



Item No.

APPROVED BY
CITY MANAGER

TO: MAYOR MARQUEZ AND MEMBERS OF THE CITY COUNCIL

FROM: OFFICE OF THE CITY MANAGER
BY: MOHAMMAD MOSTAHKAMI, P.E., DIRECTOR OF PUBLIC WORKS *MM*

DATE: JANUARY 27, 2015

SUBJECT: ADOPT RESOLUTION APPROVING THE CITY'S ENERGY ACTION PLAN

RECOMMENDATION

That the City Council:

1. Receive and file a presentation on the Energy Action Plan, by kW Engineering, the City's project consultant; and
2. Adopt a Resolution approving the City of Downey's comprehensive Energy Action Plan

BACKGROUND

The California Assembly Bill 32 known as California Global Warming Solutions Act (AB 32) sets a target to decrease emissions statewide to 1990 levels by the year 2020. Reducing greenhouse gas emissions to 1990 levels means cutting approximately 30% from emissions levels projected for 2020, or about 15% from today's levels. The City of Downey recognizes the impact carbon emissions have on global climate change and is aiming to reduce its energy consumption and greenhouse gas emissions (GHG) to become a more sustainable community through Energy Action Plan (EAP). The main goal of the EAP is to provide a roadmap for the City of Downey to reduce GHG emissions through reductions in the energy used in facility buildings and city operations. This EAP identifies current energy measures that are being considered and future opportunities that will contribute to the energy reduction goal. In addition, this EAP identifies other potential energy reduction measures that the City will consider for future implementation.

The City's long-term vision for energy efficiency focuses around four primary objectives:

- Reduce the City's carbon footprint and its adverse effect on the environment
- Conserve energy at the local government facilities
- Raise energy conservation awareness in local community and improve the quality of life
- Achieve Platinum Status on the Local Government Agency Partnership

This EAP outlines various measures and strategizes numerous methods on how the City's long-term vision can be achieved. Key goals of this EAP are highlighted in the list below.

- Meet and exceed AB 32 energy reduction goals
- Enhance energy efficiency and operations in existing buildings through systematic commissioning strategies or independent energy efficiency studies
- Evaluate all suggested energy efficiency action measures presented in this EAP, establish a priority for implementation, and determine possible funding sources
- Explore the newest "green" technologies and methods to decrease future energy dependency
- Explore renewable energy recourses (not limited to solar) and possible financing based on available grants/rebates
- Continue interacting, educating, and informing the community about energy efficiency and greenhouse gas emissions
- Be an example for energy efficiency and sustainability at City facilities

In May 2014, the City Council awarded a contract to kW Engineering for the preparation of a comprehensive EAP for the City of Downey to develop short-term and long-term recommendations for reducing overall energy consumption and associated operation and maintenance costs by employing different operational strategies, capital improvements such as renewal energy (solar, i.e.) implementation, and modifications to existing programs and procedures.

DISCUSSION

After numerous meetings with staff and site visits, detailed City facilities audits, along with coordination with other partners such as the Energy Network (TEN) (an agency providing no cost support to local governments for energy efficiency) and SCE's Water Wise program, kW Engineering completed the Energy Action plan (attached) in November 2014. Attached is a summary of the final Energy Action plan, with main goals and objectives.

It is important that the identified strategies in the EAP are implemented to address the needs and ability of the City and Community, based on financial feasibility, and the overall benefit to the City and Community. For effective implementation, staff will monitor and evaluate the progress of the plan and systematically track energy use and reflect any changes in facilities and equipment. Energy use for each facility will be analyzed periodically to ensure that it is moving towards the target reduction goal. Staff will also monitor funding opportunities that can be leveraged to implement the recommended actions.

The City has already begun the Energy Savings by being a member of the Gateway Cities Energy Leader Partnership program conducted by Southern California Edison and the Gas Company. This partnership provides its member cities with benefits, such as audits at selected facilities, one-on-one technical support, strategic planning support on energy efficiency and sustainability, and marketing/outreach materials for the Community.

There are four Gateway Partnership tier levels (Valued, Silver, Gold, Platinum) which are dependent on cities completing various energy related activities, such as achieving certain amount of kilowatt hour savings; enrolling in demand response programs; and participating in community outreach events. Downey is currently at the Silver level, and can reach the Gold

Level by completing an Energy Action Plan (EAP), resulting in increased monetary utility rebates/incentives. As member cities increase to the next tier level, the monetary rebate incentive for completing energy efficiency projects also increases.

The proposed EAP was presented to the Public Works Committee in December 2014. Staff recommends adoption of the attached Resolution approving the City's EAP.

FINANCIAL IMPACT

The total approved cost for the EAP preparation was \$77,000 of which \$30,000 was covered by the Gateway Cities Energy Leader Partnership through Southern California Edison/Gas Company and the remaining City's share of \$47,000 was funded from General funds. The City's share was however reduced to approximately \$20,000 due to partnering with the Energy Coalition and SCE's Water Wise program to complete certain portions of the detailed audits and analysis at no cost to the City.

The total recommended Energy efficiency measures identified in the Plan amount to approximately \$4.7 million dollars, with annual cost savings of \$455,000. The recommended energy efficiency projects and improvements will be phased into a multi-year project timeframe based on funding availability. To minimize impacts to the City's General and other funds, staff will also seek grant opportunities and competitive funding from the Energy Commission.

Attachments

- Summary – Goals and Objectives of Plan
- Resolution and Energy Action Plan

ENERGY ACTION PLAN – SUMMARY OF GOALS AND OBJECTIVES

The City's long-term vision for energy efficiency focuses around four primary objectives:

- Reduce the City's carbon footprint and its adverse effect on the environment
- Conserve energy at the local government facilities
- Raise energy conservation awareness in local community and improve the quality of life
- Achieve Platinum Status on the SCE Gateway Partnership

This EAP outlines various measures and strategizes numerous methods on how the City's long-term vision can be achieved. This EAP is intended to guide the City to reduce greenhouse emissions by lowering municipal and community-wide energy use.

Key goals of this EAP are highlighted in the list below.

- Meet and exceed AB 32 energy reduction goals
- Enhance energy efficiency and operations in existing buildings through systematic commissioning strategies or independent energy efficiency studies
- Evaluate all suggested energy efficiency action measures presented in this EAP, establish a priority for implementation, and determine possible funding sources
- Explore the newest "green" technologies and methods to decrease future energy dependency
- Explore renewable energy recourses (not limited to solar) and possible financing based on available grants/rebates
- Continue interacting, educating, and informing the community about energy efficiency and greenhouse gas emissions
- Be an example for energy efficiency and sustainability at City facilities
- Create a long-term vision for energy efficiency
- Identify and categorize City energy use and greenhouse gas emissions
- Highlight the City's major energy-using facilities
- Establish reduction targets for energy efficiency
- Prioritize goals, policies, and actions to achieve energy reductions
- Develop implementation plan for the identified goals, policies, and actions

Based on the energy consumption information for the citywide facilities, kW Engineering conducted audits for the facilities listed below to assess the energy savings potential at these buildings. The goal of this approach was to focus efforts on the sites that would likely provide the greatest savings, while also covering a wide breadth of building types within the city. Although not every building in the city was audited, the sites that were selected make up a vast majority of the city building stock's overall energy consumption (not including street lights or pumps).

- Barbara J. Riley Senior Center
- City Hall
- Civic Theatre
- Discovery Sports Complex
- Fire Station #1
- Library
- Maintenance Yard
- Parking Structure

- Police Department
- Rio Hondo Golf Course
- Rio San Gabriel Park
- Space Center
- Transit Center
- Wilderness Park

A key component to this Energy Action Plan (EAP) is to establish a target energy reduction goal. Accordingly, this EAP has set a goal to reduce City of Downey's existing municipal energy use by 15% prior year 2020. The savings goal was determined with reference to the Global Warming Solutions Act of 2006 (AB 32) which requires by California law a reduction of greenhouse gas emissions (GHG) to 1990 levels by 2020. Energy records indicate that in 2006, the City's municipal facilities used a total of 14,404,611 kWh of electricity. These figures shall be used as the benchmark (or baseline) to track the performance of EAP related energy-saving goals. Per the 15% savings goal established above, the target energy use for 2020 is 12,243,919 kWh for electricity. These are projected savings of approximately 2.2 million kWh for AB 32. Additionally, kW Engineering determined the energy saving requirements to achieve the Gold level status (10%: 1.4 million kWh savings) and Platinum (20%: 2.9 million kWh savings) for the SCE levels within the Gateway Cities Partnership.

The following outlines a few policies that can be implemented to help achieve the energy savings goal for City-wide energy use.

Community Outreach

By leveraging resources and other funding opportunities, the City can organize outreach groups consisting of representatives from City, SCE, and SCG. Outreach staff will be responsible for developing energy awareness materials and programs that educate the community about energy use in a simple manner, including outreach to the City's largest commercial customers.

Energy Awareness

The City and related partners should work together to share information with the public. Community residents should have easy access to information on what to do to make their homes or businesses more energy efficient and whom to contact for support. This information can be made publicly available through the dedicated "green" web-page on the City's web site.

Completed Energy Efficiency Projects

During the development of this Energy Action Plan, the City moved forward with interior lighting and lighting controls retrofits through SCE's Direct Install program. This program provided free equipment and installation for select interior lighting retrofits and control upgrades. SCE's consultant, FCI, implemented these lighting upgrades at 13 sites within the City. The retrofits included:

- Replacing T12 fluorescent fixtures with 28W T8 fixtures
- Replacing 32W T8 fluorescent lamps with 28W T8 lamps
- De-lamping fluorescent fixtures and installing reflector kits
- Replacing incandescent, CFL, and halogen flood lights with LEDs
- Installing wall-mounted occupancy sensors

Future Energy Efficiency Projects – Preliminary Steps in Progress

Well and Booster Pump Efficiency Upgrades

The City has begun preliminary steps to improve the energy efficiency of their city-wide water distribution system. The City participated in SCE's WISE program. Under this program, SCE's 3rd party consultant, Lincus Incorporated, conducted an energy efficiency study of the City's well and booster pumping stations. Lincus' analysis identified three potential energy efficiency projects to reduce the energy consumption of the city's water distribution:

- System optimization of well and booster pumps
- Pump efficiency improvements

The system optimization measures propose to install variable frequency drives (VFDs) on six well pumps and three booster pumps. SCE conducted pump tests on all of the city's wells and found that 10 well pumps were operating inefficiently and could be significantly improved through a pump overhaul.

SCADA System Upgrade

The City's water distribution systems are currently controlled by an outdated Supervisory Control and Data Acquisition (SCADA) system. The existing system is only capable of turning well pumps on and off in order to maintain a single pressure set point, which is measured at the city's Maintenance Yard. The new SCADA system will be capable of controlling wells based on multiple pressure set points. As a result, fewer well pumps should be required since pumps on the north end of the city will not be staging on in order to supply water demand in the south end.

City-owned Streetlight LED Conversions

There is significant savings potential in upgrading the existing City owned streetlights from high intensity discharge (HID) and incandescent fixtures to lower wattage LEDs. The SCE owned streetlights were not considered for retrofit, because these streetlights are not currently owned by the City.

Based on the audit, the city's existing city owned LS-2/LS-3 streetlights include:

- High Pressure Sodium (HPS) fixtures ranging from 70W to 400W
- 250W Metal Halide (MH) fixtures
- Mercury Vapor (MV) fixtures ranging from 175W to 700W
- Incandescent 448W fixtures

Future Facility Energy Efficiency Improvements

This EAP outlines various energy conservation projects to consider for future implementation at the top ranking energy using facilities. The top ranking facilities include the following:

- Police Station
- Barbara Riley Senior Center
- City Hall
- Civic Theater
- Rio Hondo Golf Course

- Library
- Fire Station #1
- Discovery Sports Center
- Columbia Space Center
- Wilderness Park
- Rio San Gabriel Park
- Transit Center
- Maintenance Yard

The following list of seven measures represents the top measures that showed the greatest savings potential across the most number of sites. Note that while the projects presented herein are only analyzed for the largest City facilities, the City can also apply the same project concepts at other smaller facilities with similar potential.

1. Interior Lighting and Controls Retrofits

The proposed lighting retrofits and controls measures at these sites include:

- Barbara Riley Senior Center: Replacing 2x2 long compact fluorescent fixtures with 2x2 LED fixtures
- Maintenance Yard: Installing occupancy sensors to control the T8 fluorescent lighting in private offices.

2. Replace HID Exterior Lighting with LED

Nine of the investigated sites within the city use high intensity discharge (HID) fixtures to provide exterior lighting. To reduce the electricity consumption of exterior lighting, the City should replace the HID fixtures with more efficient LED fixtures.

3. Use Cool Roofing Material when Replacing Rooftops

Six of the investigated sites within the city have rooftops constructed of tar and gravel. These roofs have poor thermal qualities, in that they absorb a significant amount of the sun's radiation and reflect very little energy. As a result, buildings gain a significant amount of heat from the roof, causing additional load on the cooling systems.

Cool roofing products are made of highly reflective and emissive materials that can remain approximately 50 to 60°F (28-33°C) cooler than traditional materials during peak summer weather. Building owners and roofing contractors have used these types of cool roofing products for more than 20 years.

Installing cool roofs saves energy in areas where cooling loads outweigh heating loads, as is the case in Downey. However, replacing the entire roof in order to install a cool roof is not financially feasible as a stand-alone project. Therefore, the City should only consider installing a new cool roof once the existing rooftop is ready to be replaced. Alternatively, for rooftops that still have a significant amount of remaining useful life, spray-on cool roof material provides a cheaper option for improving the roof's thermal qualities without replacing the entire roof.

4. Replace Aging Packaged HVAC Equipment with Energy Efficient Units

Seven of the investigated sites within the city have packaged HVAC equipment that is near or beyond its estimated useful life (EUL). The EUL represents the average service life of a unit. Units that are beyond their EUL have a higher chance of failure, and are presumed to be ready for replacement in the near future.

Rooftop equipment at these project sites includes gas/electric packaged units and packaged heat pumps. According to the City's HVAC inventory, these units range in vintage from 1983 to 1998, and range in capacity from 4 tons to 13.5 tons. The average efficiency (expressed in energy efficiency ratio [EER]) of the existing units is 8.9 EER. New packaged HVAC equipment can achieve efficiencies of 13 EER or greater.

5. Tie in Sites to Central Building Automation System (BAS)

This measure proposes to install tie five of the investigated sites into the city's existing centralized building automation system (BAS). The primary goal of the BAS installation is to save energy through improved control over the HVAC operations. The central BAS is located in City Hall, and serves numerous buildings in the Civic Center. However, many project sites are not integrated into this BAS network.

Two of the sites, the Library and Space Center, have stand-alone Climatec BAS systems that provide a limited range of scheduling and set point control.

The three other sites included in this proposed retrofit, the Police Station, Fire Station #1, and Rio Hondo Golf Course, do not have any existing BAS. The HVAC at these sites are controlled by individual thermostats, which have limited programmable capabilities. These sites have even less control capabilities than the Library and Space Center, so significant savings should be achievable by tying these sites into the main BAS.

This measure is expected to save energy by improving the scheduling of HVAC equipment, improving fan speed control, and expanding economizer functionality.

6. Install Low Flow Water Fixtures

This measure proposes to replace existing faucet aerators and shower heads with low flow fixtures. Two project sites, the Police Department and Fire Station #1, have the potential for gas savings through installing low flow water fixtures. These sites were selected due to the use of showers at these facilities. Due to the high flow of the existing water fixtures, the city is using more water than necessary.

7. Install Rooftop Photovoltaic Systems

This measure proposes to install rooftop photovoltaic (PV) generation systems at seven project sites. The selected sites have ample flat roof space that is not shaded by surrounding structures or trees, making them ideally suited for PV. On-site generation, including PV systems, can be expensive but can also yield significant demand reduction and energy savings. PV prices have been steadily dropping, and systems are becoming more cost effective.

The primary limiting factors for PV systems are roof area and the building's electric energy consumption. Care must be taken to design a system that provides less power than the building consumes, since the city would not be compensated for excess power generated. Therefore, it is important to install energy efficiency projects before sizing and installing PV systems, in order to prevent over-sizing of the system once the building load drops due to EE project implementation.

Since costs are continually falling, and EE projects should be implemented first, the city should wait to install PV until all other suggested measures are installed. The specific design and capacity of the system will be determined by the solar contractor. This report, however, assumes that 25% of the roof area at the suggested sites would be devoted to PV. This value leaves room for expansion, will likely not cause excessive stress to the roof, and does not oversize the system.

Funding Opportunities for Energy Efficiency Projects:

The following are various project funding mechanisms that the City should investigate and utilize (wherever applicable).

Federal Government and State Grants

Most energy efficiency grants are issued by individual state governments; a database of these can be found at <http://www.ca.gov/Grants>. However, grants for the largest amount of money are typically issued by the Federal Government; a full directory of available energy efficiency grants can be found at <http://www.grants.gov>. These grants are split between competitive grants, in which applicants compete with a number of other applicants for a limited pool of money, and formula grants, in which money is allocated according to a particular set of requirements that an applicant must meet.

Utility Rebates and Incentives (SCE/SCG EE Programs)

The City of Downey should continue to leverage the many rebate and incentive programs made available through local utilities, including SCE and SCG.

On-Bill Financing (OBF)

On-Bill Financing is an IOU mechanism that enables cities to finance energy efficiency projects with loans that are repaid through their utility bill. Both SCE and SCG offer On-Bill Financing Programs in conjunction with their energy-efficiency rebate/incentive programs, which consist of 0% interest loans with no fees on loan costs and repayment through monthly SCE/SCG bill.

The Energy Network (TEN) - Energy Project Lease Financing Program

The Energy Project Lease Financing Program is authorized by the CPUC and provided through The Energy Network. Funding for Energy Project Lease Financing is provided through private lenders and may be combined with other financing sources including utility or public financing, rebates and incentives. Loans are structured as equipment leases secured by the new equipment and upgrades installed during the project or by using real property.

CEC's Energy Efficiency Financing Program

The California Energy Commission's (CEC) Energy Efficiency Financing Program provides financing for cities, counties, public care institutions, public hospitals, public schools and

colleges, and special districts through low-interest loans for the installation of energy-saving measures.

- 1% fixed interest rate Loans for energy projects can fund 100% of the project within a 17 year (maximum) simple payback. The loan must be repaid from energy cost savings or other legally available funds within a maximum term of 20 years (including principal and interest). The repayment schedule is based on the estimated annual energy cost savings from the aggregated project(s), using energy costs and operating schedules at the time of loan approval. Simple payback is calculated by dividing the dollar amount of the loan by the anticipated annual energy cost savings.

Power Purchase Agreements (PPAs)

A Power Purchase Agreement (PPA) is a mechanism for an end-use customer to purchase clean energy from a power producer for on-site projects. In the case of solar photovoltaic electricity, a city can opt to purchase solar energy from a system installed on-site through a PPA at a negotiated rate instead of purchasing, installing, and maintaining the operations of solar photovoltaic panels themselves. While the solar panels may be installed on city premises, the city will not own the system. However, ownership of any renewable energy certificates (RECs) and carbon offset credits generated will need to be negotiated as part of the PPA. A major advantage of a PPA is that no up-front investment or ongoing maintenance costs are required from the city while the solar PV energy is often guaranteed by the PV provider. However, the risk of the negotiated electricity rate is usually placed on the buyer.

Efficiency Services Agreements (ESA's)

An Efficiency Services Agreement (ESA) is a pay-for-performance financing solution that allows building owners to implement energy efficiency projects without any upfront capital expenditure. Under this power purchase agreement (PPA)-like structure for energy efficiency, an ESA provider pays for all development and construction costs. After a project is operational, the building owner uses a portion of the cost savings associated with reduced energy consumption to make periodic service payments over the ESA term. ESA payments vary by billing period according to the actual amount of achieved savings.

For each project, the ESA provider enters into the ESA directly with the building owner and pays a third-party contractor (for example, an ESCO) to engineer, implement and maintain the energy efficiency project. Key features of an ESA generally include:

- ESA provider funds 100% of all design, engineering, and construction costs
- Projects can include a broad range of energy efficiency technologies and measures
- ESA provider owns and is responsible for ongoing maintenance services for all equipment, with customer buyout options available
- After the ESA term expires, the customer has the option to purchase the equipment at fair market value
- ESA payments are an operating expense similar in nature to a regular utility bill, although each owner is responsible for conducting their own accounting review

Energy Performance Contracts (EPCs)

Energy Performance Contracts (EPCs) are structured so that energy efficiency projects can be installed with little or no up-front costs to the customer. A portion of the revenue from energy savings goes directly to an Energy Service Company (ESCO), who finances and constructs the

project. ESCOs can take on the debt associated with the projects done through the EPC, allowing Districts to keep the debt off of their books.

Green Revolving Fund (GRF)

A Green Revolving Fund (GRF) is an internal fund that provides the financing to parties within an organization or institution to implement energy efficiency, renewable energy, and other sustainability projects that generate cost savings. These savings are tracked and used to replenish the fund for the next round of green investments, thus establishing a sustainable funding cycle while cutting operating costs and reducing environmental impact. Capital for a GRF may be obtained from a variety of funding sources, including grants, government funding, utility rebates and incentives, and from annual operating budgets.

RESOLUTION NO.

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF DOWNEY
APPROVING AN ENERGY ACTION PLAN**

WHEREAS, the City of Downey recognizes that energy efficiency is important and is committed to reducing the City's carbon footprint and reducing greenhouse gas emissions; and

WHEREAS, on May 13, 2014, the City of Downey hired kW Engineering to complete the Energy Action Plan; and

WHEREAS, kW Engineering has completed the City's Energy Action plan shown in Exhibit A, in partnership with Southern California Edison and the Southern California Gas Gateway Local Government Partnership; and,

WHEREAS, the proposed Energy Action Plan implementation will result in significant energy savings.

**NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF DOWNEY DOES
HEREBY RESOLVE AS FOLLOWS:**

SECTION 1. The Energy Action Plan shown in Exhibit A, is hereby adopted.

SECTION 2. That the City Council of the City of Downey authorizes the Director of Public Works to implement the City's Energy Action Plan based upon funding availability.

SECTION 3. The City Clerk shall certify to the adoption of this resolution.

APPROVED AND ADOPTED this 27th day of January, 2015.

Luis Marquez, Mayor

ATTEST:

ADRIA M. JIMENEZ, CMC
City Clerk

I HEREBY CERTIFY that the foregoing Resolution was adopted by the City Council of the City of Downey at a regular meeting held on the 27th day of January, 2015, by the following vote, to wit:

AYES:	Council Members:
NOES:	Council Member:
ABSENT:	Council Member:
ABSTAIN:	Council Member:

ADRIA M. JIMENEZ, CMC
City Clerk

City of Downey Energy Action Plan

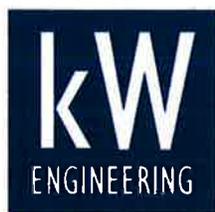


Energy Action Plan

January 21st, 2015

EXHIBIT "A"

kW
ENGINEERING



Copyright © 2014 kW Engineering. All rights reserved.

Reproduction or distribution of the whole, or any part of the contents of this document without written permission of kW Engineering is prohibited. Neither kW Engineering nor any of its employees makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any data, information, method, product or process disclosed in this document, or represents that its use will not infringe upon any privately-owned rights, including but not limited to, patents, trademarks or copyrights.

Table of Contents

Table of Contentsii

Energy Action Plan Checklist.....iii

Disclaimer.....iv

1 Executive Summary.....5

2 Introduction.....6

2.1 Recent Action Items7

3 City of Downey Energy Use10

3.1 City Departments10

3.2 Electric Energy Usage10

3.3 Natural Gas Energy Usage.....13

3.4 Highest Energy Users.....13

3.5 Selected Project Sites18

3.6 Current Energy Programs/Policies.....20

4 City of Downey Energy Reduction Goals22

4.1 Municipal Energy Use Goals.....22

4.2 Community Outreach Goals.....23

5 City of Downey Action Steps.....25

5.1 Municipal Facility Energy Efficiency Projects.....25

5.2 Funding of Projects37

5.3 Policies and Guidelines.....40

5.4 Energy Use Tracking & Benchmarking.....43

6 Conclusion45

7 Appendix A – Glossary of Key Terms.....51

8 Appendix B – Savings Calculations.....64

9 Appendix C – Project Cost Information65

10 Appendix D – Site Specific Summary Tables.....66

Energy Action Plan Checklist

EAP Requirements	Section and Page Number
A. Establish long term vision and plan for energy efficiency in City/County (In kWh savings or % reduction)	Section 4: Page 22
B. Clearly states the aim and objectives of the plan	Section 1: Page 5
C. Records the baseline municipal energy usage (kWh)	Section 3: Page 10
D. Displays the highest users (facilities) that the city should target (kWh)	Section 3: Page 13
E. Identifies the City/County reduction goals and milestones to help reach long term target (kWh)	Section 4: Page 22
F. Provides the plan of municipal facility projects that the City/County can complete to assist in achieving their reduction (Provide savings calculated for each project) <ul style="list-style-type: none"> i. Identify priority of projects ii. Identifies expected funding mechanisms to complete municipal facility energy efficiency projects 	Section 5: Page 25 Section 6: Page 45
G. Identifies any policies or procedures the City/County can implement to assist in reducing energy use	Section 5: Page 40
H. Identify the actions that will constitute the EAP is considered implemented (a requirement if partner desires to obtain ELP Platinum Level). This identification can be made through various options such as included in the EAP, a staff report, resolution, or the attached Appendix (A) in Section 2. C. To delineate implementation actions that shall include, but are not limited to, municipal retrofit projects, policies, and procedures discussed in the EAP (per criteria F and G).	Section 6: Page 45

Disclaimer

The intent of this energy action plan is to develop the long term vision and plan for energy efficiency for the City of Downey. This report is not intended to serve as a detailed engineering design document. The descriptions of the improvements are only diagrammatic in nature in order to document the basis of cost estimates and savings, and to demonstrate the feasibility to construct the improvements. It should be noted that detailed design efforts may be required in order to implement several of the improvements evaluated as part of this energy analysis. As appropriate, costs for those design efforts are included as part of the cost estimate for each measure.

While the recommendations in this report have been reviewed for technical accuracy and are believed to be reasonably accurate, the findings are estimates and actual results may vary. As a result kW Engineering, Inc. is not liable if projected estimated savings or economics are not actually achieved. All savings and cost estimates in the report are for informational purposes, and are not to be construed as a design document or as guarantees.

In no event will kW Engineering, Inc. be liable for the failure of the customer to achieve a specified amount of energy savings, the operation of customer's facilities, or any incidental or consequential damages of any kind in connection with this report or the installation of recommended measures.

1 Executive Summary

The California Assembly Bill 32 - California Global Warming Solutions Act (AB 32) sets a target to decrease emissions statewide to 1990 levels by the year 2020. Reducing greenhouse gas emissions to 1990 levels means cutting approximately 30% from business-as-usual emissions levels projected for 2020, or about 15% from today's levels. The City of Downey (The City) recognizes the impact carbon emissions have on global climate change.

The City is aiming to reduce its energy consumption *and* greenhouse gas emissions (GHG) to become a more sustainable community. The main goal of the Energy Action Plan (EAP) is to provide a roadmap for the City of Downey to reduce GHG emissions through reductions in the energy used in facility buildings and city operations. This EAP identifies current energy measures that are being considered and future opportunities that will contribute to the energy reduction goal. In addition, this EAP identifies other potential energy reduction measures that the City will consider for future implementation.

The City's long-term vision for energy efficiency focuses around four primary objectives:

- Reduce the City's carbon footprint and its adverse effect on the environment
- Conserve energy at the local government facilities
- Raise energy conservation awareness in local community and improve the quality of life
- Achieve Platinum Status on the Local Government Agency Partnership

This EAP outlines various measures and strategizes numerous methods on how the City's long-term vision can be achieved. Key goals of this EAP are highlighted in the list below.

- Meet and exceed AB 32 energy reduction goals
- Enhance energy efficiency and operations in existing buildings through systematic commissioning strategies or independent energy efficiency studies
- Evaluate all suggested energy efficiency action measures presented in this EAP, establish a priority for implementation, and determine possible funding sources
- Explore the newest "green" technologies and methods to decrease future energy dependency
- Explore renewable energy recourses (not limited to solar) and possible financing based on available grants/rebates
- Continue interacting, educating, and informing the community about energy efficiency and greenhouse gas emissions
- Be an example for energy efficiency and sustainability at City facilities

2 Introduction

The purpose of this Energy Action Plan (EAP) is to define the City of Downey's long-term vision for achieving energy efficiency in local government facilities and within the community. The driving force for City of Downey's energy efficiency efforts includes demonstrating leadership through the implementation of cost-effective energy efficiency improvements in their own facilities, minimizing costs associated with energy and utilities, and protecting the environment. This EAP is intended to guide the City to reduce greenhouse emissions by lowering municipal and community-wide energy use. The City of Downey understands the role energy usage and energy efficiency plays in maintaining a sustainable environment. The City is committed to promoting long-term climate action activities in order to reduce energy usage and mitigate greenhouse gas (GHG) emissions.

Local governments play an important role in leading the community by example. This EAP shows the multiple strides the City has taken towards a more sustainable environment. Energy efficiency improvements in government operations provide a foundation for more comprehensive community-wide efficiency strategies. This EAP provides additional strategies that provide a path towards optimizing energy use in the city, reducing utility costs, and maximizing operational productivity of facilities.

Created in partnership with Southern California Edison (SCE) and Southern California Gas Company (SCG), this EAP identifies municipal strategies to achieve the City's long-term electricity and natural gas efficiency goals. This integration of City-wide municipal strategies allows the City of Downey to lead by example.

The key objectives of this Energy Action Plan are as follows:

- Create a long-term vision for energy efficiency
- Identify and categorize City energy use and greenhouse gas emissions
- Highlight the City's major energy-using facilities
- Establish reduction targets for energy efficiency
- Prioritize goals, policies, and actions to achieve energy reductions
- Develop implementation plan for the identified goals, policies, and actions

2.1 Recent Action Items

Maximization of Partnership Programs & Resources

The City of Downey has a history of promoting sustainability and energy conservation. Specifically as it pertains to municipal facilities, the City has taken a proactive role in implementing energy reduction measures whenever possible and as funding permits. In the pursuit of its energy saving goals, the City has always sought out assistance and leveraged available resources. These have included grants from the federal government, incentives from utility companies, and assistance from energy partnerships. The City of Downey will continue to leverage the services and resources made available through the following partnerships:

Local Government Partnerships (LGPs)

In an effort to increase City-wide energy efficiency, the City of Downey entered into a joint partnership with Southern California Edison (SCE) and Southern California Gas (SCG) via the Gateway Cities Energy Leadership Partnership Program (the Partnership). The Partnership allows the City of Downey to capture additional incentives for electricity and natural gas saved through municipal retrofit projects and community outreach efforts.

The Partnership was initially established to provide funds to participating Partnership cities when the cities invest in energy efficiency projects. It was designed to provide integrated technical and financial assistance to help local governments effectively lead their communities to increase energy efficiency, reduce greenhouse gas emissions, protect air quality, and ensure that communities are sustainable. Existing Partnership participants include the cities of Downey, Southgate and Norwalk.

The Partnership provides a performance-based opportunity for the City of Downey to demonstrate energy efficiency leadership in its community through energy saving actions, including retrofitting its municipal facilities and providing opportunities for constituents to take action in their homes and businesses. By implementing measures in its own facilities, the City of Downey has led by example. The City, SCE, and SCG have worked together to increase community awareness of energy efficiency and positioned the City as a leader in energy management practices. The City of Downey will continue working with their local utility representatives and the Partnership's Lead to ensure that the City is maximizing the services and resources made available through the partnership.

Through the Energy Leader Partnership (ELP) Program, Southern California Edison (SCE) supports local governments in identifying and addressing energy efficiency (EE) and demand response (DR) opportunities in municipal facilities, taking actions supporting the California EE Strategic Plan, and increasing community awareness of demand side management opportunities. Local government partners are recognized at various ELP levels for achieving specified performance thresholds in EE and DR. The benefits to local governments increase as they ascend from level to level. A 'Valued Level' Partner is the most basic, followed by 'Silver Level,' 'Gold Level,' and lastly 'Platinum Level.' The City is presently a *Silver* level partner and is aiming towards the Platinum level tier. The figure below outlines the various criteria and incentives for the various partnership levels. As shown, to achieve Gold and Platinum status, the City needs to initiate, complete, and implement an Energy Action Plan (EAP), in addition to achieving 20% kWh reduction for city facilities.

Recognition Levels	Valued Partner	Silver Level 5% kWh Savings	Gold Level 10% kWh Savings	Platinum Level 20% kWh Savings	
	<ul style="list-style-type: none"> Valued Partner Level enhanced incentives Technical Support Strategic Plan Support Co-Branded Marketing & Outreach Support 	<ul style="list-style-type: none"> Silver Level enhanced incentives Technical Support Strategic Plan Support Co-Branded Marketing & Outreach Support 	<ul style="list-style-type: none"> Gold Level enhanced incentives Technical Support Strategic Plan Support Co-Branded Marketing & Outreach Support 	<ul style="list-style-type: none"> Platinum Level enhanced incentives Technical Support Strategic Plan Support Co-Branded Marketing & Outreach Support 	
	Energy Efficiency Criteria	<p>Basic EE Criteria:</p> <ul style="list-style-type: none"> Commitment to Long Term Energy Efficiency Leadership Commitment to Partnership goals including energy savings in municipal facilities 	<p>Basic EE Criteria Plus:</p> <ul style="list-style-type: none"> City initiates Energy Action Plan 5% kWh reduction for city facilities 1 Community Menu Item Co-sponsor marketing & outreach to the community on EE programs 	<p>Basic EE Criteria Plus:</p> <ul style="list-style-type: none"> City completes Energy Action Plan 10% kWh reduction for city facilities 1 Additional Community Menu Item Co-sponsor marketing & outreach to the community on EE programs 	<p>Basic EE Criteria Plus:</p> <ul style="list-style-type: none"> City implements Energy Action Plan 20% kWh reduction for city facilities 1 Additional Community Menu Item Co-sponsor marketing & outreach to the community on EE programs
	Demand Response Criteria	<p>Basic DR Criteria:</p> <ul style="list-style-type: none"> Enroll in California's Statewide Flex Alert and implement an internal educational campaign Complete an Integrated Demand Side Management (IDSM) audit at all eligible facilities greater than 200 kW 	<p>Basic DR Criteria Plus:</p> <ul style="list-style-type: none"> Distribute Energy Solutions brochure to partner employees Enroll one (1) eligible facility in a Demand Response program and develop an Event Curtailment Plan for participating facility 	<p>Basic DR Criteria Plus:</p> <ul style="list-style-type: none"> Enroll 25% of eligible facilities in Demand Response Programs and develop Event Curtailment Plan(s) for participating facilities Conduct one (1) co-branded DR awareness item from Marketing & Outreach Menu 	<p>Basic DR Criteria Plus:</p> <ul style="list-style-type: none"> Enroll one eligible service account into one of SCE's Auto Demand Response Programs and reduce load with automated controls or conduct a community forum with at least 40% of the program content Demand Response focused Enroll 50% of eligible facilities in Demand Response Programs and develop Event Curtailment Plan(s) for participating facilities Conduct one (1) additional co-branded DR awareness item from Marketing & Outreach Menu

Figure 2.1: SCE Energy Leader Partnership (ELP) Tiers

The Energy Network (TEN)

The City of Downey is one of 38 cities enrolled with The Energy Network (TEN), which was created in 2012 by the California Public Utilities Commission (CPUC) to harness the collective power of residents, businesses, and the public sector to achieve energy savings across Southern California. As the City of Downey is aware, TEN's Public Agency Program provides a full range of no-cost energy efficiency services specifically tailored for public agencies. The full, turnkey service offered includes:

- Project start-to-finish management support
- Technical Assistance
- Access to financing
- Competitively bid specialty contractors
- Transparent pricing
- Assistance with utility rebate processing

The City has been engaged with TEN as of June 2014 and is actively utilizing their auditing services for a comprehensive City Streetlight Efficiency Project, which proposes to retrofit over 1,600 light fixtures. Moving forward, the City shall continue to work closely with TEN as it continues to identify and install energy efficiency projects. The next steps involve doing energy audits at six parks throughout the City. More information about The Energy Network can be found by visiting: action.theenergynetwork.com

Statewide Energy Efficiency Collaborative (SEEC)

The Statewide Energy Efficiency Collaborative (SEEC) is a not-for-profit, virtual resource center supported by the four California IOUs, the Local Government Commission (LGC), the Institute for Local Government (ILG), and ICLEI-Local Governments for Sustainability. The SEEC provides technical training and other resources for local governments to improve energy efficiency, reduce costs, and reduce GHG emissions. More information on the SEEC program can be found here: <http://californiaseec.org/>

SCE Direct Install Program

The SCE Direct Install Program is an excellent way for small businesses to reduce energy and save money. This effortless program provides qualifying businesses with free energy-efficient products, free installation, and long-term savings. Available equipment retrofits include:

- Fluorescent Lighting
- Refrigeration — Gaskets, door closers, suction line insulation, and strip curtains
- LED Signs - Open and Exit signs
- Window Film
- Occupancy Sensors
- Vending Misers
- Programmable Thermostats

Through the Direct Install program the City was able to achieve free lighting retrofits at thirteen facilities. More information on the SCE Direct Install program can be found here:

https://www.sce.com/NR/rdonlyres/DA486A27-66A0-4295-B84B-D1A766E83259/0/DI_FactSheet.pdf

3 City of Downey Energy Use

3.1 City Departments

The City's energy expenditures are broken up into two funds, General and Enterprise. The Enterprise Fund is used for services provided to the public. These include services such as water and sewer utilities. The General Fund is used to account for general operations and activities.

3.2 Electric Energy Usage

Summary

Energy use and cost data presented in this section were provided by the City of Downey in spreadsheet format. The City receives this information from SCE and SCG upon request, as there is currently no process for automatically tracking and compiling energy billing data. As part of this EAP, it is recommended that the City implement an EEIMS (Enterprise Energy Information Management System) to track energy consumption throughout city facilities.

Energy usage shown in all tables and figures is representative of Fiscal Year 2012-2013.

Electricity Use

The following table shows the breakdown of electrical energy usage and cost, sorted by highest cost accounts first. The well pumping sites and streetlights were each combined in to a single line item. Additionally, service accounts that were not categorized on the submitted data sheets were grouped together as a single line item.

Table 3.1: Summary of City of Downey Electrical Consumption and Annual Revenue

Facility	Peak Demand (kW)	Annual Energy (kWh)	Annual Revenue
WELL SITES	2066.64	8,098,266	\$ 884,465.34
STREETLIGHTS	0	4,022,989	\$ 836,119.35
POLICE	163	834,180	\$ 98,403.70
BARBARA R ILEY CENTER	209	648,305	\$ 91,038.22
CITY HALL	218.4	561,679	\$ 86,163.33
UNCATEGORIZED	167	545,476	\$ 95,900.79
CIVIC THEATER	341.12	476,243	\$ 101,180.29
RIO HONDO GOLF COURSE	224.52	420,954	\$ 75,724.65
SEAACA	115	386,519	\$ 55,102.40
LIBRARY	120	336,971	\$ 56,934.04
FIRESTATION # 1	75	315,232	\$ 40,404.50
DISCOVERY SPORTS CTR	180	227,358	\$ 15,491.65
COLUMBIA SPACE CTR	134	199,772	\$ 48,538.37
INDEPENDENCE PARK	128	179,148	\$ 13,490.36
WILDERNESS PARK	45	169,222	\$ 22,258.39
RIO SAN GABRIEL PARK	185	154,591	\$ 10,991.17
PARKING STRUCTURE	27	144,270	\$ 19,109.60
MAINTENANCE YARD	40	83,055	\$ 16,338.44
FURMAN PARK	43	70,292	\$ 9,101.57
GOLDEN PARK	35	68,462	\$ 14,621.17
FIRESTATION # 3	27	67,505	\$ 12,065.55
TRANSIT CENTER	22	53,377	\$ 8,567.09
APOLLO/HISTORICAL BLDG	22	51,690	\$ 10,300.29
FIRESTATION # 2	17	38,646	\$ 6,741.00
DOWNEY ADULT SCHOOL	32	38,570	\$ 2,675.23
DENNIS THE MENACE PK	5	10,637	\$ 1,899.02
PW WATER YARD	6	5,177	\$ 1,078.68
BROOKSHIRE PARK	1	3,099	\$ 774.23
MAIN POST OFFICE	0	68	\$ 330.18
TEMPLE PARK	0	66	\$ 329.10
TOTALS	4648.68	18,211,819	\$ 2,636,137.70

This data is further compiled into an electrical energy-use breakdown of the city by usage type. The main usage categories included Water Distribution, Street lighting, Public Facilities, Parks, Transportation, and Miscellaneous. The data, presented below, clearly shows that water distribution, street lighting, and public facilities dominate the city’s overall energy consumption.

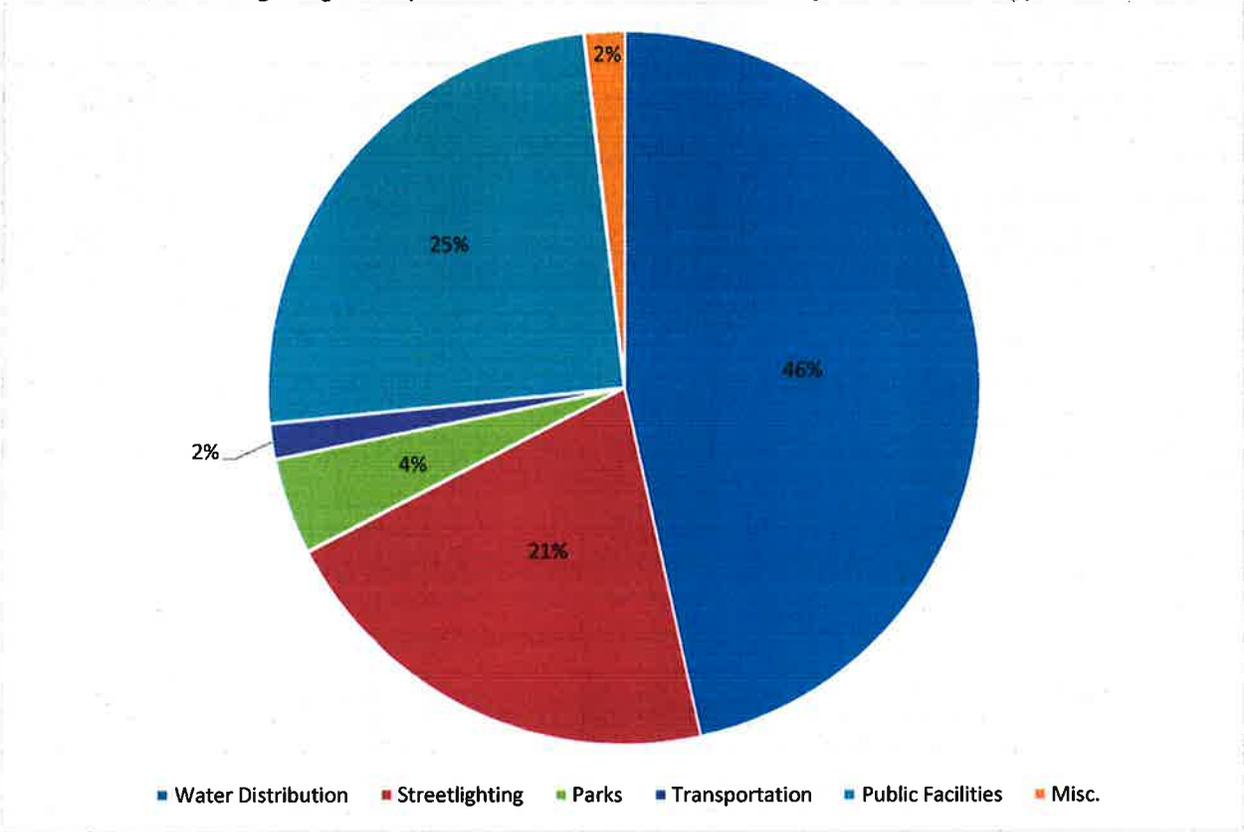


Figure 3.1: Electrical energy-use breakdown by usage type

3.3 Natural Gas Energy Usage

Natural Gas Use

The following table presents the natural gas data for all accounts in the City. The sites are listed from highest gas consumption to lowest. Annual revenue data was not provided.

Table 3.2: Summary of City of Downey Natural Gas Consumption

Facility	Annual Gas Consumption (Therms)
LIBRARY	13,675
POLICE	13,479
CITY HALL	9,697
CIVIC THEATER	7,368
SEAACA	4,348
COLUMBIA SPACE CTR	3,609
BARBARA R ILEY CENTER	3,534
FIRESTATION #1	2,821
GOLDEN PARK	698
APOLLO PARK	466
FURMAN PARK	340
TRANSIT CENTER	246
PW WATER YARD	164
MAINTENANCE YARD	154
TOTAL	60,599

3.4 Highest Energy Users

The following graphs show the highest energy using facilities in the City (in order from highest to lowest). Figure 3.2 shows the highest electric-consuming facilities, and Figure 3.3 shows the highest gas-consuming facilities. Figure 3.4 shows the energy consumption of all well sites, and Figure 3.5 shows the total street lighting energy consumption. This EAP attempts to focus the energy conservation efforts in those facilities with highest energy use.

Highest Energy Using Buildings

The following graphs shows the ten highest electrical energy and natural gas-consuming facilities in the City's building stock. The facilities included in this section do not include street lighting or pumping accounts.

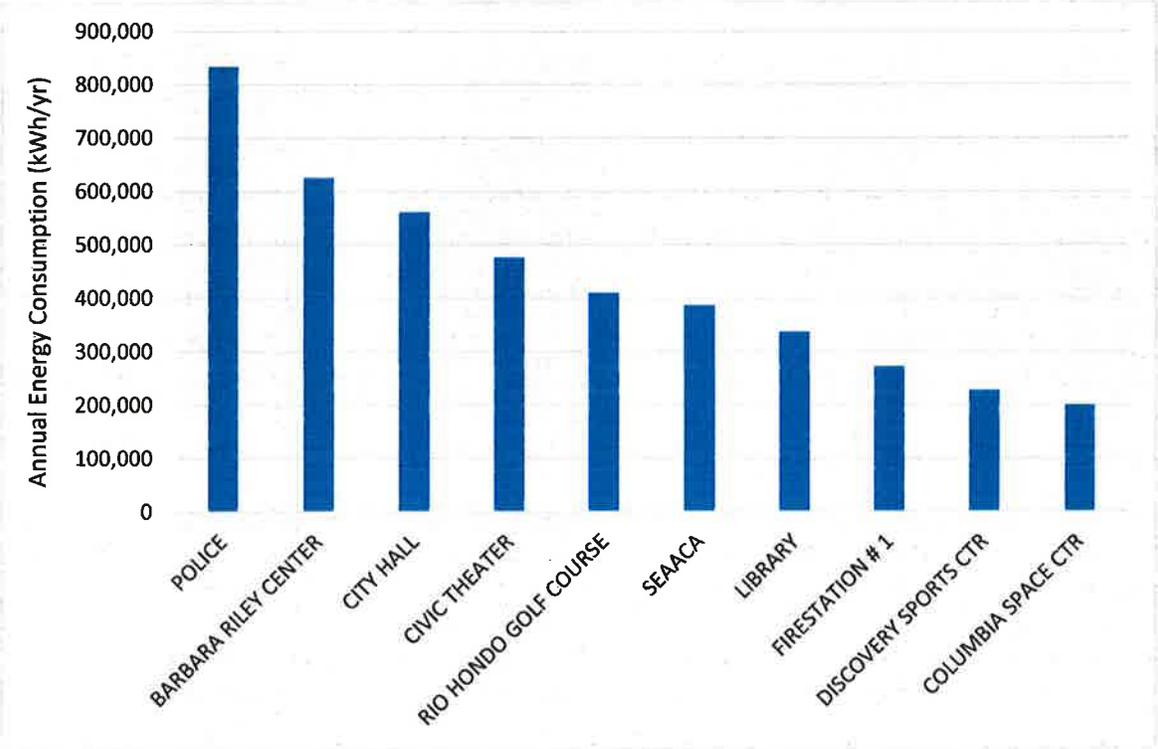


Figure 3.2: Highest Electrical Energy-Using Buildings – Top 10

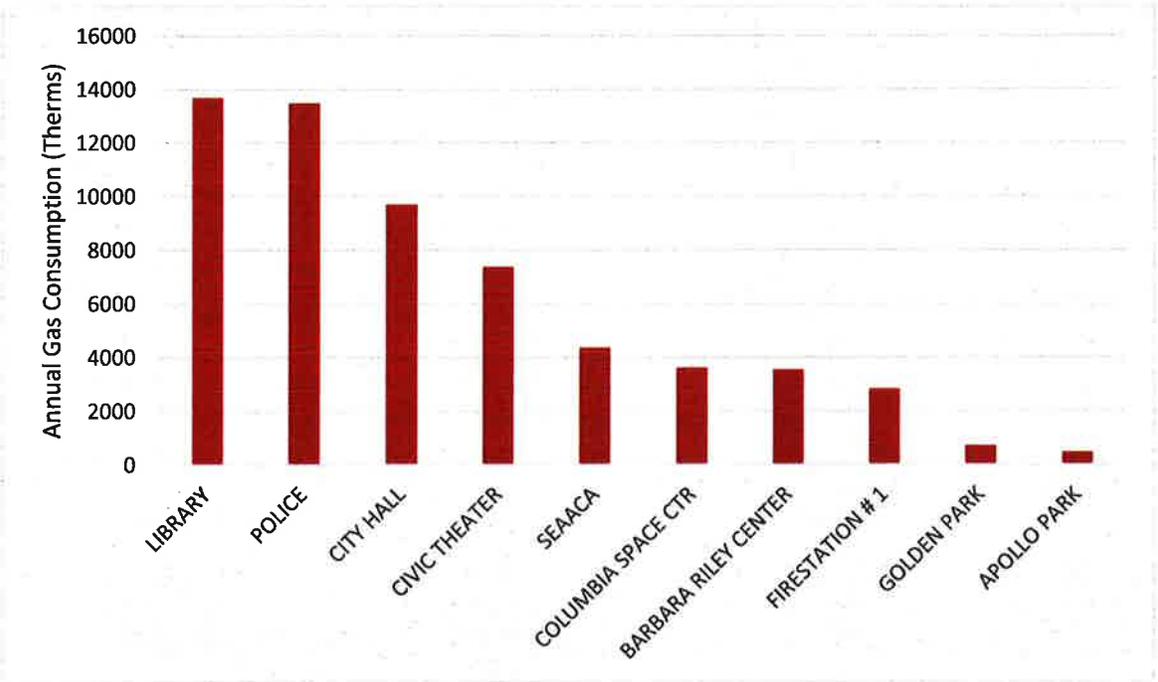


Figure 3.3: Highest Natural Gas-Using Buildings – Top 10

Other Accounts (Pumps, Street Lights, etc.)

The following graphs show the energy consumption of other primary energy-using accounts within the city. The city’s primary energy-consumers are well pumps and street lights, which are both presented below.

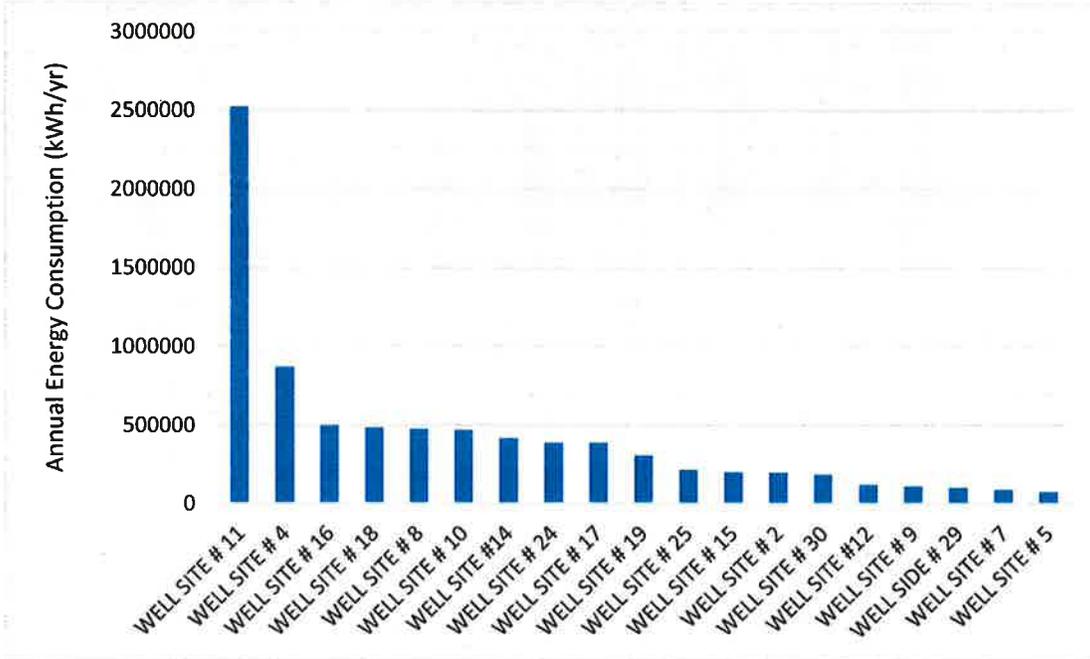


Figure 3.4: City Well Sites Annual Energy Consumption Ordered Highest to Lowest

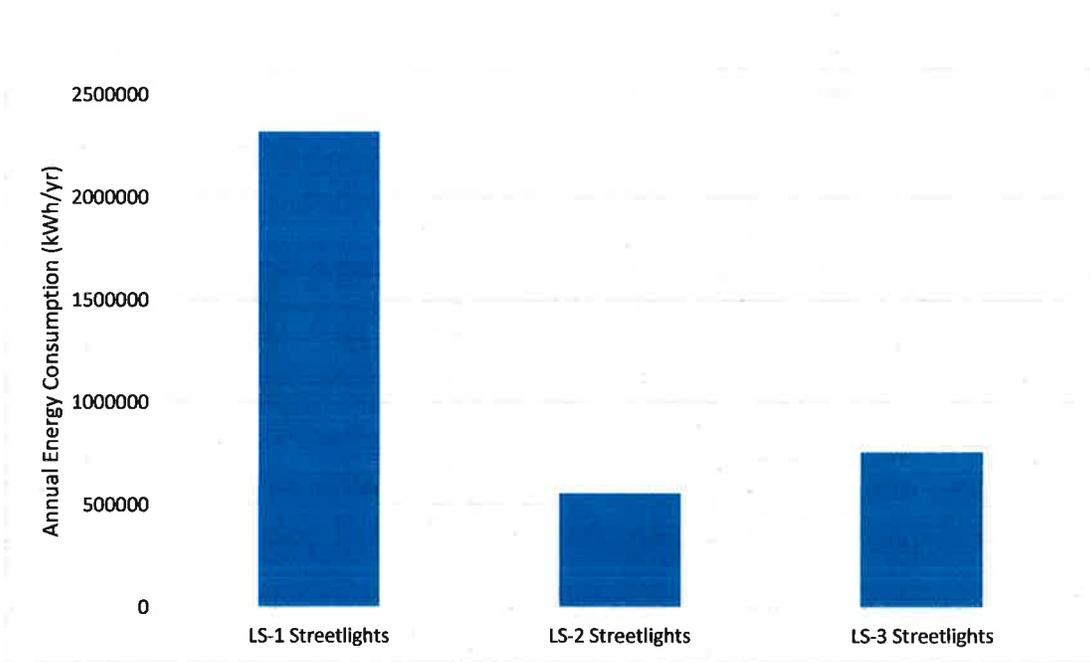


Figure 3.5: City-Wide Streetlight Energy Consumption

Energy Use Index

A building's Energy Use Index (EUI) is calculated by taking the total energy consumed in one year (measured in kWh or therms) and dividing it by the total floor space of the building (measured in Sq.Ft.). The EUI is a useful reference, especially when tracking a building's energy performance over time, or comparing one building (of similar type) to another. Figure 3.6 ranks the city facilities from highest to lowest electrical EUI (kWh/Sq. Ft.) while Figure 3.7 ranks the buildings in order of highest to lowest natural gas EUI (Therms/Sq. Ft.).

A building's EUI will vary depending on various factors including occupancy type, operational schedule, building age, building construction, equipment efficiency, weather, etc. These factors must be taken into consideration when comparing one City building to another. The EUI may also be compared to other benchmarks formulated from other sources (see links below):

- U.S. Energy Information Administration: <http://www.eia.gov/consumption/commercial/index.cfm>
- CalArch – California Building Energy Reference Tool: <http://poet.lbl.gov/cal-arch/compare.html>

Note that the order of facilities with respect to EUI in the following figures is not the same as the total energy consumption graphs in Figure 3.2 and Figure 3.3. This indicates that some of the large energy-consuming buildings are not necessarily the least efficient on a per square foot basis.

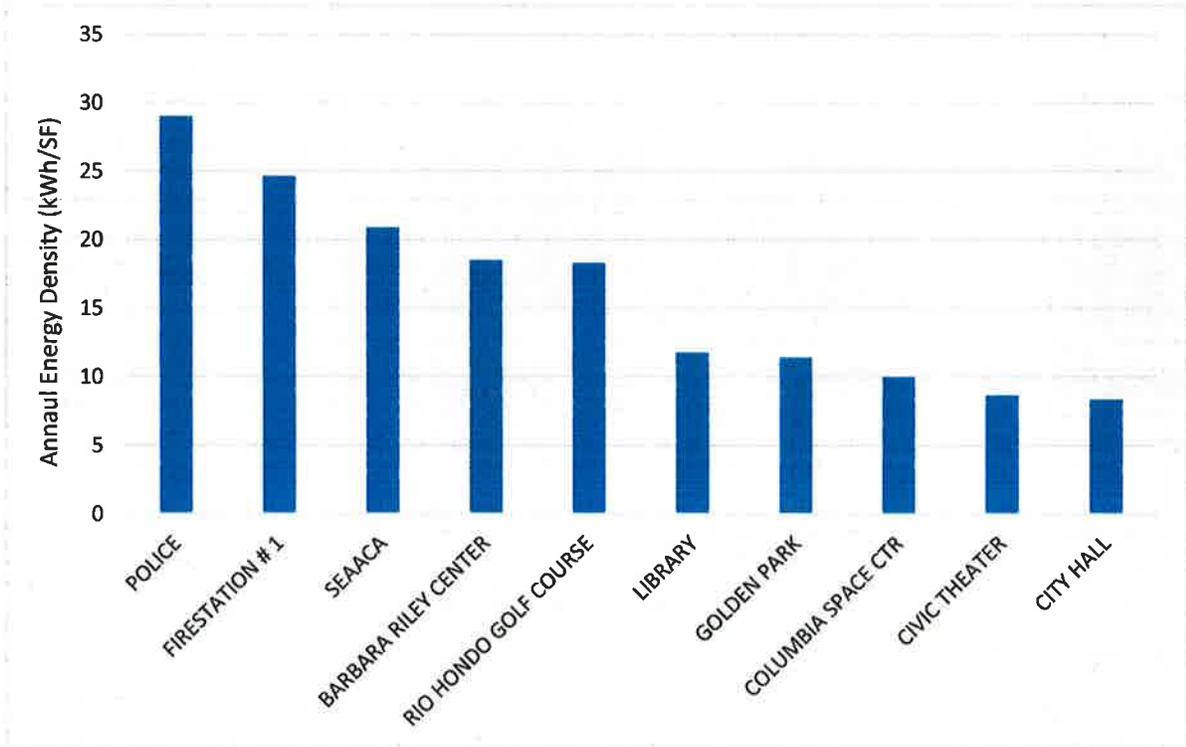


Figure 3.6: Highest Electrical Energy-Using Buildings per Square Foot – Top 10

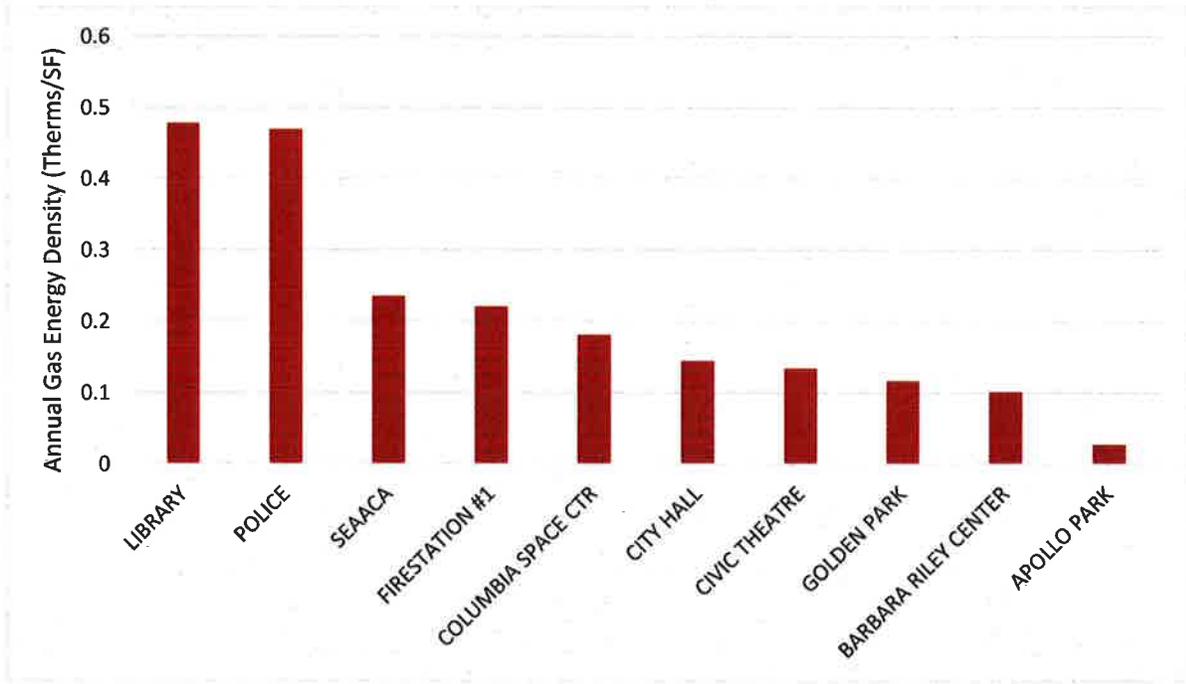


Figure 3.7: Highest Natural Gas-Using Buildings per Square Foot – Top 10

3.5 Selected Project Sites

Based on the energy consumption information above, certain sites were selected for ASHRAE Level 1 audits to assess the energy savings potential at these buildings. Project sites were divided between general usage buildings, public assembly buildings, and parks, and the top energy-users from those categories were selected for audit. The goal of this approach was to focus efforts on the sites that would likely provide the greatest savings, while also covering a wide breadth of building types within the city.

Based on this method of selection, the City elected to conduct ASHRAE Level 1 audits at the following sites:

- Barbara Riley Center
- City Hall
- Civic Theatre
- Discovery Sports Complex
- Fire Department #1
- Library
- Maintenance Yard
- Parking Structure
- Police Department
- Rio Hondo Golf Course
- Rio San Gabriel Park
- Space Center
- Transit Center
- Wilderness Park

Although not every building in the city was audited, the sites that were selected make up a vast majority of the city building stock's overall energy consumption (not including street lights or pumps). The graphs below show the percent of electrical and gas consumption that the investigated sites represent.

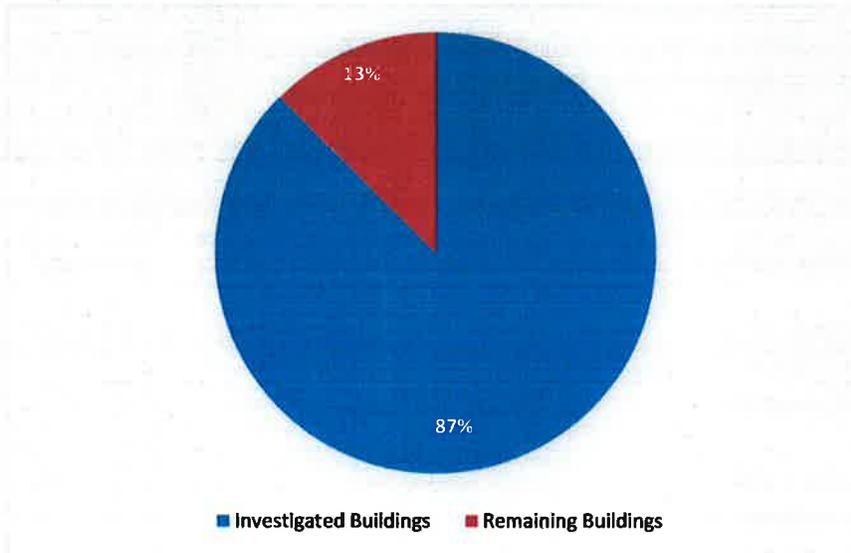


Figure 3.8: Electrical energy consumption at investigated sites compared to overall consumption of entire city stock

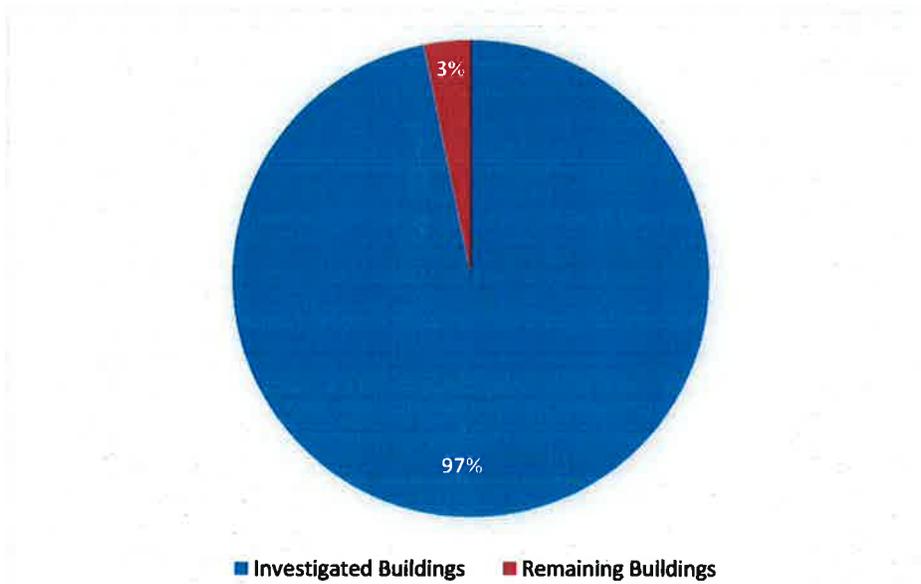


Figure 3.9: Natural gas consumption at investigated sites compared to overall consumption of entire city stock

The energy savings and distributed energy generation projects identified at the selected project sites are summarized in Section 5, City of Downey Action Steps, below.

3.6 Current Energy Programs/Policies

AB 32 – Global Warming Solutions Act

The Global Warming Solutions Act of 2006, or Assembly Bill (AB) 32, is a California State Law that fights climate change by establishing a comprehensive program to reduce greenhouse gas emissions from all sources throughout the state. AB 32 requires the California Air Resources Board (CARB or ARB) to develop regulations and market mechanisms to reduce California's greenhouse gas emissions to 1990 levels by 2020, with mandatory caps beginning in 2012 for significant emissions sources. The bill provides the Governor the ability to suspend the emissions caps for up to one year in the case of an emergency or significant economic harm.

In 2008, the Assembly Bill 32 Scoping Plan was released by CARB which describes measures to implement the requirements set by AB-32. The "Scoping Plan" cites local government action as an integral to meeting the State's energy and GHG goals. In addition to partnering with local governments to encourage the establishment of regional emission reduction goals and community regulations, the Scoping Plan uses various mechanisms to reduce emissions state-wide, including incentives, direct regulation, and compliance mechanisms.

Energy Efficiency and Conservation Block Grant (EECBG) Program

The Energy Efficiency and Conservation Block Grant (EECBG) Program, funded for the first time by the American Recovery and Reinvestment Act (Recovery Act) of 2009, represents a Presidential priority to deploy the cheapest, cleanest, and most reliable energy technologies available - energy efficiency and conservation - across the country. It is intended to assist U.S. cities, counties, states, territories, and Indian tribes to develop, promote, implement, and manage energy efficiency and conservation projects and programs designed to do the following:

- Reduce fossil fuel emissions;
- Reduce the total energy use of the eligible entities;
- Improve energy efficiency in the transportation, building, and other appropriate sectors
- Create and retain jobs. □

Through formula and competitive grants, the Program empowers local communities to make strategic investments to meet the nation's long-term goals for energy independence and leadership on climate change. Grants can be used for energy efficiency and conservation programs and projects communitywide, as well as renewable energy installations on government buildings. Activities eligible for use of funds include the following:

- Development of an energy efficiency and conservation strategy;
- Building energy audits and retrofits, including weatherization;
- Financial incentive programs for energy efficiency such as energy savings performance □contracting, on-bill financing, and revolving loan funds;
- Transportation programs to conserve energy and support renewable fuel infrastructure;
- Building code development, implementation, and inspections;
- Installation of distributed energy technologies including combined heat and power and district heating and cooling systems;
- Material conservation programs including source reduction, recycling, and recycled content procurement programs;
- Reduction and capture of greenhouse gas emissions generated by landfills or similar

waste- related sources;

- Installation of energy efficient traffic signals and street lighting;
- Installation of renewable energy technologies on government buildings; and
- Any other appropriate activity that meets the purposes of the program and is approved by DOE.

Energy Action Plan

This Energy Action Plan (EAP) is intended to provide a roadmap that the City can follow to meet its long-term energy efficiency and sustainability goals. The EAP aims to identify quantifiable goals and provides various measures and policies that the City can implement to achieve.

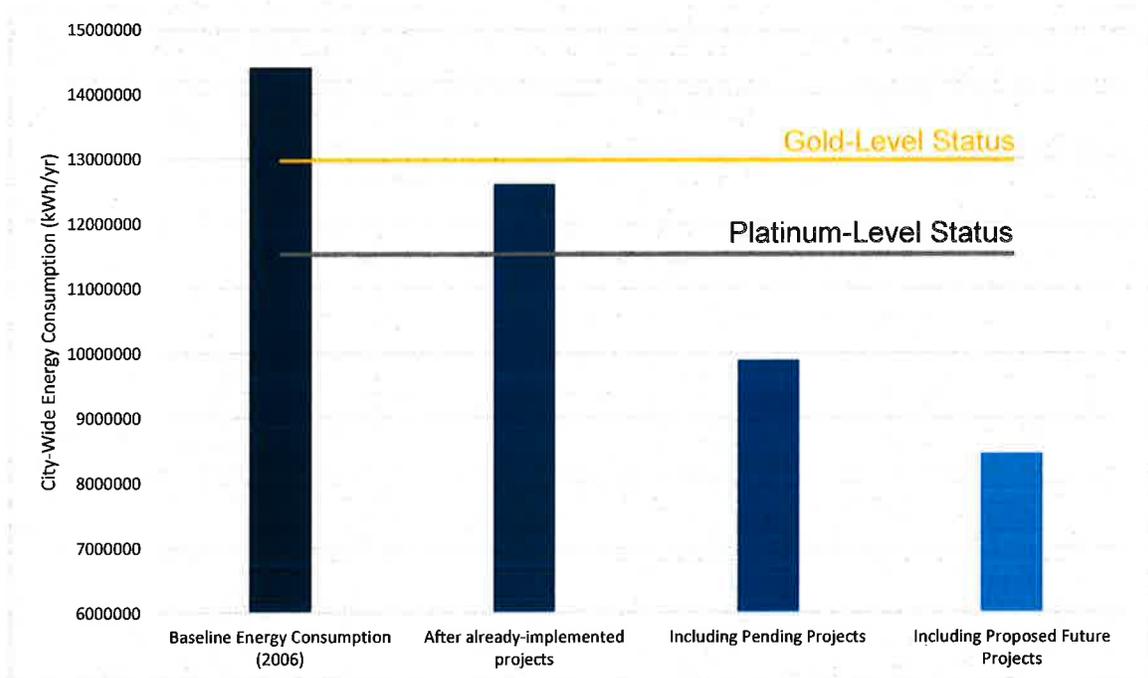
4 City of Downey Energy Reduction Goals

4.1 Municipal Energy Use Goals

A key component to this Energy Action Plan (EAP) is to establish a target energy reduction goal. Accordingly, this EAP has set a goal to reduce City of Downey’s existing municipal energy use by 15% prior year 2020. The savings goal was determined with reference to the Global Warming Solutions Act of 2006 (AB 32) which requires by California law a reduction of greenhouse gas emissions (GHG) to 1990 levels by 2020. As indicated in the AB 32 scoping plan, reducing greenhouse gas emissions to 1990 levels means cutting approximately 30% from business-as-usual emissions levels projected for 2020, or about 15% from today’s levels. It should be noted that 30% reduction in energy consumption does not equate to 30% reduction in overall GHG emissions.

Energy records indicate that in 2006, the City’s municipal facilities used a total of 14,404,611 kWh of electricity. These figures shall be used as the benchmark (or baseline) to track the performance of EAP related energy-saving goals.

Per the 15% savings goal established above, the target energy use for 2020 is 12,243,919 kWh for electricity. These are projected savings of approximately 2.2 million kWh for AB 32. Additionally, we determined the energy saving requirements to achieve Gold (10%: 1.4 million kWh savings) and Platinum (20%: 2.9 million kWh savings) levels within the Gateway Cities Partnership. See figures below.



4.2 Community Outreach Goals

Community-wide energy awareness and outreach programs are essential to achieve the City-wide energy reduction goals. The City has to lead by example before it asks its citizens for cooperation in achieving these goals. Leading by example may include ensuring that new City facilities are built to the highest energy performance and green building standards, providing education and training to the municipal users, changing operations and maintenance practices, and opportunities for use of renewable energy resources. The following outlines a few policies that can be implemented to help achieve the energy savings goal for City-wide energy use.

Community Outreach Groups

By leveraging Energy Partnership resources and other funding opportunities, the City can organize outreach groups consisting of representatives from City, SCE, and SCG. Outreach staff will be responsible for developing energy awareness materials and programs that educate the community about energy use in a simple manner. Residents should be aware of their impact on the environment and alternative energy efficiency options to reduce energy consumption. All the material and programs should be explained in a simple language and take into account seasonal changes. City may partner with the local utilities and organizations to educate the community by various media types including newspapers, radio, and television. Also, information can be distributed via utility bill inserts, community/HOA meetings, and special events.

Energy Awareness

The City and related partners should work together to share information with the public. Community residents should have easy access to information on what to do to make their homes or businesses more energy efficient and whom to contact for support. This information can be made publicly available through the dedicated “green” web-page on the City’s web site. For example, various links to useful resources can be posted on this same site. These can include the following:

- Energy Upgrade California – Resource for projects, rebates, and State-certified energy efficiency contractors all in one place. (<https://energyupgradeca.org/>)
- Electric Vehicle Readiness - Southern California Edison's website with information about purchasing a plug-in electric vehicle. (<http://www.sce.com/info/electric-car/>)
- Flex Your Power - Get quick tips for easy things you can do to save energy, and find rebates for appliances, lighting, heating and cooling, energy audits, and more. (<http://www.fypower.org/>)
- Cool California - Find rebates and incentive programs for making the home or business more energy efficient. (<http://www.coolcalifornia.org/funding-wizard-home>)
- Energy Kids On-Line - Fun games and activities for kids and teachers, to help educate kids about the importance of energy efficiency. (<http://www.eia.gov/kids/index.cfm>)
- Database for Energy Efficient Resources (DEER) - Provides estimates for the energy-savings potential of various energy-efficient technologies. (<http://www.deeresources.com/>)

As an option, the City can provide a summary of municipal facility energy use including recent energy action steps taken to reduce energy. The City is in the process of compiling an

Enterprise Energy Management Information System (EEMIS) that can generate various energy reports and track energy data. While this information may be too complex for an average user to understand, a concise easy-to-read summary of annual usage will be helpful. If the City leads by example, it will encourage citizens to reduce their own energy consumption and respective impact on the environment.

5 City of Downey Action Steps

5.1 Municipal Facility Energy Efficiency Projects

Recently Implemented Projects

Direct Install Interior Lighting Retrofits

During the development of this Energy Action Plan, the City moved forward with interior lighting and lighting controls retrofits through SCE’s Direct Install program. This program provides free equipment and installation for select interior lighting retrofits and control upgrades. SCE’s consultant, FCI, implemented these lighting upgrades at 13 sites within the City. The retrofits included:

- Replacing T12 fluorescent fixtures with 28W T8 fixtures
- Replacing 32W T8 fluorescent lamps with 28W T8 lamps
- De-lamping fluorescent fixtures and installing reflector kits
- Replacing incandescent, CFL, and halogen flood lights with LEDs
- Installing wall-mounted occupancy sensors

FCI estimated the demand and energy savings associated with their installed retrofits. The savings are presented in the following table.

Table 5.1: Summary of Direct Install Lighting Savings

Serv Acct Name	Rate	FACILITY NAME	Serv Acct Address	Peak Demand Savings (kW)	Annual Energy Savings (KWh/yr)
Downey, City of	GS-2	CITY HALL	11111 BROOKSHIRE AVE	5.56	23,245
Downey, City of	TOU-GS1A	DENNIS THE MENACE PK	9125 ARRINGTON AVE	0.12	515
Downey, City of	TOU-GS2B	DOWNEY POLICE DEPARTMENT	10911 BROOKSHIRE AVE	6.89	28,599
Downey, City of	TOU-GS2B	FIRESTATION # 3	9900 PARAMOUNT BLVD	1.3	5,526
Downey, City of	TOU-GS2B	FIRESTATION # 1	12222 PARAMOUNT BLVD	3.9	16,436
Downey, City of	TOU-GS1A	FIRESTATION # 2	9556 IMPERIAL HWY	1.48	6,404
Downey, City of	TOU-GS1A	FIRESTATION #4	9349 FLORENCE AVE	1.42	6,018
Downey, City of	TOU-GS1A	FURMAN PARK	10419 RIVES AVE	2.48	11,052
Downey, City of	TOU-GS2B	LIBRARY	8494 3RD ST	8.2	34,335
Downey, City of	TOU-GS2A	RIO HONDO GOLF COURSE	10627 OLD RIVER SCHOOL RD UNIT B	4.46	19,032
Downey, City of	TOU-GS2B	RIO HONDO PRO SHOP	10627 OLD RIVER SCHOOL RD UNIT D	1.93	8,029
Downey, City of	GS-1	RIO SAN GABRIEL PARK	9612 ARDINE ST	0.22	968
Downey, City of	TOU-GS2A	COLUMBIA SPACE CENTER	12400 CLARK AVE	8.97	16338
Downey, City of	GS-2/GS1	TRANSIT CENTER	8150 NANCE AVE	0.11	456
				47.04	176,953

Pending Projects in the Pipeline

Well and Booster Pump Efficiency Upgrades □

The City has begun preliminary steps to improve the energy efficiency of their city-wide water distribution system. The City is participating in SCE's Water Infrastructure and System Efficiency (WISE) program. Under this program, SCE's 3rd party consultant, Lincus Incorporated, conducted an energy efficiency study of the City's well and booster pumping stations. Lincus' analysis identified three potential energy efficiency projects to reduce the energy consumption of the city's water distribution:

- System optimization of well and booster pumps
- Pump efficiency improvements

The system optimization measures propose to install variable frequency drives (VFDs) on six well pumps and three booster pumps, remove the discharge valves, and implement controls to modulate the pump flow using the VFD rather than controlling the flow through on/off cycling or discharge valves. These measures also propose to increase water storage so that pump schedules can be optimized to reduce operation during peak demand periods.

SCE conducted pump tests on all of the city's wells and found that 10 well pumps were operating inefficiently and could be significantly improved through a pump overhaul. These pump efficiency improvements will entail removing the pump from the ground and inspecting the condition of the pump bowls, bushings, shafts, and motor. These parts will be refurbished to improve efficiency or, if the pumping conditions at the well have changed, will be modified to most efficiently meet the current pumping conditions.

Lincus provided the following savings estimates for their proposed pump system optimization and overhaul projects.

Table 5.2: Well and Booster Pump System Optimization Energy Savings

Pumping Plant Name	Pump Location	Motor HP	Energy Savings (kWh/yr)	Measure Cost (\$)
Well #2	7932 Telegraph Rd	100	17,488	\$21,500
Well #8	7442 Lubec Ave	100	82,520	\$21,500
Well #10	10001 Haledon Ave	150	16,288	\$32,250
Well #14	10505 La Reina Ave	100	10,939	\$21,500
Well #17	7237 Pellet St	75	10,638	\$16,125
Well #24	9643 Washburn Rd	100	18,746	\$21,500
Booster 2-A	7932 Telegraph Rd	30	78,850	\$6,450
Booster 2-B	7932 Telegraph Rd	60	52,146	\$12,900
Booster 8-B	7442 Lubec Ave	30	40,262	\$6,450
TOTALS		745	327,877	\$160,175

Table 5.3: Well and Booster Pump Overhaul Savings

Pumping Plant Name	Pump Location	Motor HP	Energy Savings (kWh/yr)	Measure Cost (\$)
Well #2	7932 Telegraph Rd	100	101,110	\$35,000
Well #5	9034 Stokes Ave	75	1,953	\$26,250
Well #7	7440 Suva St	100	5,894	\$35,000
Well #11	11051 Brookshire Ave	450	794,209	\$157,500
Well #14	10505 La Reina Ave	100	28,201	\$35,000
Well #15	10628 Casanes	125	1,093	\$43,750
Well #17	7237 Pellet St	75	27,041	\$26,250
Well #18	7538 Burns Ave	150	57,002	\$52,500
Well #23	8201 Stewart and Gray	100	2,480	\$35,000
Well #24	9643 Washburn Rd	100	112,857	\$35,000
Booster 8-B	7442 Lubec Ave	30	17,554	\$10,500
TOTALS		1,405	1,149,394	\$491,750

SCADA System Upgrade

The City's water distribution systems are currently controlled by an outdated Supervisory Control and Data Acquisition (SCADA) system. The existing system is only capable of turning well pumps on and off in order to maintain a single pressure set point, which is measured at the city's Maintenance Yard. The current pressure set point is 65 psig. Pressures throughout the city can differ by as much as 20 psig from this set point due to the location of wells and changes in elevation throughout the city. As a result, more wells are turned on than should be required in order to maintain proper pressure throughout the city. The new SCADA system will be capable of controlling wells based on multiple pressure set points. New pressure sensors will be added (one in the south-end of the city and one in the north). The water distribution piping will be divided into north and south zones as well by installing bi-directional pressure valves across the midline of the city. The new SCADA system will then control the north and south zones independently so that each zone's average pressure is 65 psig. As a result, fewer well pumps should be required since pumps on the north end of the city will not be staging on in order to supply water demand in the south end.

SCE Field Engineering conducted an analysis of the potential demand and energy savings associated with this SCADA system upgrade. These savings, which have already been approved through SCE's Customized Incentive Program (CIP), are presented below.

Table 5.4: SCADA System Upgrade Savings Summary

Project	Pump Location	Peak Demand Savings (kW)	Energy Savings (kWh/yr)	Measure Cost (\$)
SCADA System Upgrade	City-Wide Water Distribution	71	338,709	\$250,000

LS-2 and LS-3 Streetlight LED Conversions

As recommended during the development of this Energy Action Plan, the City has partnered with The Energy Network (TEN) to develop a street lighting upgrade plan. Based on TEN's analysis, there is significant savings potential in upgrading the existing LS-2 and LS-3 streetlights from high intensity discharge (HID) and incandescent fixtures to lower wattage LEDs. The LS-1 streetlights were not considered for retrofit, because these streetlights are currently owned by SCE.

Based on TEN's audit, the city's existing LS-2 and LS-3 streetlights include:

- High Pressure Sodium (HPS) fixtures ranging from 70W to 400W
- 250W Metal Halide (MH) fixtures
- Mercury Vapor (MV) fixtures ranging from 175W to 700W
- Incandescent 448W fixtures

TEN's proposal will replace the existing HID and incandescent fixtures with lower wattage LED fixtures which range from 27W to 214W. In total, 488 LS-2 fixtures and 1,154 LS-3 fixtures will be replaced with LEDs.

There are numerous LED manufacturers with varying recommended fixture wattages and implementation costs. TEN's analysis uses Leotek fixtures because the City has already installed a few test Leotek fixtures with favorable results. The proposed energy savings and costs for upgrading the streetlights to LED is presented in the table below.

Table 5.5: LED Street Light Conversion Energy Savings Summary

Project	Location	Peak Demand Savings (kW)	Energy Savings (kWh/yr)	Measure Cost (\$)
Retrofit LS-2 and LS-3 Street Lights with LED Luminaires	City-Wide	0	901,613	\$656,342

Projects to be Considered for Future Implementation

The City is in the process of implementing measures that will save a significant amount of electrical energy in their pumping and street lighting systems. However, there are opportunities in other city-owned buildings to save electrical energy, and also to capture natural gas energy savings. This EAP outlines various energy conservation projects to consider for future implementation at the top ranking energy using facilities. As was outlined in Section 2, the top ranking facilities include the following:

- . Police Station
- . Barbara Riley Senior Center
- . City Hall
- . Civic Theater
- . Rio Hondo Golf Course
- . Library
- . Fire Station #1
- . Discovery Sports Center
- . Columbia Space Center
- . Wilderness Park
- . Rio San Gabriel Park
- . Transit Center
- . Maintenance Yard

ASHRAE Level 1 audits were conducted at each of these facilities to identify potential cost-effective energy efficiency, demand response, and distributed generation measures. Numerous potential energy projects were identified at each site. The following list of seven measures represents the top measures that showed the greatest savings potential across the most number of sites.

Note that while the projects presented herein are only analyzed for the largest City facilities, the City can also apply the same project concepts at other smaller facilities with similar potential.

Interior Lighting and Controls Retrofits □

Some project sites underwent interior lighting and controls retrofits through SCE’s direct install program. However, other sites were not selected to participate in this program, either because the existing lighting was replaced too recently, or the light fixture types were not covered under the program. The sites with the potential for energy savings through interior lighting and controls upgrades, but which were not included in the Direct Install program, include the Barbara Riley Senior Center and Maintenance Yard.

The proposed lighting retrofits and controls measures at these sites include:

- **Barbara Riley Senior Center:** Replacing 2x2 long compact fluorescent fixtures with 2x2 LED fixtures
- **Maintenance Yard:** Installing occupancy sensors to control the T8 fluorescent lighting in private offices.

The following table summarizes the calculated energy savings and costs associated with each of the proposed retrofits. Additional calculation details can be found in Appendix B – Savings Calculations.

Table 5.6: Savings summary for interior lighting and controls retrofits

Project Site	Annual Energy & Cost Savings				Financial Metrics			
	Peak Savings (kW)	Electricity Savings (kWh/yr)	Gas Savings (therms/yr)	Total Cost Savings	Measure Cost	Potential Incentive	Net Measure Cost	Simple Payback
Barbara Riley Senior Center	9.4	36,523	-	\$ 6,171	\$ 54,108	\$ 9,074	\$ 45,034	7.3
Maintenance Yard	-	4,198	-	\$ 495	\$ 2,250	\$ 336	\$ 1,914	3.9
Sub-Total	9.4	40,721	-	\$ 6,666	\$ 56,358	\$ 9,410	\$ 46,948	7.0

Replace HID Exterior Lighting with LED

Nine of the investigated sites within the city use high intensity discharge (HID) fixtures to provide exterior lighting. These fixtures primarily include pole-mounted parking lot fixtures and wall-mounted fixtures. The existing fixtures include both high pressure sodium (HPS) and Metal halide (MH), ranging from 50W to 400W.

To reduce the electricity consumption of exterior lighting, the City should replace the HID fixtures with more efficient LED fixtures. LEDs use significantly less power than HID fixtures, have longer useful lives, and provide better light distribution and quality. Unlike HID fixtures, LEDs start instantly, and can therefore use occupancy sensors to control their operation. Occupancy sensors are recommended on all fixtures except for the parking pole fixtures, which are over 20 feet tall.

The following table summarizes the project sites, projected energy savings, and costs for the proposed exterior lighting measures.

Table 5.7: Savings summary for exterior lighting retrofit

Project Site	Annual Energy & Cost Savings				Financial Metrics			
	Peak Savings (kW)	Electricity Savings (kWh/yr)	Gas Savings (therms/yr)	Total Cost Savings	Measure Cost	Potential Incentive	Net Measure Cost	Simple Payback
City Hall	-	16,500	-	\$ 1,947	\$ 30,637	\$ 3,465	\$ 27,172	14.0
Maintenance Yard	-	4,198	-	\$ 495	\$ 7,554	\$ 336	\$ 7,218	14.6
Barbara J. Riley	-	16,580	-	\$ 2,801	\$ 19,157	\$ 3,482	\$ 15,675	5.6
Golf Course	-	24,080	-	\$ 3,760	\$ 47,514	\$ 1,926	\$ 45,588	12.1
Library	-	2,845	-	\$ 481	\$ 25,755	\$ 427	\$ 25,329	52.7
Theatre	-	55,000	-	\$ 6,490	\$ 78,302	\$ 11,550	\$ 66,752	10.3
Wilderness Park	-	10,827	-	\$ 1,278	\$ 47,873	\$ 866	\$ 47,007	36.8
Transit Center	-	13,193	-	\$ 1,557	\$ 32,323	\$ 1,979	\$ 30,344	19.5
Rio San Gabriel Park	-	13,285	-	\$ 1,568	\$ 21,460	\$ 1,063	\$ 20,398	13.0
Sub-Total	-	156,508	-	\$ 20,377	\$ 310,576	\$ 25,094	\$ 285,482	14.0

Use Cool Roofing Material when Replacing Rooftops □

Six of the investigated sites within the city have rooftops constructed of tar and gravel. These roofs have poor thermal qualities, in that they absorb a significant amount of the sun’s radiation and reflect very little energy. As a result, buildings gain a significant amount of heat from the roof, causing additional load on the cooling systems.

Cool roofing products are made of highly reflective and emissive materials that can remain approximately 50 to 60°F (28-33°C) cooler than traditional materials during peak summer weather. Building owners and roofing contractors have used these types of cool roofing products for more than 20 years.

Installing cool roofs saves energy in areas where cooling loads outweigh heating loads, as is the case in Downey. However, replacing the entire roof in order to install a cool roof is not financially feasible as a stand-alone project. Therefore, the City should only consider installing a new cool roof once the existing rooftop is ready to be replaced. Alternatively, for rooftops that still have a significant amount of remaining useful life, spray-on cool roof material provides a cheaper option for improving the roof’s thermal qualities without replacing the entire roof.

The following table summarizes the project sites, projected energy savings, and costs for the proposed cool roofing measures.

Table 5.8: Savings summary for cool roof retrofit

Project Site	Annual Energy & Cost Savings				Financial Metrics			
	Peak Savings (kW)	Electricity Savings (kWh/yr)	Gas Savings (therms/yr)	Total Cost Savings	Measure Cost	Potential Incentive	Net Measure Cost	Simple Payback
Police Dept.	22.0	42,550.0	-	\$ 5,021	\$ 36,875	\$ -	\$ 36,875	7.3
City Hall	11.0	27,500.0	-	\$ 3,245	\$ 24,832	\$ -	\$ 24,832	7.7
Library	9.0	26,490.0	-	\$ 4,476	\$ 41,300	\$ -	\$ 41,300	9.2
Barbara J. Riley	15.0	49,000.0	-	\$ 8,279	\$ 56,198	\$ -	\$ 56,198	6.8
Civic Theatre	13.0	21,000.0	-	\$ 2,478	\$ 36,875	\$ -	\$ 36,875	14.9
Fire Station 1	2.0	19,050.0	-	\$ 762	\$ 17,700	\$ -	\$ 17,700	23.2
Sub-Total	72.0	185,590	-	\$ 24,261	\$ 213,779	\$ -	\$ 213,779	8.8

Replace Aging Packaged HVAC Equipment with Energy Efficient Units

Seven of the investigated sites within the city have packaged HVAC equipment that is near or beyond its estimated useful life (EUL). The EUL represents the average service life of a unit. Units that are beyond their EUL have a higher chance of failure, and are presumed to be ready for replacement in the near future.

Rooftop equipment at these project sites includes gas/electric packaged units and packaged heat pumps. According to the City’s HVAC inventory, these units range in vintage from 1983 to 1998, and range in capacity from 4 tons to 13.5 tons. The average efficiency (expressed in energy efficiency ratio [EER]) of the existing units is 8.9 EER. New packaged HVAC equipment can achieve efficiencies of 13 EER or greater. The savings for this measure are calculated based on this increased cooling efficiency. These savings estimates are conservative as they do not account for improved part-load control or improved air-side economizer performance, which the new HVAC units should provide. There are no calculated natural gas savings for this proposed project because the average furnace efficiency of the existing units is 81%, which is consistent with the efficiency of today’s models.

The following table summarizes the project sites, projected energy savings, and costs for the proposed HVAC replacements.

Table 5.9: Savings summary for HVAC unit replacements

Project Site	Annual Energy & Cost Savings				Financial Metrics			
	Peak Savings (kW)	Electricity Savings (kWh/yr)	Gas Savings (therms/yr)	Total Cost Savings	Measure Cost	Potential Incentive	Net Measure Cost	Simple Payback
Library	16.1	39,262.9	400.0	\$ 7,034	\$ 162,379	\$ -	\$ 162,379	23.1
Barbara J. Riley	57.8	97,689.4	-	\$ 16,505	\$ 143,205	\$ -	\$ 143,205	8.7
Police Dept.	9.0	11,600.0	-	\$ 1,369	\$ 26,180	\$ -	\$ 26,180	19.1
Fire Station 1	8.7	11,566.0	-	\$ 463	\$ 24,364	\$ -	\$ 24,364	52.7
Theatre	44.0	57,800.0	400.0	\$ 7,220	\$ 106,284	\$ -	\$ 106,284	14.7
Maintenance Yard	0.2	6,918.8	-	\$ 816	\$ 8,372	\$ -	\$ 8,372	10.3
Transit Center	0.1	9,061.6	-	\$ 1,069	\$ 12,730	\$ -	\$ 12,730	11.9
Sub-Total	135.9	233,899	800	\$ 34,477	\$ 483,513	\$ -	\$ 483,513	14.0

Tie in Sites to Central Building Automation System (BAS)

This measure proposes to install tie five of the investigated sites into the city’s existing centralized building automation system (BAS). The primary goal of the BAS installation is to save energy through improved control over the HVAC operations. The central BAS is located in City Hall, and serves numerous buildings in the Civic Center. However, many project sites are not integrated into this BAS network.

Two of the sites, the Library and Space Center, have stand-alone Climatec BAS systems that provide a limited range of scheduling and set point control. However, during the ASHRAE Level 1 audits, many areas in these buildings were found to be in cooling mode, even though the spaces were unoccupied. Site staff stated that the schedules and set points are not maintained closely because staff has to travel to the sites in order to make changes. As a result, savings could be achieved by integrating these sites in to the main city-wide BAS.

The three other sites included in this proposed retrofit, the Police Station, Fire Station #1, and Rio Hondo Golf Course, do not have any existing BAS. The HVAC at these sites are controlled by individual thermostats, which have limited programmable capabilities. These sites have even less control capabilities than the Library and Space Center, so significant savings should be achievable by tying these sites into the main BAS.

This measure is expected to save energy by improving the scheduling of HVAC equipment, improving fan speed control, and expanding economizer functionality. Additional savings opportunities may be identified through a more in-depth study of the current controls and proposed BAS functionalities.

The following table summarizes the project sites, projected energy savings, and costs for the proposed BAS tie-in projects.

Table 5.10: Savings summary for tying in existing HVAC controls to central BAS

Project Site	Annual Energy & Cost Savings				Financial Metrics			
	Peak Savings (kW)	Electricity Savings (kWh/yr)	Gas Savings (therms/yr)	Total Cost Savings	Measure Cost	Potential Incentive	Net Measure Cost	Simple Payback
Library	4.8	16,048.6	336.0	\$ 3,048	\$ 37,413	\$ 3,463	\$ 33,950	11.1
Police Dept.	-	32,000.0	400.0	\$ 4,076	\$ 57,920	\$ 4,880	\$ 53,040	13.0
Fire Station 1	1.7	13,111.5	110.5	\$ 530	\$ 24,072	\$ 2,116	\$ 21,956	41.4
Golf Course	4.7	17,848.0	275.5	\$ 3,063	\$ 40,810	\$ 2,402	\$ 38,408	12.5
Space Center	11.4	16,490.0	360.0	\$ 4,367	\$ 41,911	\$ 4,537	\$ 37,375	8.6
Sub-Total	22.5	95,498	1,482	\$ 15,083	\$ 202,125	\$ 17,397	\$ 184,729	12.2

Install Low Flow Water Fixtures

This measure proposes to replace existing faucet aerators and shower heads with low flow fixtures. Two project sites, the Police Department and Fire Station #1, have the potential for gas savings through installing low flow water fixtures. These sites were selected due to the use of showers at these facilities.

The ASHRAE Level 1 site visits found that the sink faucets at each site use 2.2 gpm aerators, and the showers use 2.5 gpm shower heads. These water fixture flow rates are higher than the current standard, leading to increased water consumption. The current Universal Plumbing Code (UPC) sets a standard for public lavatory faucets of 0.5 gpm, while showerheads recommended by EnergyStar have a flow rate of 1.5 gpm.

Due to the high flow of the existing water fixtures, the city is using more water than necessary. This increased water flow also increases each facility’s gas consumption, since the water for some of the sinks and for the showers is heated using gas-fired water heaters. Reducing the sink and shower flow rates by installing low flow sink aerators and showerheads will yield both water and gas savings for the city. Faucet aerators should all be replaced with 0.5 gpm aerators, and the existing shower heads should be replaced with 1.5 gpm models.

The following table summarizes the project sites, projected energy savings, and costs for the proposed low flow water fixture projects.

Table 5.11: Savings summary for low flow water fixture aerators

Project Site	Annual Energy & Cost Savings				Financial Metrics			
	Peak Savings (kW)	Electricity Savings (kWh/yr)	Gas Savings (therms/yr)	Total Cost Savings	Measure Cost	Potential Incentive	Net Measure Cost	Simple Payback
Police Dept.	-	-	1,938.4	\$ 1,454	\$ 560	\$ 280	\$ 280	0.2
Fire Station 1	-	-	577.7	\$ 578	\$ 224	\$ 112	\$ 112	0.2
Sub-Total	-	-	2,516	\$ 2,031	\$ 784	\$ 392	\$ 392	0.2

Install Rooftop Photovoltaic Systems

This measure proposes to install rooftop photovoltaic (PV) generation systems at seven project sites. The selected sites have ample flat roof space that is not shaded by surrounding structures or trees, making them ideally suited for PV. On-site generation, including PV systems, can be expensive but can also yield significant demand reduction and energy savings. PV prices have been steadily dropping, and systems are becoming more cost effective.

The primary limiting factors for PV systems are roof area and the building’s electric energy consumption. Care must be taken to design a system that provides less power than the building consumes, since the city would not be compensated for excess power generated. Therefore, it is important to install energy efficiency projects before sizing and installing PV systems, in order to prevent over-sizing of the system once the building load drops due to EE project implementation.

Since costs are continually falling, and EE projects should be implemented first, the city should wait to install PV until all other suggested measures are installed. The specific design and capacity of the system will be determined by the solar contractor. This report, however, assumes that 25% of the roof area at the suggested sites would be devoted to PV. This value leaves room for expansion, will likely not cause excessive stress to the roof, and does not oversize the system.

The following table summarizes the project sites, projected energy savings, and costs for the proposed photovoltaic installations.

Table 5.12: Savings summary for photovoltaic (PV) installations

Project Site	Annual Energy & Cost Savings				Financial Metrics			
	Peak Savings (kW)	Electricity Savings (kWh/yr)	Gas Savings (therms/yr)	Total Cost Savings	Measure Cost	Potential Incentive	Net Measure Cost	Simple Payback
Police Dept.	83.0	127,659.0	-	\$ 15,064	\$ 463,804	\$ 39,258	\$ 424,546	28.2
City Hall	44.0	68,400.0	-	\$ 8,071	\$ 223,520	\$ 30,800	\$ 192,720	23.9
Library	53.0	82,100.0	-	\$ 13,871	\$ 296,164	\$ 37,100	\$ 259,064	18.7
Barbara J. Riley	61.5	95,140.0	-	\$ 16,075	\$ 343,662	\$ 43,050	\$ 300,612	18.7
Space Center	37.0	57,254.0	-	\$ 13,911	\$ 187,960	\$ 14,138	\$ 173,822	12.5
Civic Theatre	40.0	56,900.0	-	\$ 6,714	\$ 223,520	\$ 28,000	\$ 195,520	29.1
Fire Station 1	30.0	48,612.0	-	\$ 5,736	\$ 167,640	\$ 21,000	\$ 146,640	25.6
Sub-Total	348.5	536,065	-	\$ 79,442	\$ 1,906,270	\$ 213,346	\$ 1,692,924	21.3

5.2 Funding of Projects

As is the case with most local governments today, adequate resources and availability of funding plays a critical role in the implementation of projects. In the last couple years, the economic recession has made it particularly difficult to approve energy conservation projects, regardless attractive payback periods. The following are various project funding mechanisms that the City should investigate and utilize (wherever applicable).

Federal Government and State Grants

Most energy efficiency grants are issued by individual state governments; a database of these can be found at <http://www.ca.gov/Grants>. However, grants for the largest amount of money are typically issued by the Federal Government; a full directory of available energy efficiency grants can be found at <http://www.grants.gov>. These grants are split between competitive grants, in which applicants compete with a number of other applicants for a limited pool of money, and formula grants, in which money is allocated according to a particular set of requirements that an applicant must meet.

Energy efficiency grants have become more common in recent years along with increased concerns about climate change and energy independence. The U.S. Department of Energy's Energy Efficiency and Conservation Block Grant Program (EECBG), as described in detail in Section 3.5, provided over \$3.2 billion in 2009 for a variety of energy efficiency programs (approx. \$1M to the City of Downey), such as auditing and retrofitting residences and businesses to make them more energy efficient; the implementation of various energy conservation campaigns; and the deployment of energy efficient street lights and traffic signals.

For information on Federal Government energy efficiency funding initiatives, visit the Federal Government website: <http://www.eere.energy.gov>.

Utility Rebates and Incentives (SCE/SCG EE Programs)

The City of Downey should continue to leverage the many rebate and incentive programs made available through local utilities, including SCE and SCG. These programs provide a crucial economic boost for energy projects, including retrofit, new construction, and retro-commissioning (RCx)/ monitoring-based commissioning (MBCx) projects. Program and incentive specifics can be found by contacting the City's local SCE & SCG representatives.

On-Bill Financing (OBF)

On-Bill Financing is an IOU mechanism that enables cities to finance energy efficiency projects with loans that are repaid through their utility bill. Both SCE and SCG offer On-Bill Financing Programs in conjunction with their energy-efficiency rebate and incentive programs. Key Features include:

- 0% interest loans
- No fees on loan costs
- Convenient loan repayment through your monthly SCE/SCG bill

For more information, visit: sce.com/on-bill-financing and socialgas.com/rebates/zero-interest

The Energy Network (TEN) - Energy Project Lease Financing Program

The Energy Project Lease Financing Program is authorized by the CPUC and provided through The Energy Network. Funding for Energy Project Lease Financing is provided through private lenders and may be combined with other financing sources including utility or public financing, rebates and incentives. Loans are structured as equipment leases secured by the new equipment and upgrades installed during the project or by using real property. To find out more about the advantages of Energy Project Lease Financing visit: energylease.org.

CEC's Energy Efficiency Financing Program

The California Energy Commission's (CEC) Energy Efficiency Financing Program provides financing for cities, counties, public care institutions, public hospitals, public schools and colleges, and special districts through low-interest loans for the installation of energy-saving measures.

- Loans for energy projects can fund 100% of the project within a 17 year (maximum) simple payback. The loan must be repaid from energy cost savings or other legally available funds within a maximum term of 20 years (including principal and interest). The repayment schedule is based on the estimated annual energy cost savings from the aggregated project(s), using energy costs and operating schedules at the time of loan approval. Simple payback is calculated by dividing the dollar amount of the loan by the anticipated annual energy cost savings.
- The interest rate is 1% and is fixed for the term of the loan.

For more information, see visit: energy.ca.gov/efficiency/financing

Power Purchase Agreements (PPAs)

A Power Purchase Agreement (PPA) is a mechanism for an end-use customer to purchase clean energy from a power producer for on-site projects. In the case of solar photovoltaic electricity, a city can opt to purchase solar energy from a system installed on-site through a PPA at a negotiated rate instead of purchasing, installing, and maintaining the operations of solar photovoltaic panels themselves. While the solar panels may be installed on city premises, the city will not own the system. However, ownership of any renewable energy certificates (RECs) and carbon offset credits generated will need to be negotiated as part of the PPA. A major advantage of a PPA is that no up-front investment or ongoing maintenance costs are required from the city while the solar PV energy is often guaranteed by the PV provider. However, the risk of the negotiated electricity rate is usually placed on the buyer.

Efficiency Services Agreements (ESA's)

An Efficiency Services Agreement (ESA) is a pay-for-performance financing solution that allows building owners to implement energy efficiency projects without any upfront capital expenditure. Under this power purchase agreement (PPA)-like structure for energy efficiency, an ESA provider pays for all development and construction costs. After a project is operational, the building owner uses a portion of the cost savings associated with reduced energy consumption to make periodic service payments over the ESA term. ESA payments vary by billing period according to the actual amount of achieved savings.

For each project, the ESA provider enters into the ESA directly with the building owner and pays a third-party contractor (for example, an ESCO) to engineer, implement and maintain the energy efficiency project. Key features of an ESA generally include:

- ESA provider funds 100% of all design, engineering, and construction costs
- Projects can include a broad range of energy efficiency technologies and measures
- ESA provider owns and is responsible for ongoing maintenance services for all equipment, with customer buyout options available
- After the ESA term expires, the customer has the option to purchase the equipment at fair market value
- ESA payments are an operating expense similar in nature to a regular utility bill, although each owner is responsible for conducting their own accounting review

Energy Performance Contracts (EPCs)

Energy Performance Contracts (EPCs) are structured so that energy efficiency projects can be installed with little or no up-front costs to the customer. A portion of the revenue from energy savings goes directly to an Energy Service Company (ESCO), who finances and constructs the project. ESCOs can take on the debt associated with the projects done through the EPC, allowing Districts to keep the debt off of their books.

Green Revolving Fund (GRF)

A Green Revolving Fund (GRF) is an internal fund that provides the financing to parties within an organization or institution to implement energy efficiency, renewable energy, and other sustainability projects that generate cost savings. These savings are tracked and used to replenish the fund for the next round of green investments, thus establishing a sustainable funding cycle while cutting operating costs and reducing environmental impact. Capital for a GRF may be obtained from a variety of funding sources, including grants, government funding, utility rebates and incentives, and from annual operating budgets. The implementation of GRF's has been hugely successful within the college, university, and other nonprofit institutional settings. The GRF approach has begun to expand to new sectors, including healthcare institutions, municipalities, private companies, and governments. Should the City of Downey have interest in exploring the possibility of funding sustainability projects through the GRF model, there is a wealth of resources available online. A particularly informative document is a report titled "Green Revolving Funds: A Guide to Implementation & Management," which can be found by following this link:

http://greenbillion.org/wp-content/uploads/2013/08/GRF_Full_Implementation_Guide.pdf

5.3 Policies and Guidelines

California has adopted numerous regulations aimed at reducing the State's GHG emissions, and it is anticipated that the impact of these regulations on local governments will evolve over time. Compliance with state policies and regulations regarding these issues is an important factor for consideration by the City of Downey. In addition to State policies and regulations, the City of Downey understands that establishing and upholding effective local planning and implementation policies and guidelines will have the largest influence on attaining a long-term sustainable environment. Key objectives that the City shall consider in the implementation of new policies are as follows:

- Reduce energy use and carbon emissions at existing facilities
- Identify and eliminate energy waste
- Exceed energy efficiency standards in new construction facilities
- Stay informed on evolving energy efficiency technologies
- Sustain an effective energy usage tracking mechanism
- Prioritize staff education and training particular to energy efficiency and new technologies

The following outlines various policies and guidelines that the City should encourage and consider as they move forward towards a sustainable future:

Assembly Bill 32

Described in detail in section 3.5. The City of Downey will be consistent with Assembly Bill 32 and the greenhouse gas emission reduction goals. This EAP outlines the goals set forth in addition to various energy efficiency measures to help attain those goals.

Assembly Bills 1890 & 995

Under Assembly Bill 1890 (1996) and Assembly Bill 995 (2000), California has established a "loading order" that establishes energy efficiency as the State's highest priority. The "loading order" mandates the prioritization of cost-effective energy efficiency measures, followed by demand response, renewable energy, and new generation projects. The City of Downey understands that Energy efficiency is the most cost-effective and common sense energy policy and has designed this EAP to meet the State's loading order requirements.

Federal and State Energy Efficiency Requirements

The City of Downey shall adhere to federal and state-level energy efficiency requirements for both new and existing buildings. This will include compliance with the latest California building energy efficiency standards (Title 24), ASHRAE Standard 90.1 (Energy Standard for Buildings except Low-Rise Residential Buildings), and the International Energy Conservation Code (IECC). Key enforcement procedures shall include the following:

- Review of plans
- Review of products, materials, and equipment specifications
- Review of tests, certification reports, and product listings
- Review of supporting calculations
- Inspection of the building and its systems during construction
- Evaluation of materials substituted in the field
- Inspection prior to occupancy

Energy Efficiency in New Construction

Incorporate a clearly defined set of energy efficiency requirements into the City's Owner Project Requirements and Basis of Design Documents.

Savings by Design

For all future new construction or major modernization projects, City should utilize the services provided by the Savings By Design (SBD) program wherever feasible and practical. SBD is California's nonresidential new construction energy efficiency program, administered statewide and funded by Utility customers through the Public Purpose Programs surcharge applied to gas and electric services.

Savings By Design encourages energy-efficient building design and construction practices, promoting the efficient use of energy by offering up-front design assistance supported by financial incentives based on project performance. Projects participating in Savings By Design receive services including design assistance, Owners Incentives, Design Team Incentives, and Energy Design Resources. Services begin in the project design phase and continue through construction completion.

Design assistance can range from simple plan review and efficiency upgrade recommendations to complete computer simulation analysis comparing a number of alternative systems and integrated building design options. Financial incentives, to help offset increased design interaction and potential costs of construction, are available for projects that exceed thresholds established by the program. Participation in the program brings additional benefits, such as reduced long-term operating costs, greater comfort, health and productivity for occupants, and conservation of natural resources and cleaner air due to avoided power generation.

Leadership in Energy and Environmental Design (LEED)

The City understands the sustainability benefits from LEED. The City will continue to encourage LEED in new construction and major modernization projects wherever feasible. LEED is a voluntary third-party certification program and the nationally accepted benchmark for the design, construction and operation of high performance green buildings. City participation in the LEED process demonstrates leadership, innovation, environmental stewardship and social responsibility. Green design categories that are addressed by LEED include sustainable sites, water efficiency, energy efficiency, materials, and indoor environmental quality.

Building Commissioning and Retro-Commissioning

The City understands the benefit that building commissioning (Cx) brings to the energy performance of new and existing buildings. When a building is initially commissioned it undergoes an intensive quality assurance process that begins during design and continues through construction, occupancy, and operations. Cx ensures that the new building operates initially as the owner intended and that building staff are prepared to operate and maintain its systems and equipment. Retro-commissioning (RCx) is the application of the commissioning process to existing buildings. Depending on the age and condition of the systems, this RCx process often resolves problems that occurred during design or construction, or addresses problems that have developed throughout the building's life. For all future capital projects, the City intends to incorporate Cx into the project requirements. For all existing buildings, the City will identify those that can benefit from RCx. To the extent economically feasible and technically practicable, the City should plan on undergoing an RCx process in order of priority.

Environmental Preferred Purchasing (EEP) Policy

Los Angeles County, which encompasses the City of Downey, is a very large consumer of goods and services. As such, the purchasing decisions of its employees and contractors have a significant impact on the environment and are a crucial component of reaching the Cities' energy and sustainability goals. LA County understands the importance of an EEP and, in 2007, adopted a countywide "Purchase of Environmentally Preferable Products (Green Purchasing)" Policy (LA County Policy P-1050). The Policy instructs all County departments to implement and uphold the following objectives:

- Conserve natural resources
- Minimize environmental impacts such as pollution and excessive use of water and energy;
- Eliminate or reduce toxics that create hazards to workers and the community;
- Support strong recycling markets;
- Reduce materials that are sent to landfills;
- Encourage manufacturers and vendors to reduce environmental impacts in their production and distribution systems; and
- Create a model for successfully purchasing environmentally preferable products that encourages other purchasers in our community to adopt similar goals.

Where applicable, the LA County EEP requires that energy-efficient equipment shall be purchased with the most up-to-date energy efficiency functions. County departments and agencies are expected to include an energy-efficiency requirement component to their solicitation to purchase products where Energy Star® of Federal Energy Management Program (FEMP) standards are available. By adhering to the LA County EPP policy, the City of Downey will help reduce its negative impact on the environment, lower pollution levels from its operations, protect public health, and improve the environmental quality of the Downey community.

For more information about the LA County Environmental Purchasing Policy, please visit the following link: <http://doingbusiness.lacounty.gov/P-1050.pdf>

Energy Star®

Energy Star is a labeling program derived from a partnership between the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy (DOE). All products displaying the Energy Star label meet Federal Energy Management Program (FEMP) standards. Typically, this means that labeled products are in the top 25 percent of all similar products when ranked by energy efficiency, and use 25 to 50 percent less energy than their traditional counterparts. As described in the section above, the LA County EEP states that Energy Star® standards shall be considered in all purchasing decisions made by the City of Downey, wherever applicable.

Support Staff Training

Ongoing energy efficiency related training of staff is critical to the sustainability and success of the EAP. Department leaders should encourage staff to participate in training made available by various organizations like the Statewide Energy Efficiency Collaborative), Local Governments for Sustainability (ICLEI), the Local Government Commission (LGC), Southern California Edison (SCE), and Southern California Gas Company (SCG). In particular, the City will leverage the free workshops offered by SCE to increase staff knowledge on various sustainability and energy efficiency topics. Areas of focus will include the following:

- Title 24 and other Energy Efficiency Building Standards (i.e., CALGreen, ASHRAE 90.1, etc.)
- Current green building policies » LEED (Leadership in Energy and Environmental Design)
- Developing energy efficiency technologies
- Building Energy Auditing tools and techniques
- Bench-marking and Performance Tracking

In addition, free webinars are typically available through Energy Star®, California Energy Commission (CEC), and variety of other organizations.

5.4 Energy Use Tracking & Benchmarking

Introduction

The City of Downey understands the importance of benchmarking, tracking and monitoring the year-to-year energy use at its facilities and the progress it is making towards the EAP goals. Accordingly, it is critical that the City establishes or adopts a system that will help track energy use and expenditures for each energy-using account. This tracking mechanism shall illustrate how recent energy action steps, or lack thereof, have impacted energy use. Stakeholders and decision makers can then utilize this data to manage the City's interim progress and ensure necessary milestones are met. Tracked results can also be used as rationale for obtaining additional funding or for gaining public support for a broader portfolio of programs.

Enterprise Energy Management Information System (EEMIS)

The City should consider implementing an Enterprise Energy Management Information System (EEMIS) that will allow the City to easily monitor energy consumption and year-to-year reduction at all its facilities. Funding for the EEMIS is through SCE's Flight #5.6 Grant (Local Government Strategic Plan Strategies Solicitation).

An EEMIS includes many useful features as outlined below:

- Bill analysis;
- Energy use analysis;
- Electricity rate analysis;
- Electric demand management;
- Greenhouse gas reporting;
- Reporting to identify the best and the worst performing facilities;
- Collection of real-time data from large electricity accounts allows the City to better manage daily energy usage;

- Energy usage forecasting allows the City to make informative decisions regarding load control commands in response to California grid conditions and demand reduction goals; and
- Identification of cost savings measures to shift power usage to non-peak hours. □

While the ultimate goal is to reduce the City's overall energy use, it will be useful to track the progress of the various City departments as outlined in Section 2 of this EAP. Further, if energy use at (a) building facilities, (b) pumping stations, and (c) street lighting are isolated, it will help give a clearer picture of the progress and provide the visibility necessary to make informed decisions.

EPA's ENERGY STAR® Portfolio Manager™

Another tracking mechanism that the City may consider using is the U.S. Environmental Protection Agency (EPA) ENERGY STAR® Portfolio Manager™, a free online tool that will provide an energy performance score of a specific building in relation to similar facilities in similar climates. The tool can help the City do the following:

- Track multiple energy and water meters;
- Benchmark facilities relative to past performance;
- View percent improvement in weather-normalized source energy;
- Monitor energy and water costs;
- Verify building energy performance;
- Produce customizable reports specific to a variety of stakeholders; and
- Determine energy performance ratings. □

This EAP proposes that the City's most energy-intensive buildings (outlined in Section 2) be tracked using EPA's Portfolio Manager. The main intent shall be to establish a benchmark score for the baseline year for comparison against future time periods.

Impact of New Construction

As is the case with any large organization, the City may in the future add (or remove) facilities based on current demand and economics. It will be important to make note of when these changes take place and how they will impact energy use. Section 2 of this EAP has established a "baseline" energy use with a defined set of City buildings and energy using accounts. Future comparisons against this "baseline" shall be done using the same set of parameters. If for example, a new building or a new lighted road is added, this will undoubtedly have an impact on overall City energy use.

To accurately account for the increase (or decrease) of energy-consuming City facilities, energy use and goals outlined in this EAP should be analyzed and tracked on a per square foot basis. For example, if average energy use index (EUI) is calculated for all facilities City-wide, this will allow the City to track the progress of energy efficiency efforts, even if new City buildings are added over-time. Understandably, this analysis strategy would only apply to those building facilities with a defined square footage. Service accounts like street lighting and pumping stations would have to be excluded and analyzed separately.

6 Conclusion

The City of Downey is keen on sustainability and continuing the effort to reduce energy use at all its facilities. This is evident by all the energy efficiency measures that have been implemented to date and the projects that are in the pipeline. The City is well aware that its facilities will set the example for the citizens within Downey. The table below summarizes the energy reduction measures that have been completed and are planned for the future. As shown, the City is on its way to meeting the energy reduction goal set-forth in this Energy Action Plan. As the City moves forward, it will continue to look for feasible energy reduction opportunities along with funding for the same.

City of Downey – Energy Action Plan

Measure Number	Measure Description	Applicable Project Sites	Annual Energy & Cost Savings				Financial Metrics				
			Peak Savings (kW)	Electricity Savings (MWh/yr)	Gas Savings (therms/yr)	Total Cost Savings	CO ₂ Savings (tons)	Measure Cost	Potential Incentive	Net Measure Cost	Simple Payback
EEM-1	Well and Booster Pump Efficiency Upgrade	City-Wide	-	1,477,271	-	135,865	472.7	\$ 651,925	\$ 203,482	\$ 448,443	3.3
EEM-2	SCADA System Upgrade	City-Wide	71.0	338,709	-	31,149	108.4	\$ 250,000	\$ 98,069	\$ 191,931	6.2
EEM-3	LS-2 and LS-3 Streetlight Upgrade	City-Wide	-	601,613	-	77,089	288.5	\$ 656,342	\$ 128,226	\$ 530,116	6.9
EEM-4	Interior Lighting and Controls Retrofit	City Hall Barbara J. Riley Police Dept. Fire Stations 1-4 Theatre Library Golf Course Transit Center Space Center Dennis the menace, Fuman, Rio San Gabriel Parks	56.4	217,674.0	-	28,715	68.7	\$ 56,358	\$ 9,074	\$ 47,284	1.6
EEM-5	Exterior Lighting Retrofit	City Hall Maintenance Yard Barbara J. Riley Golf Course Library Theatre Wilderness Park Transit Center Rio San Gabriel Park	-	154,728	-	20,167	48.5	\$ 208,919	\$ 21,862	\$ 187,257	9.3
EEM-6	Cool Roof	Police Dept. City Hall Library Barbara J. Riley Civic Theatre Fire Station 1	72.0	185,590	-	24,261	58.4	\$ 213,779	\$ -	\$ 213,779	8.8
EEM-7	Rooftop HVAC Retrofit	Library Barbara J. Riley Police Dept. Fire Station 1 Theatre Maintenance Yard Transit Center	135.9	233,896.7	800.0	34,477	79.1	\$ 483,513	\$ -	\$ 483,513	14.0
EEM-8	Upgrade HVAC Control	Library Police Dept. Fire Station 1 Golf Course Space Center	35.7	137,148.1	1,762.0	22,400	53.2	\$ 239,538	\$ 35,913	\$ 203,626	9.1
EEM-9	Low Flow Water Fixtures	Police Dept. Fire Station 1	-	-	2,516	2,031	19.3	\$ 784	\$ 392	\$ 392	0.2
EEM-10	Photovoltaic System	Police Dept. City Hall Library Barbara J. Riley Space Center Civic Theatre Fire Station 1	348.5	536,065.0	-	79,442.5	171.5	\$ 1,906,270	\$ 243,960	\$ 1,662,320	20.9
Sub-Total			719.5	4,182,696.7	5,078.1	455,595	1,365.3	\$ 4,667,428	\$ 688,768	\$ 3,968,660	8.7
TOTALS (All Recommended Measures)			719.5	4,182,696.7	5,078.1	455,595	1,365.3	\$ 4,667,428	\$ 688,768	\$ 3,968,660	8.7

EAP Implementation

The City of Downey is presently a *Silver Partner* with the Energy Partnership. To attain a Gold level status, the City is required to “initiate” and “complete” an Energy Action Plan. To attain Platinum the City needs to “implement” the Energy Action Plan. This is key for Gold, and Platinum levels, respectively. This section highlights the City’s plan for EAP approval and implementation.

A strategy for successful implementation of this EAP was developed by the City and is outlined in Table 6.2 below. The table defines clear and measurable goals that the City will pursue as it moves forward through the implementation phase. Action steps are also identified to direct the City’s efforts in accomplishing each goal.

Table 6.2 – EAP Implementation Plan

ENERGY EFFICIENCY GOALS	ACTION STEPS
Energy Action Plan	Finalize Energy Action Plan and get approval from SCE to achieve Gold Level for their Gateway Cities Energy Leadership Partnership
DR Awareness	Conduct one co-branded DR awareness item towards Platinum Goal
Complete the Well and Booster Pump Efficiency Upgrades	Implement the following measures: <ul style="list-style-type: none"> • System optimization of well and booster pumps • System optimization of booster pumps • Pump efficiency improvements
Complete the SCADA System Upgrade	Implement the SCADA System Upgrade
Enroll into SCE’s Auto Demand Response Program	Enroll one of the participating DR facilities into the Automated Demand Response Program Or Conduct a community forum with at least 50% of the program content Demand Response Focused
Complete the Street Lighting LED Retrofit	Implement the LED fixture retrofits on the 1,642 LS-2 and LS-3 fixtures throughout the City

<p>Complete the lighting and mechanical retrofits at the City buildings.</p>	<p>Implement the applicable lighting and mechanical retrofits identified at the following facilities.</p> <ul style="list-style-type: none"> . Police Station . Barbara Riley Senior Center . City Hall . Civic Theater . Rio Hondo Golf Course . Library . Fire Station #1 . Discovery Sports Center . Columbia Space Center . Wilderness Park . Rio San Gabriel Park . Transit Center . Maintenance Yard
<p>Complete the renewable projects identified at the City buildings</p>	<p>Implement the renewable measures identified at the following facilities:</p> <ul style="list-style-type: none"> . Police Station . Barbara Riley Senior Center . City Hall . Civic Theater . Library . Fire Station #1 . Columbia Space Center

<p>POLICY AND GUIDELINES GOALS</p>	<p>ACTION STEPS</p>
<p>Incorporate Policy to Benchmark Energy Use at City Buildings</p>	<p>Integrate City Buildings into Enterprise Energy Management Information System (EEMIS).</p>
<p>Benchmark facilities using EPA's Portfolio Manager</p>	<p>Use Portfolio Manager to benchmark all of the City buildings. Free training is available through Edison or hire a consultant.</p>
<p>Energy Efficiency Training for City Staff</p>	<p>Inform City Staff of all available resources for energy efficiency training. SCE and SCG regularly have free courses and workshops.</p>

COMMUNITY OUTREACH GOALS	ACTION STEPS
Develop Energy Awareness to educate the community about energy use	Organize outreach groups consisting of City representatives to develop energy awareness material and effective outreach avenues. SCE and SCG have plenty of material available.

EAP Adoption

The success of any EAP is directly related to the degree of its implementation. The first step in this effort is to take the completed EAP through City Council and have it considered for adoption. Adoption by City Council will be a key starting point and provide valuable leverage for further EAP actions. The list below outlines various factors the City should consider in the decision process for EAP adoption and the implementation of actions recommended in the plan.

- . Adoption of the EAP does not automatically deploy actions for implementation
- . The EAP is not binding on the City Council or the Community
- . Strategies will be implemented based on the needs and ability of the City and Community
- . Strategies should be financially feasible
- . Pursue actions, not simply based on their emissions reduction potential, but on the collection of benefits that it can provide to the City and Community
- . Pursuing low or no-cost high-priority recommendations will have the greatest likelihood of success

EAP Integration

With the intent of helping guide the City in achieving its energy efficiency goals, the City will consider implementation of the policies and projects outlined in this EAP, where possible, through the following planning mechanisms already in-place:

- . General Plan
- . City Ordinances
- . Capital Improvement Plans
- . City Engineering Designs
- . Other energy efficiency plans, regulations, and practices

The City plans to review all existing planning mechanisms in-place and determine which are best suitable for implementation of the EAP's long-term policies.

EAP Recurring Tasks

For effective implementation, efforts will also be necessary to monitor and evaluate the progress of the plan. Evaluating the progress of the EAP is an ongoing process, and as such, the EAP should be treated as a working document that must adapt to changes. The City will need to systematically track energy use and reflect any changes in facilities and equipment. Energy use for each facility should be analyzed periodically to ensure that it is moving towards the target reduction goal. It will also be important to continually monitor funding opportunities that can be leveraged to implement the higher cost recommended actions.

7 Appendix A – Glossary of Key Terms

Adjusted Business-as-Usual (ABAU) Forecast

An emissions forecast that accounts for actions and legislation implemented by the State of California to reduce greenhouse gas emissions statewide that will also have a measureable beneficial impact for local jurisdictions' emissions.

American Recovery and Reinvestment Act (ARRA)

Commonly referred to as the Stimulus Plan or Recovery Act, ARRA is an economic stimulus package enacted by the federal government in 2009. The intent of the stimulus is to create jobs and promote investment and consumer spending during the economic recession. On February 13, 2009, Congress passed ARRA as a direct response to the economic crisis.

Assembly Bill 32 (AB 32)

California Global Warming Solutions Act of 2006 □ Establishes a comprehensive program of regulatory and market mechanisms to achieve real, quantifiable, cost-effective reductions of greenhouse gases for the State of California. Makes the California Air Resources Board (CARB) responsible for monitoring and reducing statewide greenhouse gas emissions, with a target to reduce emissions to 1990 levels by 2020. □

Assembly Bill 811(AB 811)

California Assembly Bill 811 (authored by Assembly member Lloyd Levine and signed by Governor Arnold Schwarzenegger on July 21, 2008) authorizes California cities and counties to designate areas within which willing property owners could enter into contractual assessments to finance the installation of energy efficiency improvements and/or distributed renewable energy generation. □

Assembly Bill 1109 (Huffman Bill) □

California Assembly Bill 1109 (authored by Assembly member Jared Huffman and signed by Governor Arnold Schwarzenegger on October 12, 2007) prohibits the manufacturing for sale or the sale of certain general purpose lights that contain hazardous substances, and requires the California Energy Commission to adopt energy efficiency standards for general purpose lights. \

Baseline Inventory □

The base year for assessment of energy trends against which future progress can be measured for a single calendar year (2005–2008), consistent with legislative guidance and the Assembly Bill 32 Scoping Plan. □

Building Envelope

All components of a building that enclose conditioned space and separate it from unconditioned space or the outdoors.

Build-out

Development of land to its full potential or theoretical capacity as permitted under current or proposed planning or zoning designations.

Business as Usual (BAU)

A scenario that assumes that no specific actions will be taken to reduce emissions and growth coming from the expansion of activity and services within the city. All forecasts are based on this scenario.

California Air Pollution Control Officers Association (CAPCOA)

An association of air pollution control officers representing the 35 local air quality agencies throughout California.

California Air Resources Board (CARB)

A part of the California Environmental Protection Agency that reports directly to the Governor's Office in the Executive Branch of California State Government. CARB's mission is to promote and protect public health, welfare, and ecological resources through the effective and efficient reduction of air pollutants while recognizing and considering the effects on the economy of the state.

California Building Code (Title 24)

California Code of Regulations, Title 24, also known as the California Building Standards Code (composed of 12 parts). Title 24, Part 6 sets forth California's energy efficiency standards for residential and nonresidential buildings and was established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods.

California Environmental Quality Act

A state law requiring state and local agencies to regulate activities with consideration for environmental protection. If a proposed activity has the potential for a significant adverse environmental impact, an environmental impact report (EIR) must be prepared and certified as to its adequacy before action can be taken on the proposed project. General plans require the preparation of a program EIR.

California Global Warming Solutions Act of 2006

See Assembly Bill 32.

California Green Building Code (CALGreen, Title 24, Part 11)

Refers to CALGreen component of the California Building Code. See California Building Code.

California Long Term Energy Efficiency Strategic Plan (CEESP)

A plan adopted by the California Public Utilities Commission in 2008 that presents a single road map to achieve maximum energy savings across all major groups and sectors in California. This comprehensive plan for 2009 to 2020 is the state's first integrated framework of goals and strategies for saving energy, covering government, utility, and private sector actions, and holds energy efficiency to its role as the highest priority resource in meeting California's energy needs.

California Solar Initiative (CSI)

Allows the California Public Utilities Commission to provide incentives to install solar technology on existing residential, commercial, nonprofit, and governmental buildings if they are customers of the state's investor-owned utilities: Pacific Gas & Electric, San Diego Gas & Electric, or Southern California Edison.

Carbon Dioxide Equivalent (CO₂e)

A metric measure used to compare the emissions from various greenhouse gases based upon their global warming potential (GWP). The carbon dioxide equivalent for a gas is derived by multiplying the tons of the gas by the associated GWP. For example, the GWP for methane is 21. This means that emissions of one million metric tons of methane are equivalent to emissions of 21 million MTCO₂e.

Clean Car Fuel Standard (AB 1493 – Pavley)

Signed into law in 2002 and commonly referred to as Pavley standards. Requires carmakers to reduce greenhouse gas emissions from new passenger cars and light trucks beginning in 2011. CARB anticipates that the Pavley standards will reduce greenhouse gas emissions from new California passenger vehicles by about 22% in 2012 and about 30% in 2016, all while improving fuel efficiency and reducing motorists' costs.

Climate Change (global climate change)

The term —climate change is sometimes used to refer to all forms of climatic inconsistency, but because the earth's climate is never static, the term is more properly used to imply a significant change from one climatic condition to another. In some cases, climate change has been used synonymously with the term —global warming; scientists, however, tend to use the term in the wider sense to also include natural changes in climate.

Community-Wide Greenhouse Gas Inventory

Looks at greenhouse gas emissions caused by all activities within a city's geographic boundary. Typical sectors include residential, commercial, and industrial energy use, transportation, off-road equipment, waste generation, and energy associated with water delivery and treatment.

Cool California

A State-operated website that provides tools and information to residents, businesses, schools, and local governments to take action related to climate change. The website links and resources related to energy efficiency, cool roofs, grant programs, and more. The website is available at <http://www.coolcalifornia.org/>.

Daylighting

Building assemblies (such as use of windows, skylights, light tubes, and reflective surfaces) designed to introduce daylight into a building for the purpose of illumination and view, and to reduce a building's reliance on electric lighting.

Demand Response

Mechanism for managing end user electricity consumption in response to energy supply conditions. A demand-responsive system is one that can be controlled (either directly or remotely) to reduce electricity consumption during times of increased energy demand and/or constrained energy availability.

Direct Access Electricity

Direct access service is an optional choice that customers can select to purchase electricity and other services from an electric service provider (ESP), instead of from Southern California Edison. An ESP is an entity that contracts directly with its customers to provide electric service and is responsible for arranging an adequate supply of electricity. ESPs are required to meet certain requirements with the California Public Utilities Commission in addition to meeting financial and technical requirements with Southern California Edison.

Lighting-Street and Highway-Unmetered Service Company-Owned System (LS-1)

Applicable to SCE-owned service accounts for the lighting of streets, highways, and publicly owned and publicly operated automobile parking lots which are open to the general public where SCE owns and maintains the street lighting equipment and associated facilities. These accounts are not metered (not based on actual energy use) and are charged based on SCE's monthly rate per lamp.

Lighting-Street and Highway-Customer-Owned Installation-Unmetered Service (LS-2)

Applicable to unmetered service for the lighting of streets, highways, other public thoroughfares, and publicly owned and publicly operated automobile parking lots which are open to the general public, where the customer owns the street lighting equipment including, but limited to, the pole,

mast arm, luminaire and lamp, and all connecting cable in a streetlight system. These accounts are not metered (not based on actual energy use) and are charged based on SCE's monthly rate per lamp.

Lighting-Street and Highway-Customer-Owned Installation-Metered Service (LS-3)

Applicable to metered service for the lighting of streets, highways, directional highway signs served in conjunction with street and highway lighting, other public thoroughfares, and publicly owned and publicly operated automobile parking lots which are open to the general public, where the customer owns the street lighting equipment operated within the period from dusk to dawn. Electricity charges are based on metered electricity use.

Traffic Control Service (TC-1)

Applicable to single- and three-phase service: for traffic directional signs or traffic signal systems located on streets, highways and other public thoroughfares, and to railway crossing and track signals; for public thoroughfare lighting that is utilized 24 hours per day or is not controlled by switching equipment, such as tunnel or underpass lighting; and to public authorities for the illumination of bus stop shelters located in the dedicated road right-of-way where such service is combined with other traffic control service as defined above.

Electricity Sectors

The EAP groups electricity use into four key topics, based on the type of activity that consumes electricity and causes greenhouse gas emissions. The electricity sectors consist of existing residential, existing nonresidential, new development (residential and nonresidential), and City government operations.

Emissions Forecast

Baseline emissions are forecast to future years based on projected increases in population, jobs, households, and other local trends. Forecasts will show two scenarios: (1) outcomes if no behavioral or regulatory changes are made (a business-as-usual scenario), and (2) outcomes to account for reduction efforts mandated by the State of California, such as new vehicle standards and fuel standards.

Emissions Standard

The maximum amount of pollutant legally permitted to be discharged from a single source, either mobile or stationary.

Energy Conservation

Methods of reducing energy waste, such as turning off lights or heating when not needed.

Energy Efficiency

Doing the same or more work with less energy, such as replacing incandescent light bulbs with compact fluorescent light bulbs, using appliances that use less electricity to run than older models, or utilizing a vehicle that can travel farther using the same amount of gasoline.

Energy Efficiency and Conservation Block Grant

The Energy Efficiency and Conservation Block Grant program was funded through the American Recovery and Reinvestment Act and managed by the US Department of Energy to assist cities, counties, states, and territories to develop, promote, and implement energy efficiency and conservation programs and projects.

Energy Environment and Natural Resource Committee

The San Gabriel Valley Council of Government's Energy, Environment, and Natural Resources Committee coordinates environment-related efforts among the valley's many jurisdictions, pursues funding opportunities for the valley, and promotes beneficial policies to its member agencies.

Energy Leader Partnership Model

Southern California Edison (SCE) has developed the Energy Leader Partnership (ELP) Model to provide support to local governments in identifying and implementing opportunities to improve energy efficiency in municipal facilities and promoting community awareness of demand side energy management opportunities. By participating in SCE's Energy Leader Partnership, local governments are taking actions to support the California Long Term Energy Efficiency Strategic Plan while saving energy and fiscal resources for their communities.

Energy Star

A joint program of the US Environmental Protection Agency and the US Department of Energy to provide consumers with information and incentives to purchase the most energy-efficient products available.

Energy Upgrade California

Energy Upgrade California is a new statewide program that offers incentives to homeowners who complete select energy- saving home improvements on a single-family residence. These incentive packages encourage customers to take a "whole house" approach by combining several related improvements at once to increase a home's overall energy efficiency and achieve greater savings. By working with participating contractors, homeowners can choose from two incentive options, the Basic Upgrade Package or the Advanced Upgrade Package, based on their improvement needs and budget.

Enterprise Energy Management Information Systems

The San Gabriel Valley Council of Governments (SGVCOG) has funded and created a program to set up a —utility manager computer program to track municipal usage and identify need for sub-metering to plan, budget, and manage bills for each city facility. The SGVCOG is collaborating with the County of Los Angeles to implement the County's Enterprise Energy Management Information System (EEMIS) utility manager to track municipal energy usage, enabling participating San Gabriel Valley municipalities to access facility energy consumption, archive billing data, and report and analyze energy consumption data via the Internet. The County's EEMIS project was developed in 2000 and has been adapted to assist cities in the SGVCOG with monitoring, forecasting, and budgeting for energy use at city facilities.

First Cost

Immediate purchase and installation cost. First costs do not include life-cycle or long-term operating costs, which may result in long-term cost savings from increased efficiency, reduced maintenance, and other factors.

Goal

The desired end state or expected outcome related to electricity reduction targets in the Energy Action Plan (EAP). Each goal corresponds to one of the EAP's seven topic areas: existing residential buildings, existing nonresidential buildings, new development, planning framework, urban cooling, water and electricity efficiency, and municipal operations.

Graywater (also recycled water, reclaimed water)

Treated or recycled wastewater of a quality suitable for non-potable uses such as landscape irrigation; not intended for human consumption.

Green Building

Sustainable or —green" building is a holistic approach to design, construction, and demolition that minimizes the building's impact on the environment, the occupants, and the community.

Greenhouse Gases

Gases which cause heat to be trapped in the atmosphere, warming the earth. Greenhouse gases are necessary to keep the earth warm, but increasing concentrations of these gases are implicated in global climate change. The majority of greenhouse gases come from natural sources, although human activity is also a major contributor. The principal greenhouse gases that enter the atmosphere because of human activities are:

Carbon Dioxide (CO₂): Carbon dioxide is a colorless, odorless gas that occurs naturally in the earth's atmosphere. Carbon dioxide also enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees, and wood products, and as a result of other chemical reactions (e.g., manufacture of cement). Carbon dioxide is also removed from the

atmosphere (or —sequestered) when it is absorbed by plants as part of the biological carbon cycle. □

Methane (CH₄): Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills. □

Nitrous Oxide (N₂O): Nitrous oxide is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste. □

Fluorinated Gases: Hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for ozone-depleting substances (i.e., chlorofluorocarbons, hydrochlorofluorocarbons, and halons). These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as high global warming potential gases (—high GWP gases). □ **Greenhouse Gas Inventory** □ A greenhouse gas inventory provides estimates of the amount of greenhouse gases emitted to and removed from the atmosphere by human activities. A city or county that conducts an inventory looks at both community emissions sources as well as emissions from government operations. A base year is chosen and used to gather all data from that year. Inventories include data collection from such things as vehicle miles traveled (VMT), energy usage from electricity and gas, and waste. Inventories include estimates for carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulfur hexafluoride (SF₆), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs), which are referred to as the six Kyoto gases.

Green Teams □

A formal or informal group of people in a company who are passionate about environmental issues. The groups brainstorm solutions and promote ways in which their company's practices can become more environmentally sustainable, often creating sustainability plans and approaching management for funding to meet plans.

Green Waste

Refers to lawn, garden, or park plant trimmings and materials and can be used in home composts or picked up curbside by municipal waste haulers.

General Service-Non-Demand (GS-1) Electricity Accounts

See Electricity Accounts.

General Service-Demand (GS-2) Electricity Accounts

See Electricity Accounts.

Heating, Ventilation, and Air Conditioning (HVAC)

Systems that help maintain good indoor air quality through adequate ventilation with filtration and provide thermal comfort.

Implementation Action

An action, procedure, program, or strategy to achieve the electricity reductions of a policy. Action items may provide interim steps or supporting strategies. Actions may also indicate the range of opportunities to increase the electricity reduction potential of a policy.

Incentive

See SCE Incentive.

Integrated Systems

Lighting systems that include components, assemblies, and controls designed to work together effectively.

Kilowatt-Hour (kWh)

A unit of energy equivalent to one kilowatt (kW) of energy used for an hour. For example, if an appliance requires a kW of energy to function, leaving the appliance on for one hour would consume one kWh of energy.

Leadership in Energy and Environmental Design

A green building standard and set of rating systems established by the US Green Building Council.

Life-Cycle Cost

Cost of a component, technology, or system over its entire lifespan, including not just first costs but also operating, maintenance, and disposal costs.

Method

A consistent body of methods or procedures to approach a given task; in terms of a greenhouse gas emissions inventory and forecast, refers to an internally consistent approach to quantify greenhouse gas emissions that supports the principles of inventories identified in the Local Government Operations Protocol: relevance, completeness, consistency, transparency, and accuracy.

Mixed Use

Properties on which various uses such as office, commercial, institutional, and residential are combined in a single building or on a single site in an integrated development project with significant functional interrelationships and a coherent physical design. A —single sitell may include contiguous properties.

Municipal Operations Greenhouse Gas Inventory

Looks at greenhouse gas emissions caused by City operations. Typical sectors include energy associated with City facilities, vehicle fleets, equipment, waste generation, employee commutes, and more.

Participating Municipality

Those jurisdictions or member cities that: (i) are located in Southern California Edison's (SCE) service territory; and (ii) have been selected by SCE and the SGVCOG to participate in the program as set forth in the Statement of Work. Includes 27 participating cities (Alhambra, Arcadia, Baldwin Park, Bradbury, Claremont, Covina, Diamond Bar, Duarte, El Monte, Glendora, Irwindale, La Canada-Flintridge, La Puente, La Verne, Monrovia, Montebello, Monterey Park, Pomona, Rosemead, San Dimas, San Gabriel, San Marino, Sierra Madre, South El Monte, South Pasadena, Temple City, and West Covina).

Performance Indicators

Specific, measureable, actionable, realistic and time-specific requirements that will directly and measurably contribute to the City's Energy Action Plan goals.

Personal Energy Action Survey

As part of the regional partnership with the SGVCOG, the City distributed the personal energy action survey on energy efficiency at public events and through the City website. A blank version of the survey is provided in Appendix B. Participation in the survey was voluntary. Survey results help to provide a useful snapshot of energy-related opinion and behavior; however, the results should not be interpreted as statistically valid.

Policy

A statement that guides decision-making and indicates a commitment to achieve the specified outcomes of the goal. Policies provide the foundation for quantification of electricity reduction potentials in the Energy Action Plan.

Project Steering Committee

Along with other San Gabriel Valley cities taking part in the regional Energy Action Plan (EAP) project, the City participated in a Project Steering Committee (PSC) throughout EAP development. The purpose of the PSC is to confirm a regional approach to EAP development, guide the project, and share best practices among jurisdictions. Starting in July 2011, the PSC

convened approximately once a month. During PSC meetings, representatives from San Gabriel Valley Council of Governments staff and the technical consultant project team facilitated discussions and presentations to review options to achieve electricity efficiency.

Property Assessed Clean Energy (PACE)

A form of financing that creates municipal finance districts to provide loans to homeowners and businesses for energy- efficient retrofits and renewable energy system installations. Loans are repaid through an annual surcharge on property tax assessments. Governor Schwarzenegger signed the nation's first law allowing PACE

Public Goods Charge

The public goods charge consists of funds collected from electric utility ratepayers pursuant to Section 381 of the California Public Utilities Code for public purpose programs, including energy efficiency programs approved by the California Public Utilities Commission. The funds that make up Southern California Edison's budget for this project come from the public goods charge.

Reach Codes

Codes that direct contractors to construct buildings significantly more energy efficient than required by conventional building codes.

Rebate

Offered by the state, utility, or local government to promote the installation of renewables and energy efficiency projects.

Renewable Energy

Energy from sources that regenerate and are less damaging to the environment, such as solar, wind, biomass, and small- scale hydroelectric power.

Renewables Portfolio Standard

Requires utility providers to increase the portion of energy that comes from renewable sources to 20% by 2010 and to 33% by 2020. Due to potential implementation issues, the adjusted business-as-usual forecast assumes that energy providers will achieve a minimum 28% renewable portfolio by 2020.

SCE Energy Leader Partnership

A program run by Southern California Edison (SCE) that provides support to local governments and institutions to assist them in achieving a joint vision of sustainability. SCE works closely with partners to address key issues that are barriers to achieving this vision and develop a long-term energy efficiency strategy. For local governments, SCE provides support to identify and address energy efficiency opportunities in municipal facilities, take actions supporting the California Long

Term Energy Efficiency Strategic Plan, and increase community awareness and participation in demand side management opportunities. A key goal in SCE's local government partnerships is helping cities and counties lead by example in addressing energy efficiency first in their own municipal facilities.

SCE Incentive (financial incentive)

Provisions issued by Southern California Edison (SCE) in order to promote the installation of energy efficiency and renewable projects in the utility territory. There are a variety of types of incentives, including rebates, loans, and alternative rates. The incentives are paid through the statewide Public Good Charge.

Senate Bill 375

Requires the California Air Resources Board to develop regional greenhouse gas emissions reduction targets to be achieved from the automobile and light truck sectors for 2020 and 2035. The regional targets adopted by the Southern California Association of Governments (SCAG) are an 8% reduction in per capita transportation emissions by 2020 and a conditional 13% reduction by 2035 which will be achieved through the development of a Sustainable Communities Strategy as part of the 2012 Regional Transportation Plan update.

Sectors

Emissions are grouped by the type of activity that generated the emissions, such as transportation, residential energy use, or commercial energy use.

Simple Payback Period

Amount of time required to recover an initial investment.

Smart Lighting

Lighting that is dynamically responsive to end-user needs based on daylighting, occupancy, scheduling, and demand response requirements.

Southern California Edison (SCE)

An investor-owned utility that is the primary electricity provider to Southern California and the San Gabriel Valley.

Southern California Regional Energy Consortium

Los Angeles County program that will bundle like projects for economies of scale after city energy efficiency projects have been identified.

Standard Practice

As opposed to best practices, standard practices include techniques, policies, methodologies, procedures, technologies, and systems that are typically employed by practitioners and generally do not achieve optimal results (in terms of energy efficiency, demand-responsiveness, high quality, environmental sustainability, smart-grid connectedness, and integration with renewable energy generation sources).

Sustainability

Community use of natural resources in a way that does not jeopardize the ability of future generations to live and prosper.

Sustainable Development

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Tariff

Electricity rates set by the utility and approved by the California Public Utilities Commission to recover costs. Customers may be placed in different rate classes based on a combination of parameters such as level of demand, end-use applications, or economic situation.

Time-of-Use General Service-Demand Metered (TOU-GS-3)

See Electricity Accounts.

Vehicle Miles Traveled (VMT)

A key measure of overall street and highway use. Reducing VMT is often a major objective in efforts to reduce vehicular congestion and achieve regional air quality goals.

Water Conservation

Reducing water use, such as turning off taps, shortening shower times, and cutting back on outdoor irrigation.

Water Efficiency

Replacing older technologies and practices in order to accomplish the same results with less water; for example, by replacing toilets with new low-water-using models and by installing —smart controllers in irrigated areas.

Zero Net Energy

For buildings, use of no more energy over the course of a year than can be generated on site through renewable resources such as solar, wind, or geothermal power.

8 Appendix B – Savings Calculations

Energy savings calculations used in this report are included in the attached zip file:

“City of Downey EAP Energy Savings Calculations.zip”

9 Appendix C – Project Cost Information

Project cost calculations are included in the attached calculation files:

“City of Downey EAP Energy Savings Calculations.zip”

10 Appendix D – Site Specific Summary Tables

Police Department

Measure Number	Measure Description	Annual Energy & Cost Savings					Financial Metrics					
		Peak Savings (kW)	Electricity Savings (kWh/yr)	Gas Savings (therms/yr)	Total Cost Savings	CO2 Savings (tons)	Measure Cost	Potential Incentive	Net Measure Cost	Simple Payback	Recommended?	
EEM-4	Interior Lighting and Controls Retrofit	7.0	28,600	-	\$ 3,375	9.2	\$ -	\$ -	\$ -	-	-	Y
EEM-6	Cool Roof	22.0	42,550	-	\$ 5,021	13.6	\$ 36,875	\$ 9,257	\$ 27,618	5.5		Y
EEM-7	Roof HVAC Retrofit	9.0	11,600	-	\$ 1,369	3.7	\$ 26,180	\$ 3,786	\$ 22,394	16.4		Y
EEM-8	Upgrade HVAC Control	-	32,000	400	\$ 4,076	12.4	\$ 57,920	\$ 4,880	\$ 53,040	13.0		Y
EEM-9	Low Flow Water Fixtures	-	-	1,938	\$ 1,454	10.3	\$ 560	\$ 280	\$ 280	0.2		Y
EEM-10	Photovoltaic System	83.0	127,659	-	\$ 15,064	40.9	\$ 463,804	\$ 39,258	\$ 424,546	28.2		N
Sub-Total		121	242,409	2,338	\$ 30,358	90	\$ 585,338	\$ 57,461	\$ 527,877	17.4		
TOTALS (All Recommended Measures)		38.0	114,750	2,338	\$ 15,294	49.2	\$ 121,534	\$ 18,203	\$ 103,331	6.8		

City Hall

Measure Number	Measure Description	Annual Energy & Cost Savings					Financial Metrics					
		Peak Savings (kW)	Electricity Savings (kWh/yr)	Gas Savings (therms/yr)	Total Cost Savings	CO2 Savings (tons)	Measure Cost	Potential Incentive	Net Measure Cost	Simple Payback	Recommended?	
EEM-4	Interior Lighting Retrofit	6.0	23,200	-	\$ 2,738	7.4	\$ -	\$ -	\$ -	-	-	Y
EEM-5	Exterior Lighting Retrofit	-	16,500	-	\$ 1,947	5.3	\$ 30,637	\$ 3,465	\$ 27,172	14.0		Y
EEM-6	Install cool roof when existing roof is replaced	11.0	27,500	-	\$ 3,245	8.8	\$ 24,832	\$ 7,425	\$ 17,407	5.4		Y
EEM-10	Install solar photovoltaic system	44.0	68,400	-	\$ 8,071	21.9	\$ 223,520	\$ 30,800	\$ 192,720	23.9		N
Sub-Total		61.0	135,600	-	\$ 16,001	43.4	\$ 278,988	\$ 41,690	\$ 237,298	14.8		
TOTALS (All Recommended Measures)		17.0	67,200	-	\$ 7,930	21.5	\$ 55,468	\$ 10,890	\$ 44,578	5.6		

Fire Station #1

Measure Number	Measure Description	Annual Energy & Cost Savings					Financial Metrics					
		Peak Savings (kW)	Electricity Savings (kWh/yr)	Gas Savings (therms/yr)	Total Cost Savings	CO2 Savings (tons)	Measure Cost	Potential Incentive	Net Measure Cost	Simple Payback	Recommended?	
EEM-4	Interior Lighting and Controls Retrofit	3.9	16,436	-	\$ 1,939	5.3	\$ -	\$ -	\$ -	-	-	Y
EEM-6	Cool Roof	2.0	19,050	-	\$ 762	101.0	\$ 17,700	\$ 0	\$ 17,700	23.2		Y
EEM-7	Rooftop HVAC Retrofit	8.7	11,566	-	\$ 463	61.3	\$ 24,364	\$ 1	\$ 24,363	52.7		Y
EEM-8	Upgrade HVAC Control	1.7	13,112	110	\$ 530	4.8	\$ 24,072	\$ 2,116	\$ 21,956	41.4		Y
EEM-9	Low Flow Water Fixtures	-	-	578	\$ 578	3.1	\$ 224	\$ 112	\$ 112	0.2		Y
EEM-10	Photovoltaic System	30.0	48,612	-	\$ 5,736	15.6	\$ 167,640	\$ 21,000	\$ 146,640	25.6		Y
Sub-Total		46.3	108,775.5	688.2	\$ 3,694	172.4	\$ 66,136	\$ 2,117	\$ 64,019	17.3		
TOTALS (All Recommended Measures)		46.3	108,775.5	688.2	\$ 3,694	172.4	\$ 66,136	\$ 2,117	\$ 64,019	17.3		

Library

Measure Number	Measure Description	Annual Energy & Cost Savings					Financial Metrics					
		Peak Savings (kW)	Electricity Savings (kWh/yr)	Gas Savings (therms/yr)	Total Cost Savings	CO2 Savings (tons)	Measure Cost	Potential Incentive	Net Measure Cost	Simple Payback	Recommended?	
EEM-4	Interior Lighting and Controls Retrofit	8.2	34,335	-	\$ 5,801	11.0	\$ -	\$ -	\$ -	-	Y	
EEM-5	Exterior Lighting Retrofit	-	2,845	-	\$ 481	0.9	\$ 25,755	\$ 427	\$ 25,329	52.7	N	
EEM-6	Install cool roof when existing roof is replaced	9.0	28,490	-	\$ 4,476	8.5	\$ 41,300	\$ 5,324	\$ 35,977	8.0	Y	
EEM-7	Replace rooftop HVAC units that are beyond EUL	16.1	39,263	400	\$ 7,034	14.7	\$ 162,379	\$ 8,712	\$ 153,667	21.8	Y	
EEM-8	Upgrade HVAC Control	4.8	16,049	336	\$ 3,048	6.9	\$ 37,413	\$ 3,463	\$ 33,950	11.1	Y	
EEM-10	Install solar photovoltaic system	53.0	82,100	-	\$ 13,871	26.3	\$ 296,164	\$ 37,100	\$ 259,064	18.7	Y	
Sub-Total		91.1	201,082	736	\$ 34,710	68.3	\$ 563,011	\$ 55,025	\$ 507,986	14.6		
TOTALS (All Recommended Measures)		91.1	198,236.5	736.0	\$ 34,230	67.4	\$ 537,256	\$ 54,598	\$ 482,658	14.1		



Rio Hondo Golf Course

Measure Number	Measure Description	Annual Energy & Cost Savings					Financial Metrics				
		Peak Savings (kW)	Electricity Savings (kWh/yr)	Gas Savings (therms/yr)	Total Cost Savings	CO2 Savings (tons)	Measure Cost	Potential Incentive	Net Measure Cost	Simple Payback	Recommended?
EEM-4	Interior Lighting and Controls Retrofit	6.4	27,061	-	\$ 4,226	8.7	\$ -	\$ -	\$ -	-	Y
EEM-5	Exterior Lighting Retrofit	-	24,080	-	\$ 3,760	7.7	\$ 47,514	\$ 1,926	\$ 45,588	12.1	Y
EEM-8	Upgrade HVAC Control	4.7	17,848	276	\$ 3,063	5.7	\$ 40,810	\$ 2,402	\$ 38,408	12.5	Y
Sub-Total		11.0	68,989	276	\$ 11,048	22.1	\$ 88,324	\$ 4,328	\$ 83,996	7.6	
TOTALS (All Recommended Measures)		11.0	68,989	276	\$ 11,048	22.1	\$ 88,324	\$ 4,328	\$ 83,996	7.6	

Columbia Memorial Space Center

Measure Number	Measure Description	Annual Energy & Cost Savings					Financial Metrics				
		Peak Savings (kW)	Electricity Savings (kWh/yr)	Gas Savings (therms/yr)	Total Cost Savings	CO2 Savings (tons)	Measure Cost	Potential Incentive	Net Measure Cost	Simple Payback	Recommended?
EEM-4	Interior Lighting Retrofit	9.0	16,338	-	\$ 3,970	5.2	\$ -	\$ -	\$ -	-	Y
EEM-8	Upgrade HVAC Control	11.4	16,490	360	\$ 4,367	7.2	\$ 41,911	\$ 4,537	\$ 37,375	8.6	Y
EEM-10	Install solar photovoltaic system	37.0	57,254	-	\$ 13,911	18.3	\$ 187,960	\$ 14,138	\$ 173,822	12.5	Y
Sub-Total		57.3	90,082.1	360.0	\$ 22,247	30.7	\$ 229,871	\$ 18,675	\$ 211,197	9.5	
TOTALS (All Recommended Measures)		57.3	90,082.1	360.0	\$ 22,247	30.7	\$ 229,871	\$ 18,675	\$ 211,197	9.5	

Civic Theatre

Measure Number	Measure Description	Annual Energy & Cost Savings					Financial Metrics				
		Peak Savings (kW)	Electricity Savings (kWh/yr)	Gas Savings (therms/yr)	Total Cost Savings	CO2 Savings (tons)	Measure Cost	Potential Incentive	Net Measure Cost	Simple Payback	Recommended ?
EEM-5	Exterior Lighting Retrofit	-	55,000	-	\$ 6,490	17.6	\$ 78,302	\$ 11,550	\$ 66,752	10.3	Y
EEM-6	Install cool roof when existing roof is replaced	13.0	21,000	-	\$ 2,478	6.7	\$ 36,875	\$ 5,710	\$ 31,165	12.6	Y
EEM-7	Replace rooftop HVAC units that are beyond EUL	44.0	57,800	400	\$ 7,220	20.6	\$ 106,284	\$ 16,938	\$ 89,346	12.4	Y
EEM-10	Install solar photovoltaic system	40.0	56,900	-	\$ 6,714	18.2	\$ 223,520	\$ 28,000	\$ 195,520	29.1	Y
Sub-Total		97.0	190,700	400	\$ 22,903	63.1	\$ 444,981	\$ 62,198	\$ 382,783	16.7	
TOTALS (All Recommended Measures)		97.0	190,700	400	\$ 22,903	63.1	\$ 444,981	\$ 62,198	\$ 382,783	16.7	

Barbara Riley Senior Center

Measure Number	Measure Description	Annual Energy & Cost Savings					Financial Metrics				
		Peak Savings (kW)	Electricity Savings (kWh/yr)	Gas Savings (therms/yr)	Total Cost Savings	Total Cost Savings	Measure Cost	Potential Incentive	Net Measure Cost	Simple Payback	Recommended ?
EEM-4	Interior Lighting and Controls Retrofit	9.4	36,523	-	\$ -	6,171	\$ 54,108	\$ 9,074	\$ 45,034	7.3	Y
EEM-5	Exterior Lighting Retrofit	-	16,580	-	\$ -	2,801	\$ 19,157	\$ 3,482	\$ 15,675	5.6	Y
EEM-6	Install cool roof when existing roof is replaced	15.0	49,000	-	\$ -	8,279	\$ 56,198	\$ 12,540	\$ 43,658	5.3	Y
EEM-7	Replace rooftop HVAC units that are beyond EUL	57.8	97,689	-	\$ -	16,505	\$ 143,205	\$ 29,186	\$ 114,018	6.9	Y
EEM-8	Upgrade HVAC Control	13.2	41,650	280	\$ 7,317	7,317	\$ 37,413	\$ 11,001	\$ 26,412	3.6	Y
EEM-10	Install solar photovoltaic system	61.5	95,140	-	\$ 16,075	16,075	\$ 343,662	\$ 43,050	\$ 300,612	18.7	Y
Sub-Total		156.8	336,583	280	\$ 57,148	280	\$ 653,742	\$ 108,333	\$ 545,408	9.5	
TOTALS (All Recommended Measures)		156.8	336,582.7	280.0	\$ 57,148	280.0	\$ 653,742	\$ 108,333	\$ 545,408	9.5	

Maintenance Yard / Transit Center / Parks

Measure Number	Measure Description	Annual Energy & Cost Savings						Financial Metrics			
		Peak Savings (kW)	Electricity Savings (kWh/yr)	Gas Savings (therms/yr)	Total Cost Savings	CO2 Savings (tons)	Measure Cost	Potential Incentive	Net Measure Cost	Simple Payback	
EEM-5	Maintenance Yard - Lighting Retrofit		2,418	-	\$ 285		\$ 7,554	\$ 193	\$ 7,360	25.8	
EEM-4	Maintenance Yard - Controls Upgrade		4,198		\$ 495		\$ 2,250	\$ 336	\$ 1,914	3.9	
EEM-5	Transit Center - Exterior Lighting Retrofit		13,193	-	\$1,557		\$ 32,323	\$ 1,979	\$ 30,344	19.5	
EEM-5	Rio San Gabriel Park - Exterior Lighting Retrofit		13,285	-	\$1,568		\$ 21,460	\$ 1,063	\$ 20,398	13.0	
EEM-5	Wilderness Park - Exterior Lighting Retrofit		10,827		\$1,278		\$ 47,873	\$ 866	\$ 47,007	36.8	
EEM-7	Maintenance Yard - HVAC Replacement	0.2	6,919		\$ 816		\$ 8,372	\$ 1,053	\$ 7,319	9.0	
EEM-7	Transit Center - HVAC Replacement	0.1	9,062		\$1,069		\$ 12,730	\$ 1,369	\$ 11,361	10.6	
	Sub-Total	-	43,976	-	\$5,189	-	\$ 111,610	\$ 4,445	\$ 107,165	20.7	
TOTALS (All Recommended Measures)		-	43,976	-	\$ 5,189	-	\$ 111,610	\$ 4,445	\$ 107,165	20.7	