloped rail yards will result in GHG reduction due to improved efficiency and reduced fuel consumption.

Heavy-Duty Vehicles

- *HDV1: Performance Standards for On-Road Heavy Duty Vehicles*. By 2011, all trucks calling at the Port frequently or semi-frequently will meet or be cleaner than the EPA 2007 on-road PM emission standards and be the cleanest available NOx at the time of replacement or retrofit. New vehicles are expected to be more fuel efficient than the older vehicles they will be replacing. In addition, this Clean Truck Program has a goal of 50 percent LNG trucks.

Technology Advancement Program (TAP)

The goal of the TAP is to accelerate the verification or commercial availability of new, clean technologies, through evaluation and demonstration, to move towards an emissions free port. The main objectives of the TAP are to 1. facilitate the development and implementation of new and emerging technologies to reduce air emissions and 2. streamline the process for reaching consensus with the agencies on the emission reductions achieved by various technologies.

To date, the TAP has funded several promising research and development projects utilizing hybridization and electrification with the potential to significantly reduce GHG emissions. These include:

- *Foss Maritime Diesel/Electric Hybrid Tug Boat*. This project is a new build of a dolphin class tug boat, with a hybrid electric engine installed. The engine horsepower is downsized from traditional tug boats, given the additional power that can be gained from the batteries. With the unique ability to shut off during low power demand modes, 70 percent of the tug's engine time will be

saved by using downsized diesel/electric engines. The completed demonstration tug boat is expected to arrive at the Port for in-use testing in fall 2008.

- *Hybrid Yard Hostler*. The project will develop hybrid yard hostlers and demonstrate them in a container terminal application. In 2009, three units will be developed and tested side-by-side with traditional diesel yard hostlers. The units will be evaluated for user acceptability, operational performance, fuel efficiency, and emissions reductions.
- *Vycon REGEN System.* Vycon is currently being demonstrated on rubber-tired gantry cranes (RTGs) at marine terminals at POLA. RTGs move containers on and off container ships. Vycon uses flywheel technology that stores energy during the container drop and supplies energy during the container lift.
- *Electric RTGs*. POLA is planning to fund several tenant RTG conversions from diesel to electric. There are currently several tenants interested in possibly participating in this program. Preliminary estimates indicate that the cost of electricity would be 5 percent of the current cost of diesel.

*Balqon Electric Truck***.** A prototype low-speed full-electric tow Class 8 tractor, used for transporting containers to and from near-dock rail facilities and for handling containers within the container yards, is currently being demonstrated at POLA. POLA has made a commitment to purchase 25 Balqon electric trucks.

Terminal Efficiencies/Optimization

As highlighted in CARB's AB 32 Scoping Plan, large GHG reductions can be achieved by optimizing the efficiency of goods movement. POLA is investigating how new technologies can improve efficiency in Port operations. Virtual container yards can automate pick-up and drop-off appointments to reduce congestion and wait time, and electronically track and organize containers so that the number of container moves can be reduced. Another efficiency effort being investigated is the possibility of loading and unloading the ship from both sides.

Challenges

Developing new Port programs will require collaboration with and input from tenants, businesses that operate within the Port, regulatory agencies, environmental advocacy groups, and others.

Funding has been allocated for implementation of the CAAP. Current total monetary commitments for each funding entity over the next five years are:

- Port of Los Angeles—$177,500,000
- Port of Long Beach—$240,400,000
- SCAQMD—$47,000,000
- Environmental Cargo Fee/Bond Funding—$2,000,000,000

Industry will fund all strategies that are not covered by above funding commitments.

Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. POLA will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation. The ports intend to implement CAAP provisions through the use of lease agreements, tariffs, and Memoranda of Understanding (MOUs). The Port will continue to consider GHG emissions in all future Environmental Impact Reports (EIRs); GHG mitigation measures will be required if the GHG impacts will be significant.

Measure Evaluation

The Port has created criteria pollutant emission inventories for 2001, 2005, and 2006, and will continue to update these inventories annually. The emission inventory estimates emissions of particulate matter (PM), oxides of nitrogen (NOx), oxides of sulfur (SOx), carbon monoxide (CO), and total organic gases (TOG) for five major tenant mobile source categories:

1. Heavy-Duty Vehicles/Trucks (HDV)
2. Ocean-Going Vessels (OGV)
3. Cargo Handling Equipment (CHE)
4. Harbor Craft (HC)
5. Railroad Locomotives (RL)

These inventories are used to track criteria pollutant reduction under the CAAP. Beginning with the 2006 Port of Los Angeles Air Emissions Inventory, GHG pollutants, including CO_2, CH_4, and N_2O, are also estimated for these mobile source categories. This inventory serves as a baseline by which to measure the success of future Port-wide strategies in reducing GHG emissions from the mobile sources that service the Port.

Action P2	Complete strategic plan for the Port of Los Angeles, including sustainable and green growth options.

The Strategic Plan for the Port of Los Angeles, which is a five-year plan covering 2006 through 2011, was approved by the Board of Harbor Commissioners on March 1, 2007. One of its primary objectives is to transform the Port into the world's greenest port by raising environmental standards and protecting public health.

Lead Agency Port of Los Angeles (POLA; also called the "Harbor Department")

Other Agencies Los Angeles Department of Water and Power (LADWP)

LADWP for the provision of shore-power (or "AMP"), and the Port of Long Beach and others for CAAP (see Action Item P1).

Opportunity

Environmental Initiatives included in the Strategic Plan are:

- *Clean Air Action Plan (CAAP)*—Implement the CAAP and promote adoption of the CAAP measures internationally;
- *Sustainability Ethic*—Incorporate sustainability ethic into all Port activities and communicate to employees, customers and the community;
- *CEQA/Mitigation*—Revamp the California Environmental Quality Act (CEQA) process to ensure development of high quality CEQA evaluations for terminal improvement, and utilize mitigation as an implementation strategy for environmental action plans;
- *Clean Water/Soil/Habitat Plans*—Create and implement action plans for clean water, clean soil and groundwater and habitat management, including pursuing additional habitat mitigation projects; and
- *Compliance Measures*—Provide an environmental compliance program for Port and customer construction and operations in support of the environmental directive of the Port's Leasing Policy.

Challenges

Divisions were asked to determine resource allocations for their budgets. No budget challenges are foreseen at this time.

Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. POLA will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation. The POLA's Strategic Plan was approved by the Board of Harbor Commissioners on March 1, 2007; implementation is now beginning. POLA divisions were asked to ensure that their budget requests align with their supporting responsibilities for this fiscal year. The actions should be incorporated in the day-to-day decisions of each Division.

Measure Evaluation

Minimally, the Strategic Plan will be visited by Harbor Department Divisions annually during the budget cycle. The Strategic Plan will be revised beginning in 2010, as necessary.

Action P3	**Complete economic development plan for the port, identifying opportunities to link the port's investment in green growth to new economic opportunities in the green sector.**

One goal of the Green LA Plan is the completion of an economic development plan for the Port of Los Angeles (POLA), which would identify opportunities to link the Port's investment in green growth to new economic opportunities in the green sector.

Lead Agency Port of Los Angeles (POLA; also called the "Harbor Department")

Other Agencies Mayor's Office, Community Redevelopment Agency (CRA)

The Harbor Department will work with the Community Redevelopment Agency (CRA), the Mayor's office (Deputy Mayors for Economic Development and Workforce Development), and other strategic partners from the port and maritime communities in this endeavor.

Opportunity

Two strategic action areas pertaining to the above goal have been defined:

- *Business Development and Green Tech.* Leverage the Technology Advancement Program to locate Green Tech companies in Los Angeles.
- *Waterfront Development*. Select a world class development team to create a regional destination.

Challenges

Creation of a green tech center and development of the waterfront in the community will require collaboration with and input from businesses that operate within the Port, regulatory agencies, environmental advocacy groups, tenants, and others.

Implementation Steps

A Director of Economic Development position was created in 2007. Implementation steps identified by the Director of Economic Development include:

- *Business Development and Green Tech*
  - Collaborate with the Mayor's office on Green Tech goals.
- *Waterfront Development*
  - Issue RFQ to developers.
  - Issue RFP to short-listed teams.

Measure Evaluation

In fall 2008, POLA will release a Draft Green Tech Plan, targeting the development of green technologies as a local economic development strategy for the Port. This plan will highlight the connections with the Port's Technology Advancement Program. In spring 2009, a Master Developer will be selected to create a waterfront that will become a regional destination.

Los Angeles World Airports

Overview

Airports, like ports, present a unique set of issues pertaining to greenhouse gas (GHG) reduction plans.

The Los Angeles World Airports (LAWA) department owns and operates four airports in Southern California: Los Angeles International (LAX), LA/Ontario International (ONT), Van Nuys (VNY), and LA/Palmdale Regional (PMD).

LAWA does not operate aircraft, but provides the infrastructure (runways and terminals) and services (air traffic control, police, security) that support the aviation industry. The majority of GHG emissions associated with airport operations fall outside of the direct, and sometimes even the indirect control, of LAWA. But LAWA is committed to the implementation of a plan that will reduce its own emissions and *facilitate* reductions by airport tenants. The Board of Airport Commissioners recently adopted a comprehensive sustainability program that will govern how LAWA operates and develops.

Challenges

The United Nations Intergovernmental Panel on Climate Change (IPCC) estimates that aircraft emissions contribute approximately 2—3% of total global greenhouse gas (GHG) emissions. By 2050, it is estimated that this contribution could increase to 5%.

To monitor the effectiveness of a GHG reduction plan, LAWA must first identify a reasonable protocol for calculating airport related GHG emissions. The methods for assessing airport-level air quality, through the measurements of criteria and toxic air pollutants, are well established. But there is no specific guidance, nor standard practices, for computing airport-level GHG emission inventories.

For example, the State of California estimates that aviation represents 12% of CO_2 equivalent emissions within the state. In contrast, the City of Seattle estimates that aviation represents 17% of its total GHG emissions. This wide variance is due to the use of different quantification methodologies and databases, and some may be attributed to the double counting of emissions.

Because aircraft release emissions at high altitudes, the impact of aviation on global warming may be greater than that of other major greenhouse gas emissions sources. In the case of high-altitude airliners that frequently fly near or in the stratosphere, non-CO_2 altitude-sensitive effects may increase the total impact of anthropogenic (man-made) climate change emissions significantly.

Cognizant of this effect, the European Parliament approved a global warming control plan that limits carbon dioxide emissions from airlines flying to and from Europe beginning in 2011. The State of California also petitioned the United States EPA to adopt global warming regulations for aircraft.

For purposes of GHG inventory development, LAWA is committed to implementing its Sustainability Performance Improvement Implementation Plan (SPIMS), which promotes both environmental sustainability and economic prosperity. The comprehensive Sustainability Plan supports the “Greening LAX” program with its “Triple Bottom Line” approach to sustainability, which measures success from economic, environmental, and social perspectives. The intent is not to recreate LAWA’s business model, but to use it as a tool to 1) develop policies that will align LAWA's overarching vision, sustainability principles, and executive directives; 2) identify opportunities and implement sustainable initiatives; and 3) promote continual improvement.

The primary challenge facing LAWA is the development of a permanent working partnership with its employees and the employees of other stakeholders (tenants, members of the public, regulatory agencies, and neighborhood communities). This partnership will enable LAWA to collect credible data for the development of a comprehensive GHG inventory, and then a comprehensive GHG reduction plan.

Airports' Contribution to Climate Change

Aircraft in flight emit CO_2 through the burning or combustion of fuels; these comprise the majority of aviation related GHG emissions. Passenger and cargo ground access vehicles, ground equipment that services aircraft, energy used by airport facilities such as terminals, and equipment used for the construction of airport infrastructure also contribute to aviation GHG emissions.

Although LAWA does not operate aircraft, it provides the infrastructure for aircraft operations. The infrastructure, public access, employee and tenant operations, and fueling activities all contribute to GHG emissions. Airport emissions can be divided into four source categories:

1. Aircraft
2. Ground Vehicles
3. Buildings and Facilities
4. Construction

Aircraft

LAWA has very little control over the types of engines used by aircraft. But LAWA does provide services that can reduce engine use and associated emissions. For example, LAWA's ground power units supply electrical power to aircraft during the loading and unloading of passengers, so aircraft don't need to idle while parked at the gates. LAWA also supplies pre-conditioned air to aircraft. And through an efficient airfield layout, LAWA can reduce the on-ground distances that aircraft must travel.

Ground Vehicles

In Los Angeles, air travel is just one element of a complex transportation system that continuously moves goods and passengers and contributes GHG emissions. Efficient airport access can reduce traffic congestion and idling that unnecessarily increases GHG emissions.

Ground vehicles can be separated into on-road and off-road vehicles. For on-road vehicles, LAWA has direct control over fleet and pool vehicles, specialized vehicles, and FlyAway buses. Other on-road vehicles, over which LAWA exercises very little control, include passenger and employee vehicles, tenant/concessions vehicles, and cargo/freight vehicles.

Off-road vehicles are those driven solely on the airfield; they include LAWA's vehicles and equipment; ground support equipment that is owned by the airlines and tenants; and the construction equipment owned by the contractors.

LAWA was an early adopter of alternative fuel vehicles and is aggressively replacing its vehicle fleet with vehicles with very low or no emissions.

Buildings and Facilities

LAWA's infrastructure supports the aviation industry; GHG emissions are associated with the lighting, heating and cooling of these facilities, and the lighting of airport grounds. Stationary equipment and the co-generation facility at Los Angeles International Airport (LAX) also generate GHG emissions. Co-generation plants produce both electricity and heat.

Construction

Construction equipment utilized at the airport, such as generators, batch plants and crushing plants, generate GHG emissions.

What the Airport is Doing Now

Aircraft are the largest source of carbon emissions at the airport. However, federal laws preempt LAWA from regulating the types of aircraft that utilize the airport facilities, or their operations. But LAWA is continually reviewing the airfield configuration to determine opportunities for more efficient operations. Improvements to the airfield can reduce unnecessary fuel use both on the ground and in the air.

LAWA is also continually working on ground access improvements. Efficient transportation design can provide easier airport access and reduce the added emissions from traffic congestion and idling. LAWA has been very proactive in promoting and expanding the FlyAway program throughout the Los Angeles region to reduce unnecessary vehicle trips to LAX. FlyAway services are now offered at Van Nuys Airport, Union Station in downtown Los Angeles, and UCLA/Westwood. LAWA operates a very successful employee Rideshare Program that removes many private vehicles from roadways. Over 62% of LAWA-owned fleet vehicles use alternative fuel (including CNG, LNG, propane, hydrogen, solar, hybrid electric and pure electric). A cell phone waiting lot for vehicles picking up arriving passengers at LAX helps reduce the number of vehicles that circle the terminals. Rental car and hotel shuttle services are now being consolidated at LAX to help reduce congestion in the terminal area; a consolidated rental car facility is already in operation at LA/Ontario International Airport. Intermodal transportation systems that link various types of transit can also help ease congestion. LAWA is now working with area transportation agencies to improve airport access while also dispersing traffic to through other transportation modes.

To reduce electricity consumption and associated emissions, LAX installed energy efficient lighting fixtures exclusively, variable demand motors on terminal escalators, and variable frequency drive on fan units at terminals and in LAWA buildings. LAWA also purchases renewably generated Green Power from the Los Angeles Department of Water and Power (LADWP).

The Board of Airport Commissioners adopted sustainable building policy requiring “highest practical” Leadership in Energy and Environmental Design (LEED) standards for all airport projects. The LA/Ontario (ONT) International Airport terminals include energy conservation designs and features, and the Tom Bradley International Terminal (TBIT) will be one of the first LEED-certified renovated airport terminal projects in the nation.

LAWA recycled over 98% of construction debris from the South Airfield Improvement Project; has achieved a 65% recycling rate for all airport waste; and is participating in the EPA airport recycling pilot program.

Furthermore, as part of the LAX Master Plan process, LAWA has implemented an agreement with the LAX Coalition for Economic, Environmental, and Educational Justice to reduce emissions with the following actions and programs:

- Electrification of passenger gates
- Electrification of cargo operations areas
- Electrification of hangars
- Emissions reductions from technology retrofit requirements and offering rapid chargers for ground service equipment (GSE)
- Emission reductions from on-road trucks, buses and shuttles

- Conversion of on-site trucks, shuttles and buses to alternative fuel
- Limits on diesel idling
- Assessment and mitigation of particulate matter
- Provision of alternative fuel
- Hydrogen fuel cell infrastructure at LAX

LAWA will also conduct an Air Quality Source Apportionment Study.

Our Goals

LAWA's goal is to reduce CO_2 emissions 35% below 1990 levels by 2030. LAWA is also working aggressively to implement sustainability practices and develop programs that will reduce waste and pollutants.

How We Are Going to Get There

The development and implementation of the Sustainability Performance Improvement Implementation Plan (SPIMS) will improve energy conservation and efficiency. LAWA is gathering the information necessary information to compile and calculate an accurate GHG emissions inventory, which is the foundation that will enable us to meet our 2030 goal.

LAWA will continue to implement early actions such as increasing usage of LADWP's Green Power, continued expansion of the alternative fuel program, completion of the ground power and pre-conditioned air infrastructure at passenger gates and cargo hangers, shuttle and van conversion to alternative fuel, conversion of ground service equipment (GSE) to meet zero emission standards, the use of clean construction equipment, and other conservation measures and policies.

Finally, LAWA will develop and implement new initiatives and sustainability practices to ensure that LAWA reaches the reduction of GHG emissions 35% below 1990 levels.

Summary of GHG Reduction Actions

Aircraft Operations

- Develop aircraft idling policies
- Use hydrant systems at terminals and cargo area instead of fueling trucks
- 100% electrification of passenger gates, cargo areas and hangers at all LAWA airports
- Stage 2, larger aircraft, phase-out at Van Nuys Airport and the continued support of research, design, and implementation of lower emissions technology

Ground Vehicles

- Install rapid chargers to support electric ground support equipment and pre-conditioned air to minimize use of auxiliary power
- Hydrogen fueling station at LAX and pilot testing of hydrogen fuel cell vehicles
- Expand FlyAway services to Pasadena, Long Beach, Irvine and other Southern California locations
- Use alternative fuel buses at the FlyAway bus terminals
- Rideshare program for employees and use of mass transit program for all airport personnel;

- Promote the bicycle program and add bike lanes access to the airport
- By 2015, 100% of LAWA-owned fleet vehicles will use alternative fuel (including CNG, LNG, propane, hydrogen, solar, hybrid electric and pure electric)
- Construct additional compressed Natural Gas (CNG) stations at airports
- Board of Airport Commissioners adopted LAWA alternative fuel vehicle fleet requirement
- Hotel shuttle consolidation program
- Rental car shuttle alternative fuel vehicle fleet requirement

Electrical Consumption

- Retrofit parking lot lights to reduce energy spikes when the lights are first turned on
- Zoning cargo facilities and utilities expenditures for tenant (instead of flat rates) to promote energy conservation

Building

- Increased use low-VOC adhesives, sealants, paints and coatings
- Reduce emissions of ozone-depleting substances through the removal of the remaining halon systems in AC units

Other Actions

- Develop and implement the Sustainability Performance Improvement Management System (SPIMS)
- Develop and implement LAWA's Climate LA Work Plan Matrix and Action Plan
- Apply GHG reduction technology to South Airfield Improvement Project construction equipment
- Build the infrastructure to support a recycled (reclaimed) water program for landscape and other areas

Conclusion

Although LAWA's four airports now have little direct control over the major sources of airport-related GHG emissions (aircraft and transportation), LAWA is committed to implementing programs, such as the Sustainability Performance Improvement Management System, and developing new initiatives, that will help reduce GHG emissions.

This will require the participation and dedication of all sectors of the aviation industry. Through a partnership of these stakeholders, LAWA will be able to address the challenges posed by climate change and implement policies and practices that will preserve the environment for future generations.

Goal: Green Airports

Action AIR1	**Fully employ the Sustainability Performance Improvement Management System to track and improve sustainability initiatives.**

The Sustainability Performance Improvement Management System (SPIMS) was developed by LAWA as a tool to aid in the implementation and tracking of sustainability initiatives. It will also allow LAWA to easily recognize, and then communicate, environmental stewardship accomplishments. In short, SPIMS will help advance our global leadership position through continual sustainability performance improvement. SPIMS focuses on the "Triple Bottom Line" (TBL) approach to sustainability, which recognizes that organizations must measure their success not only by the traditional bottom line of financial performance, but also by their impact on the broader economy, the environment, and on the society in which they operate.

With the implementation of SPIMS, LAWA is committed to integrating sustainable practices into operations and administrative processes throughout our organization, and to identifying sustainable opportunities that will then be used to create a baseline against which our sustainability progress can be measured. Upon identification of these opportunities, goals and targets will be established, and a plan to implement those initiatives will be developed.

Lead Agency Los Angeles World Airports (LAWA)

Other Agencies EnvironmentLA (ELA), Los Angeles Department of Water and Power (LADWP)

LAWA regular participates in the Mayor's Sustainable Practices Cabinet and will continue to work and coordinate stakeholders, such as the airlines and other City departments, to ensure that LAWA's sustainable objectives are appropriate, and that they are implemented, during the development and implementation of all projects at all four LAWA airports: Los Angeles International (LAX), LA/Ontario International (ONT), Van Nuys (VNY), and LA/Palmdale Regional (PMD).

Opportunity

During the development phase of the SPIMS, Implementation Teams were formed to identify sustainability opportunities in 6 areas: Sustainable Design; Energy and Atmosphere; Materials and Resources; Water Efficiency; Transportation Resources; and Administrative Processes. The opportunities within each the 6 areas were assigned a ranking based on associated environmental benefits, personnel resources, feasibility, stakeholder concerns, community benefits, cost-effectiveness, and regulatory requirements. Opportunities with the highest ranks are those that would provide the most benefit to the environment and community, and would offer the highest rate of return. The Implementation Teams identified fundamental sustainability objectives; LAWA is now in the process of setting goals and targets and identifying projects and initiatives.

Challenges

The competition for resources will be challenging, as implementation of these projects and initiatives will require the dedication of staff and budget resources while LAWA is also undertaking major Master Planning efforts at all four airports. Unless it is stipulated in their leases or concessions or operating agreements, LAWA tenants, lessees, and concessionaires are not required to participate in emissions

reductions practices or programs. It will be challenging for LAWA to engage and motivate these entities to do so on a voluntary basis.

Table 31. AIR1 Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. LAWA will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation.

Milestone	Completion Date	Quantity of Measure
Conduct assessment and identify sustainability opportunities.	Pending	Improve environmental sustainability initiatives and seek opportunities for further improvement.
Draft sustainability assessment matrix.	Completed	
Develop comprehensive list of sustainability indicators.	Completed	
Implement sustainability initiatives.	Pending	

Measure Evaluation

Upon implementation of the Sustainability Performance Improvement Management System (SPIMS), the benefits of LAWA's GHG reduction programs will be tracked and measured.

Action AIR2	**Develop and implement comprehensive policies to green Los Angeles airports to meet green building specifications, improve recycling, use alternate fuel sources, use recycled water, employ water conservation methods, reduce energy requirements, and reduce GHG emissions.**

Los Angeles World Airports (LAWA) strives to be a leader in the development and implementation of airport sustainable practices. LAWA's vision is "to set the global airport standard for customer satisfaction and security, regional economic leadership and organizational performance." This vision was melded with the Mayor's Executive Directive on Sustainable Practices, the City Council motion directing Los Angeles International Airport (LAX) to be "built and held to the highest green standards," and the Board of Airport Commissioners' (BOAC) goal that LAX become the greenest airport in the world, resulting in LAWA's commitment to improving the sustainability performance of its four airports (LAX; LA/Ontario International Airport or ONT; Van Nuys Airport or VNY; and LA/Palmdale Regional Airport—PMD). To fulfill this commitment, LAWA developed and is now implementing the Sustainability Performance Improvement Management System (SPIMS). SPIMS will enable LAWA to measure its progress and facilitate the continuous improvement of sustainability practices.

LAWA's Airport Sustainable Planning, Design, and Construction Guidelines (Guidelines) will help ensure that sustainability concepts and practices are integrated into all capital and non-capital airport projects by providing performance standards for all planning, design and construction activities. The Guidelines also provide a method for measuring the degree to which performance standards are achieved, so that successes will be documented and "lessons learned" can be shared.

Lead Agency Los Angeles World Airports (LAWA)

Other Agencies EnvironmentLA (ELA), Mayor's Office

The Guidelines, which resulted from a collaborative effort among LAWA staff, other City departments, and other airports and stakeholders, are a compilation of performance standards, guidelines and tools published by numerous organizations including the United States Green Building Council (USGBC), other national airports including Chicago O'Hare (O'Hare), the Port Authority of New York and New Jersey (PANYNJ), Airports Council International (ACI), the American Association of State Highway and Transportation Officials (AASHTO), the United States Army Corps of Engineers (Corps), the University of California, the Building Research Establishment (BRE), and the International Federation of Consulting Engineers (FIDIC). A complete list is included in this document.

The Guidelines are not meant to supersede any existing standards, regulations, codes, guidelines, or practices currently in place or adopted by the State of California, City of Los Angeles, or LAWA and its tenants. The Guidelines represent additional actions that can be considered during the design and construction processes. If conflicting regulations are encountered or if a sustainable performance standard is deemed to be more environmentally beneficial than an established, conflicting regulation, it is the responsibility of the design and/or construction teams to review these conflicts and identify a plan of action. This may entail negotiations with regulators. It is expected that, to the extent feasible, the most rigorous requirement will be met.

Opportunity

In addition to LAWA staff, every engineering and construction professional team working at LAWA will be provided with a copy of the Guidelines to ensure the incorporation of sustainable elements in their

planning, designs and/or construction and maintenance implementation. LAWA's design, construction, and maintenance projects will embrace the best possible environmental, social, and fiscally responsible practices, in order to enhance the overall quality of a project and to maintain consistency with the mission and goals of the City.

Challenges

The fundamental belief underlying the Guidelines is that an integrated design process will enable LAWA to achieve thoughtful, sustainable design and construction efforts with no or minimal impact to schedules or budgets. It is especially critical that all members of a project team incorporate the Guidelines during the earliest planning efforts. Design requirements, competing interests, schedule and budget issues must be balanced at both the project and department levels. During the pre-evaluation project stage, general sustainability goals and specific design and construction strategies, including added budget demands, must be identified and communicated to all interested stakeholders. Given that sustainability initiatives may add to project costs, it will be imperative for the team to consider life cycle costs rather than initial investment alone. After the initial evaluation, continued use of the Guidelines through all stages of the planning, design and construction processes will ensure that the sustainability goals are met. Persuading hundreds of tenants/lessees/ concessionaires to embrace sustainability initiatives will also be very challenging.

Table 32. AIR2 Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. LAWA will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation.

Milestone	Completion Date
Draft Guidelines	6/2007
Issue Final Guidelines	1/2008
Implementation of Guidelines	1/2008

Measure Evaluation

LAWA's Mitigation Compliance Division will track and report LAWA's progress as the Guidelines evolve, to ensure that sustainable design measures are incorporated into every element of all LAWA projects, to the greatest extent possible.

Action AIR3	Evaluate options to reduce aircraft-related GHG emissions.

Los Angeles World Airports (LAWA) has already implemented a number of early action items that will greatly assist the City in meeting its goal of reducing greenhouse gas emissions 35% below 1990 levels by 2030. Some of these actions are still ongoing; some are mandated by agreements signed in conjunction with the LAX Master Approval process, while others are required by the mitigation-monitoring plan that was established for the LAX Master Plan.

Lead Agency Los Angeles World Airports (LAWA)

Other Agencies EnvironmentLA (ELA), Los Angeles Department of Water and Power (LADWP)

To develop the emissions inventory, LAWA will work closely with the Federal Aviation Administration (FAA); California Department of Transportation (Caltrans); Environmental Protection Agency (EPA); airlines; airport tenants; various air quality districts; and various emissions registries, as well as other City departments.

Opportunity

The mandate to compile a GHG emissions inventory represents two unique opportunities for LAWA. LAWA will develop a comprehensive database of emissions sources and impacts for greenhouse gases *and* criteria and toxic air pollutants. Because there is now no standardized GHG reporting protocol for airports, the GHG reporting protocol and framework that LAWA develops will likely become benchmarks for other airports to use.

Challenges

Clearly defining the limitations and boundaries of the inventory is paramount. Scientific experts employ different data collection methods. Sorting out relevant data points and ensuring the credibility of the collected data may be difficult. LAWA will need to be able to defend its approaches. Compiling an inventory of this scope requires a significant allocation of LAWA funds and staff, and the cooperation and input from the hundreds of airlines, tenants, lessees, and contractors that generate emissions.

Implementation Steps

The actions under this measure have been incorporated into departmental plans and budgeting. LAWA will provide regular updates to Environment LA on the status of meeting existing milestones and evaluate the need to establish additional milestones during implementation. LAWA is now developing a protocol that will be used to compile the 2005 emissions inventory. Upon completion of that inventory, LAWA will extrapolate its 1990 baseline emissions inventory. A formal GHG Reduction Plan and Implementation Plan will follow.

Table 46. AIR3 Implementation Steps

Milestone	Completion Date
Develop framework and scope.	1/2008
Develop Inventory Protocol.	6/2008
Commence Inventory.	6/2008
Data collection and compilation.	1/2009
Complete GHG inventory, determine 1990 baseline and establish 2030 goal.	12/2009
Begin GHG verification (in 1/2010).	4/2010
Develop Emissions Reduction Plan and implement new initiatives.	2010-2030
Crossfield Taxiway Project	2011

Measure Evaluation

LAWA's Clean Air Action Plan identified various measures to reduce GHG emission. This Plan will be used to monitor the progress of the initiated measures. One measure already identified and planned is the Crossfield Taxiway Project (CFTP). The CFTP's draft Environmental Impact Report (EIR) showed that construction activities for this project would increase GHG during the 18 months of the project by about 19,950 tons of CO2. However, structural replacements would slightly decrease GHG by about 24 tons or just under 1% from existing conditions. In addition, operational improvements to shorten taxi times would also decrease GHG gases from an estimated 358,045 tpy to 345,577 tpy or 12,467 tpy reduction. Therefore, the draft EIR projected that the operational reductions would offset the construction GHG in about 19 months and provide a net reduction thereafter.

GOAL: Citywide Climate Change Education Program

Action Ed1	**City will partner with community, environmental justice, and environmental organizations to develop educational materials and reach out to Angelenos with steps they can take to reduce their own emissions.**
Action Ed2	**Conduct multi-lingual outreach to all neighborhoods, with emphasis on those with environmental justice challenges, to inform them of climate action.**
Action Ed3	**Convene a series of at least 20 community workshops to engage public input into the climate plan.**
Action Ed4	**Develop a program to challenge all Angelenos to reduce their individual / household carbon footprint.**

As part of the City's climate change program, the EnvironmentLA (ELA), the Environment LA Commission (EAC), and other departments will conduct public participation, outreach, and educational activities. These activities may be conducted in a variety of ways, and will take advantage of on-going environmental outreach and education programs. Informing City staff about the climate change crisis will be emphasized, and ways to mitigate and adapt to climate change, to allow all City staff to carry the climate message in their daily work activities.

Lead Agency EnvironmentLA (ELA) and Environment LA Commission (EAC)

Other Agencies Department of City Planning; Bureau of Sanitation (BOS) of the Los Angeles Department of Public Works (LADPW); Department of Recreation and Parks (RAP); Los Angeles Housing Department (LAHD); Los Angeles Department of Water and Power (LADWP); Los Angeles World Airports (LAWA); Port of Los Angeles (POLA, also called the "Harbor Department"); Community Redevelopment Agency (CRA)

ELA plans to partner with non-profit organizations and institutions, in addition to other City departments and offices, to provide venues for community events, to attract public participation, and to help provide information on the City's climate change plans. ELA will also pursue grant funding from foundations, as well as state and federal agencies, to assist in funding these activities.

Opportunity

Several City departments are planning or conducting public participation, outreach, and educational activities on a number of environmental programs. These include the Planning Department's workshops on 12 proposed Community Plan revisions; the Bureau of Sanitation's Solid Waste Integrated Resources Plan/Zero Waste Initiative; the Recreation and Parks Department's Community Needs Assessment; the Department of Water and Power's Integrated Resources Plan for Electricity, and electricity and water rate changes studies; the Port of LA's Clean Air Action Plan; and LAWA's LAX Master Plan activities, among others. Several departments, such as Housing, Building and Safety, and Planning, have employees who meet daily with City residents and businesses, or their representatives. These employees, and the public participation and outreach activities, represent a unique opportunity to share resources to inform the public and solicit input on climate change issues, as a complement to other environmental initiatives and goals.

Challenges

No specific funding is allocated for climate change public participation activities, or for outreach and educational materials and activities. Thus, ELA will incorporate climate change messages into on-going public contacts, through our newsletter, website, and at events. With so many public activities planned by other City departments, our challenge will be to develop a consistent message that all departments, at a limited increased cost to them. It will be a challenge to ensure that the message reaches all neighborhoods, and to provide translated materials, with no budget identified. In addition, with the City's residential population of 4 million, and thousands of businesses, it will be a challenge to reach all constituents that want to participate in the climate plan activities.

Table 47. Ed1/Ed2/Ed3/Ed4 Implementation Steps

Milestone	Completion Date	Results/ Outcome
Develop strategy for public participation activities.	March 2008	
Develop initial outreach materials, update ELA Web site.	March 2008	
Provide training for City staff.	September 2008	
Implement public participation activities.	December 2008	
Study public input and prepare plan revisions.		
Develop additional outreach & educational materials.		
Assess need for new incentive programs and/or requirements to reduce GHG emissions.		

Measure Evaluation

This measure has the potential to significantly assist in the reduction of GHG emissions in the community of Los Angeles. This measure will not achieve direct emissions reductions, but will help in the development of a more complete list of actions that can do so. Based on public input, the City will design additional outreach materials to encourage residents and businesses to reduce their own GHG emissions and begin to adapt to our changing climate. It is possible that new incentive programs to reduce energy and fuel use, and/or new City requirements to do so, would also be developed.

Appendix A: Matrix of Action Items

(Coming Soon)

Appendix B: Municipal CO_2 Inventory

(Coming Soon)

Appendix C: Preliminary Community CO_2 Inventory

(Coming Soon)

Appendix D: Harbor Climate Action Plan

(Coming Soon)

Appendix E: Acknowledgements/Participants

(Coming Soon)