

ADMINISTRATIVE REPORT

Date: September 30, 2011

Agenda Item No.: 5

Council Action Date: October 10, 2011

To: RICK COLE, CITY MANAGER

From: RICK RAIVES, PUBLIC WORKS DIRECTOR

Subject: RENEWABLE ENERGY, ENERGY CONSERVATION AND GREENHOUSE GAS REDUCTION UPDATE

RECOMMENDATION

It is recommended that the City Council receive information on the progress of current and potential projects for renewable energy, energy conservation, and greenhouse gas reduction, including an update on the Federal Stimulus Grant funded energy projects.

PREVIOUS COUNCIL ACTION

April 6, 2009 – Renewable Energy, Energy Conservation and Greenhouse Gas Reduction Update

September 16, 2009 – Energy Efficiency Project – Approval of Low Interest Loan with the California Energy Commission

May 9, 2009 – Resolution Authorizing the City to Submit Applications for American Recovery and Reinvestment Act (ARRA) of 2009. Specifically, an Energy Efficiency and Conservation Block Grant (EECBG).

SUMMARY

Cutting energy costs and protecting our environment and natural resources has been a focus of the City for more than a decade. The City is committed to reducing its reliance on non-renewable energy sources and integrating energy saving measures as part of its overall performance measures, policies and practices. These efforts have paid off in generating annual cost savings of over \$1.7 million dollars.

On April 6, 2009, the City Council received an update on the status of the City's renewable energy and energy conservation programs and directed staff to pursue potential funding sources, including Power Purchase Agreements, low interest loans,

Regional Energy Alliance incentives, Federal Stimulus funding and utility incentives (See Attachment 1). Since that time, the City has obtained approximately \$1.5 Million dollars in Federal Stimulus funding, block grants and low interest loans to implement a variety of energy efficiency and conservation programs. Once completed, these projects will save an additional \$128,000 to \$228,000 per year. This report will provide an update and progress report of these programs and projects.

DISCUSSION

Accomplishments

The City has implemented a broad range of energy efficient projects that have not only made significant reductions in energy costs to the City, but have also contributed toward the AB32 Statewide goal of reducing greenhouse gas emissions. Since 2007, the City has already reduced its annual emissions by more than 14 percent or about 2,000 metric tons. That is the equivalent of removing 380 vehicles from the road.

The City has installed energy-efficient lighting, made heating and air conditioning improvements, made pumping efficiency improvements for water and wastewater systems, and installed solar energy to power the Sanjon Maintenance Yard. The Solar photovoltaic panels at the yard alone save the City about \$25,000 annually in electrical costs.

Current Successes

With City Council direction and support, staff continues to pursue renewable energy and energy conservation improvements at various City facilities for additional funding. In 2009, the City was awarded two American Recovery and Reinvestment Act (ARRA) efforts: the Energy Efficiency and Conservation Block Grant (EECBG) funds (\$1,000,000) and the 1% low interest California Energy Commission (CEC) loan (\$500,000) for various projects. Listed below is an update on these projects.

Energy Efficient and Conservation Block Grant (EECBG) funds – Federal Stimulus Program

Solar Power Purchase Program for City Hall (\$320,000)

On September 19, 2011, this item was approved by the City Council and will help the City save money and further the City's goal of becoming more environmentally sustainable. The project consists of installing solar photovoltaic panels behind City Hall and will provide the main City Hall Building with approximately 75% of its total electricity needs for the next 30 years. The project will reduce carbon dioxide emissions into the atmosphere by 210 metric tons annually, which is the equivalent of planting 45 acres of trees. Latest estimates indicate a 20-year cumulative savings between \$500,000 to \$2 million and a 30 year savings of \$1 million to \$3 million.

LED Street Lights (\$340,000)

City Crews are currently replacing 500 cobra-style high-pressure sodium (HPS) streetlights with more energy efficient LED Street lights that use about half the electricity of the HPS street lights. Since the majority of the City's street lights are owned by Southern California Edison, the only ones that can be replaced are the intersection lights the City owns at signalized intersections. Approximately 500 of these streetlights will be replaced with energy efficient LED lights. This replacement is projected to save Street Lighting District 36 about \$30,000 per year in energy costs.

In addition to savings in annual energy costs, there will also be a reduction in the maintenance costs. Currently, the HPS street lights need to be replaced every two to three years. Once the LED lights are installed it is anticipated that replacement will be unnecessary for at least another ten years, perhaps longer. Since LED street light technology is still relatively new, it is unknown how long the lights will actually last out in the field. However, the 10-year warranty provided by the LED street light manufacturer ensures a minimum of 10-year use.

The replacement of the new LED street lights is about 15% complete. It is anticipated that the full replacement will be completed in summer 2012. As money becomes available, the City will look into switching out the few remaining City-owned street lights with the more energy efficient LED Street lights. This may include the decorative street lights in the hillsides above Ventura High School.

Energy Efficiency Program for Non-Profit Organizations (\$195,000)

This program was designed to help non-profit organizations in the City reduce their utility bills by replacing inefficient lights at no cost to the organization. Twenty (20) non-profit organizations have been selected through an open process to participate in the program. Sylvania Lighting Services has been selected to conduct the lighting retrofits, which will commence October/November. The new energy efficient lights are expected to reduce the non-profits' energy bills by over \$45,000 each year. This is additional money the non-profits can put back into providing vital community services rather than paying electricity costs.

Greenhouse Gas Reduction Modeling and Cost Effective Strategy Development Project (\$150,000)

This project identifies and inventories greenhouse gas emissions in the City and develops a modeling tool that provides a detailed assessment of the cost, financial feasibility, and cost/benefit of various greenhouse gas reduction strategies. The inventory and model development have been completed and AECOM is currently using the modeling tool to conduct a neighborhood level analysis of Mid-town. The neighborhood level study will build upon the greenhouse gas reduction measures and strategies developed for the city-level study with a more detailed analysis conducted for the Mid-town neighborhood. This project will support the City's ability to make informed decision about the most effective and cost efficient strategies for reducing the City's greenhouse gas emissions.

California Energy Conservation (CEC) 1% Loan Projects

In December of 2009, the City received a 1% loan of \$500,000 to implement the following energy conservation projects, which are projected to save 745,000 kilowatts and \$76,000 with a 6.5 year anticipated payback period.

City Hall HVAC

The City Hall HVAC replacement project includes replacing the chillers, which were the last remaining inefficient equipment. In the past 6 months this has yielded 6% reduction in energy use at City Hall. The CEC Loan funded only a portion of this project, the remaining was completed as a City Capital Improvement Project.

Exterior and Interior Lighting Retrofits

Public Safety Facilities Lighting Retrofits: At the Police/Fire Headquarters and Fire Stations 5 and 6, Facilities replaced over 200 exterior lights and 60 interior lights with fewer and more energy efficient lighting while increasing the amount of perceived light. This project was completed in July, 2011.

Parks – Exterior and Interior Lighting Efficiencies: Over 120 interior and exterior lighting retrofits will be installed at the Barranca Vista and Westpark Centers and surrounding areas achieving an increase in lighting effect while realizing energy savings. It is estimated that the project will be completed by November, 2011.

Parking Lot Lighting Efficiencies: Over 200 lighting fixtures will be retrofitted with energy efficient lights at the Maintenance Yard, Downtown Parking Structure, and various park locations. It is estimated the project will be completed by January, 2012.

IT Server Virtualization

Server virtualization consolidates the operations of many dispersed servers onto fewer physical machines. Virtualization software decouples a server's operating system from its physical hardware to create a "virtual machine". The ability to run multiple virtual machines on a single physical server has significant implications for the energy required to power IT services. The resulting energy savings are significant, since a virtual server uses about one-eighth the power and cooling of a stand-alone server. The project will reduce the City of Ventura's peak energy use by 10,000 kilowatt hours annually and save \$1,400 per year.

Partnerships

The City continues to pursue regional, local and private partnerships that save energy and advance the goal of reducing the City's reliance on non-renewable energy sources. Listed below are some key partnerships that have been forged to achieve this goal.

Ventura County Regional Energy Alliance (VCREA)

The City has partnered with the VCREA since 2004 to implement numerous energy saving projects. Utilizing VCREA's expertise and over \$341,000 in incentives, the City has completed over 20 projects that reduce the City's electricity bill by \$260,000 each year.

Southern California Edison – Energy Leader Partnership

This SCE program provides support to local governments to identify and address energy efficiency opportunities in municipal facilities. The City's actions support the California Long Term Energy Efficiency Strategic Plan and increase community awareness and participation in reducing electricity demand. SCE currently has over 100 cities and counties participating in the local government partnership program.

Southern California Edison - Pump Efficiency Testing Program

Ventura Water has been participating in the SCE pump efficiency-testing program for the past 15 years. In this program, SCE provides free bi-annual pump efficiency testing for all Ventura Water facilities. After each test, SCE provides a report that details the efficiency of each pump and a detailed cost analysis of the effect of repairing each pump. Since 35% of the City's energy cost is from pumping applications within Ventura Water, the SCE pump efficiency testing program is one of Ventura Water's highest priorities for energy conservation.

Institute for Local Government – Beacon Award

The prestigious Beacon Award was presented to the City of Ventura in recognition for its success in reducing greenhouse gas (GHG) emissions, reducing energy and resource use, and adopting policies and programs to address climate change and promote sustainability. The program is funded by California utility ratepayers and administered by Southern California Edison, Southern California Gas Company, Pacific Gas and Electric, and San Diego Gas and Electric.

Solar Power Partners – Power Purchase Agreement for City Hall Solar Power Project

This is a private and public partnership that will help the City save money and further the City's goal of becoming more environmentally sustainable. This is a 20 year agreement during which Solar Power will be responsible for all system operations, maintenance and site security. The City will be responsible only to purchase all power generated and provide SPP with access to the site for proper operations and maintenance.

Future Opportunities

There are many opportunities that the City continues to pursue in efforts to strategically position itself for state and federal grants and for more Federal Stimulus (Part 2) resources. Shifting transportation energy from gasoline to electricity can help to reduce community-wide GHG emissions that are mandated by California's SB375. Public Works staff recently submitted a grant application for nine electric vehicle-charging stations within the Downtown area at the Beachfront Parking Structure, Downtown

Parking Structure and City Hall. This electric vehicle infrastructure will allow residents and visitors to easily and conveniently charge their electric vehicles in the downtown area.

Additional energy savings are also being explored at the City's Aquatic Center for the installation of solar heaters and/or wind turbines at the Ventura Community Park. We have been collecting wind measurements for the past year and have started analyzing the data to determine the feasibility of using wind power to produce electricity. The City could save an additional \$35,000 in reduced natural gas costs by installing solar heating panels adjacent to the pools. The design for solar water heating panels is currently under way and construction is expected to begin within the next year.

Further opportunities may include installation of photovoltaic panels or other energy savings opportunities at other City facilities including the water and wastewater treatment facilities. Ventura Water alone spends \$2.2 million a year on energy costs.

Other Low to High Cost Saving Measures

In an effort to continue to meet our performance measure goal of reducing energy usage by 5% each year, the City needs to consider a combination of low to high cost measures. Generally, energy use in office buildings is 39% HVAC, 33% lighting, and 17% office equipment.

Low Investment, Short Payback

A majority of the low investment energy conservation measures has been achieved, such as lighting retrofits, occupancy sensors, energy efficiency equipment and practices, and window tinting. Facilities will continue to conserve energy usage by meeting or exceeding the California Green Building standards, and staying current with the latest technologies as standard practices for daily operations.

Employee behavior can make a difference in energy use and cost. Public Works and the City's Green Team will continue to develop strategies to increase employee awareness and education to conduct City business and operations in the most energy efficient way possible.

Moderate Investment, Medium Payback

Complete the heating, ventilation, and air conditioning (HVAC) projects at City Hall and Police/Fire Headquarters, which are estimated to save an additional 6% in energy usage and cost. Future projects will be evaluated and may include cool roofs, solar thermal hot water heating, and natural day lighting, such as installation of solar tubes at fire stations.

Capital Investments with Longer Payback

As the costs of renewable energy technologies continue to drop, Public Works plans to periodically assess the feasibility of additional renewable energy projects. We also plan to continue to collaborate with SCE and Ventura County Regional Energy Alliance to

find opportunities to extend the benefits of cost saving energy efficiencies to Ventura's homes, businesses and non-profits.

FISCAL IMPACTS

Cost savings of implementing these various projects are estimated ranging from \$128,000 to \$228,000 per year; which will further reduce our energy costs. To date, the City has reduced electricity usage by nearly 12 million kilowatt-hours, which is now saving the City over \$1.7 million per year.

There are no additional fiscal impacts to the City at this time. By continuing to implement energy conservation projects, the City will realize future cost savings and reduced electricity bills immediately and long term.

ALTERNATIVES

The City Council could direct staff not to continue to pursue energy savings and energy conservation projects any further; however the City will not be able to reduce ongoing energy costs or meet its target for reducing greenhouse gas emissions.

The City Council could also provide staff direction to pursue other project opportunities in addition to those highlighted in this report.

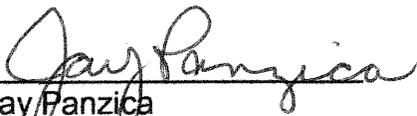
Prepared by a Public Works staff collaborative effort

For



Rick Raives
Public Works Director

Reviewed as to fiscal impacts



Jay Panzica
Chief Financial Officer

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Administrative Report

September 30, 2011

Page 8



City Manager's Office

Attachment 1 – Administrative Report dated April 6, 2009

ATTACHMENT 1

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CITY OF VENTURA
ADMINISTRATIVE REPORT

Date: March 25, 2009

Agenda Item No.: 7

Council Action Date: April 6, 2009

To: RICK COLE, CITY MANAGER

From: RONALD J. CALKINS, PUBLIC WORKS DIRECTOR

Subject: RENEWABLE ENERGY, ENERGY CONSERVATION AND
GREENHOUSE GAS REDUCTION UPDATE

RECOMMENDATION

- A. Receive information on completed and potential future renewable energy, energy conservation, and greenhouse gas reduction projects.
- B. Authorize City staff to continue pursuing the feasibility of installing a large-scale solar photovoltaic system and/or other renewable energy and energy conservation improvements at various City facilities including but not limited to City Hall; Ventura Community Park and Aquatic Center; and Water and Wastewater Facilities for the purpose of reducing annual energy costs and decreasing green house gas emissions and to return to City Council with one or more recommended projects.
- C. Authorize City staff to pursue potential funding sources, including Power Purchase Agreements, low-interest loans, Regional Energy Alliance incentives, Federal Stimulus funding and utility incentives.

SUMMARY

The City has completed many energy efficiency improvements over the past decade that are currently saving the City over \$1.7 million annually in reduced electrical costs based on current rates. Capital improvements in renewable energy and energy conservation have reduced the City's demand for electricity by nearly 12 million kilowatt-hours annually - the equivalent of powering 1,100 residential homes. This reduced electricity usage corresponds to 3,385 metric tons less green house gas emissions per year - the equivalent of planting more than 20,000 trees to remove an equivalent amount of carbon dioxide from the air. While this is a significant accomplishment, there are still many more opportunities and savings that can be realized.

Staff has identified several larger-scale projects that should be pursued. The merits of these projects have only been initially explored and require further analysis and

Administrative Report

March 25, 2009

Page 2

justification before a firm commitment and implementation is made. These projects are:

- Photovoltaic Solar Panel System at City Hall
- Solar Heaters and/or Wind Turbine(s) at the Ventura Community Park and Aquatic Center
- Photovoltaic Solar Panel Systems at one or more Water and Wastewater Facilities

At this time, staff recommends soliciting letters of interest and budgetary estimates from private solar providers and other companies that would be able to design and build these systems. Depending on the feasibility, staff will return to City Council with a recommendation to proceed or not proceed with one or more projects.

These projects will also help the City meet its Tier II Performance Measure of reducing facilities and utilities energy use. In addition, reducing our energy use and resulting greenhouse gas emissions will help the City contribute towards the AB 32 statewide goal of reducing greenhouse gas emissions to 1990 levels by 2020. These efforts will also put the City ahead of any anticipated future state or federal greenhouse gas reduction mandates.

DISCUSSION

Background

For the past several years, the City of Ventura has implemented many energy savings and conservation projects. These projects primarily included the installation of solar panels at the San Jon Yard, light replacements, heating/ventilation/air-conditioning (HVAC) improvements, and the installation of efficient pumps, variable speed drives and motors at various City facilities. A detailed list of completed projects and the estimated dollar savings for each is provided in Attachment 1. To date, the City has reduced electricity usage by nearly 12 million kilowatt-hours, which is now saving the City over \$1.7 million per year. This includes energy efficiency and conservation improvements as part of water and wastewater facilities and non-utility facilities, such as City Hall.

The City has also educated staff about the merits of energy conservation through the Green Initiative's "Get Your Green On" campaign. Staff were given energy efficient compact florescent bulbs and taught the importance of shutting off unnecessary lights and equipment. In addition, City Hall is now closed every other Friday and Information Technology developed a program that shuts down computers that are left on after 7:00 PM. These efforts alone are saving the City several thousand dollars per year in reduced electricity costs.

Administrative Report

March 25, 2009

Page 3

Many of the energy efficiencies and cost savings gained are a result of the City working closely with the Ventura County Regional Energy Alliance (REA), which was formed in 2004 and with Southern California Edison (SCE). With their continued support along with incentives funded through the Public Utilities Commission, the City expects to implement other projects that will result in additional future savings. With help from the REA and SCE, the City has identified many more projects that could result in an additional savings of 8 million kilowatt-hours or \$1.3 million annually. This is equivalent to powering 785 residential homes. In doing so, the City would also further reduce green house gas emission by an additional 2,435 metric tons. Potential future projects are listed in Attachment 2.

Many projects with relatively quick payback periods have been completed. Most recently, the City completed the installation of variable frequency drives on pump motors at the community pool facility and the pump and motor were replaced at the Victoria Well No. 2. Each project saved the City approximately \$31,000 annually, or over \$62,000. Within the past few years and with direction from City Council, lighting replacements and HVAC improvements were made at several city owned facilities. More energy efficient lights have been installed at City Hall, Police/Fire Headquarters, the San Jon Maintenance Yard, the Beach Parking Structure, traffic signals, and the Downtown Parking Structure at Santa Clara and California Streets. City staff will continue to work with the Ventura County Regional Energy Alliance (REA) to identify and implement other smaller scale projects.

In 2004, the City installed solar photovoltaic panels at the San Jon Yard. The system, partially funded by a \$420,000 incentive from SCE and a \$208,000 low-interest loan from the California Energy Commission, provides approximately 45% of the required electricity at the Yard and saves the City approximately \$25,000 per year in electrical costs. The panels reduce greenhouse gas emissions by approximately 48 metric tons per year. The payback period for this project is approximately 15 years. HVAC improvements currently underway at the Yard are expected to reduce electricity demand to a point where the solar panels will provide almost all the power needs at the facility.

While much progress has been made, it is now time to consider one or more relatively large-scale renewable energy or energy conservation projects. While the near-term savings could be relatively small and payback periods very long (more than 15 years), there are other benefits. Although payback on a traditionally funded photovoltaic project may exceed 15-20 years, new funding alternatives such as Power Purchase Agreements can fund large projects with little to no upfront costs. Other benefits include reducing the City's contribution of greenhouse gas emissions by utilizing less electricity from the grid and setting a positive example for both private businesses and other public agencies. The location of solar panels could be in plain site of the visiting public and could also include an educational component where visitors can learn how they work and more about their benefits. Potential locations for large-scale projects are at City

Administrative Report

March 25, 2009

Page 4

Hall, the Community Park, and Water and Wastewater Facilities. City Hall and the Community Park would be the most preferable locations if public visibility is desired.

City Hall Photovoltaic Solar Panel System

Photovoltaic panels at City Hall could be installed in various areas behind City Hall. The concept plan depicted in Attachment 3 illustrates potential locations, which include the employee parking lot, upper overflow parking area and the flat concrete roof at Grant Park Reservoir. Solar photovoltaic panels located in the parking lot would be limited to areas where there is sufficient solar access throughout the daytime where shadows from the City Hall building are minimal. The panels would be mounted on parking canopies and provide adequate clearance for covered parking spaces. The total size of the system is currently estimated at between 500-600 kilowatts, which is about 5 times the size of the existing system at the San Jon Yard. Concentrated solar panels could also be considered, which would dramatically reduce space requirements.

Community Park Solar Heaters and/or Wind Turbine(s)

Additional energy savings could be realized at the Ventura Community Park. Recent and pending improvements will allow the City to save up to \$40,000 annually in reduced heating and electrical costs for the pools. Preliminary findings indicate that another \$35,000 in reduced natural gas costs could be realized by installing solar heating panels adjacent to the pools at the Community Park. The system would take up approximately 13,000 square-feet of space and could be mounted on top of parking canopies in the parking area depicted in Attachment 4. Costs for such a system are currently estimated at \$1.2 million. Such a system would also help the City reduce its carbon footprint. As indicated in Attachment 7, the operation of Community Park currently contributes 1,092 metric tons of green house gas annually, which accounts for almost 7% of the City's green house gas emissions. This is more than any other single City facility. Also, the installation of such a system is one of the ways that capital money could be used to reduce on-going operating costs.

Another possibility for the Community Park is to install one or two small-scale wind turbines to produce at least a portion of electricity that is used at the pool facility. Wind turbines would be smaller in size than the very large models that are usually used at commercial-scale wind farms (100-kilowatts instead of 1 megawatt). The Park is wide open and there is a relatively high exposure to winds. One of the potential drawbacks of wind turbines is their high visibility and potential for being an "eye sore". However, such turbines could conceivably be mounted on top of sports light poles that are already planned for the site. Preliminary estimates indicate that a 100-kilowatt wind turbine at the Park would cost around \$400,000 and would reduce the annual electrical bill by about \$26,000 (25% of the total demand). Green house gas emissions would be reduced by 50 metric tons annually. In order to confirm the feasibility of this option, a

Administrative Report

March 25, 2009

Page 5

small wind gage will need to be installed in order to collect data for a period of at least six months.

Water and Wastewater Photovoltaic Projects

Photovoltaic panels could also be installed at the Wastewater Treatment Plant and at the Bailey Water Treatment Plant. There is sufficient space at each of these facilities to install large-scale systems. These facilities currently require very large amounts of electricity to operate. Water treatment, production, distribution and wastewater facilities currently account for about 50% of the City's total demand for electricity. Nearly 7,000 metric tons of green house gas is emitted from the operation of these facilities. Cost savings and carbon dioxide emissions can be significantly reduced by installing photovoltaic solar panels at one or more water and wastewater facilities. Attachment 5 and 6 illustrate potential locations for photovoltaic systems at the Bailey Water Treatment Plant and the Wastewater Plant.

FISCAL IMPACTS

Immediate Impact

There is no immediate fiscal impact. Incidental staff time will be required in order to seek out letters of interest and to obtain additional information and budget proposals and to return to City Council with one or more recommended projects. The cost associated with this effort is already built into the operating budget.

Impacts for Implementation

There are several different potential funding mechanisms for renewable energy or energy conservation projects. The Public Utilities Commission continues to provide financial incentive programs that the REA and the SCE utilize to assist their clients and customers in recognizing cost recovery following the retrofit or installation of energy efficient equipment. CEC Loans were used for many of the lighting replacement and HVAC upgrades that were made in the past several years. The dollar savings in reduced energy usage is used to pay off the loans. These loans are proposed for future projects that require little capital funding and that have payback periods of less than approximately 10 years.

There are several funding options for large-scale renewable energy and energy conservation projects. These include the use of Redevelopment Agency (RDA) Funds that are being returned to the City coffers, entering into a Power Purchase Agreement (PPA) with a private company, loans, bonds, or even grants. A PPA is a funding mechanism in which a 3rd party pays for the installation of a solar photovoltaic system and the City pays a small premium to use electricity produced by the system. This funding option requires no upfront costs. City staff is currently seeking out various

Administrative Report

March 25, 2009

Page 6

grants that may be available through the recently enacted American Recovery and Reinvestment Act. Each of these is being explored in detail and staff will return to City Council with a recommendation on which ones would be best to utilize when it returns with a recommendation for projects to implement.

ALTERNATIVES

The City Council could direct staff not to pursue energy savings and energy conservation projects any further; however, the City will not be able to reduce on-going energy costs or meet its target for reducing green house gas emissions. The City Council could also provide staff direction on other project opportunities to pursue besides the ones highlighted in this report.

Prepared by Joe McDermott
Principal Civil Engineer, for



Ronald J. Calkins
Director of Public Works

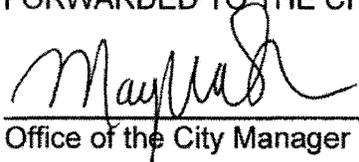
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Reviewed as to fiscal impacts



Jay Panzica
Chief Financial Officer

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Administrative Report

March 25, 2009

Page 7

Attachments:

- Attachment 1 – Completed Renewable Energy and Energy Conservation Projects
- Attachment 2 – Future Potential Renewable Energy and Energy Conservation Projects
- Attachment 3 – Potential Locations for Photovoltaic Panels at City Hall
- Attachment 4 – Potential Location for Solar Heating Panels at Community Park
- Attachment 5 – Potential Photovoltaic Panels at Bailey Water Treatment Plant
- Attachment 6 – Potential Photovoltaic Panels at the Wastewater Treatment Plant
- Attachment 7 – City Operations Green House Gas Emissions (2007)

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ATTACHMENT 1

COMPLETED RENEWABLE ENERGY AND ENERGY
CONSERVATION PROJECTS

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Wastewater Energy Savings Projects (Completed)

	Location	Description	Status	Approximate KWh Saved	Estimated Annual Energy Savings (2009 dollars)
1	Wastewater Plant	Installation of Cogeneration Facility and other Plant Improvements	Completed in 1992; Replacement or upgrade in 2020	5,202,000	\$ 780,000
2	Sewage Lift Stations (City-Wide)	Variable Frequency Drive Installations on Lift Pumps	Completed	329,000	\$ 50,000
Total Savings to Date				5,531,000 KWh	\$ 830,000
Estimated CO₂ Reduction				1,610 Tons	

5,531,000 KWh is equivalent to powering 519 residential homes for an entire year

(\$ 0.15 per KWh at 2009 rates assumed for all calculations)

Water Energy Savings Projects (Completed)

	Location	Description	Status	Approximate KWh Saved	Estimated Annual Energy Savings (2009 dollars)
1	AWTP	AWTP Savings by Design - CIP Construction included Installation of 7 VFDs and high efficiency motors	Completed	233,000	\$35,000
2	Golf Course BPS	Replaced 2 constant speed motors with 2 VFDs and high efficiency motors	Completed	400,000	\$60,000
3	Mound Well 1	Installation of VFD and high efficiency motor	Completed	300,000	\$45,000
4	Power BPS	Replaced two 2 EM Drive variable speeds with two 2 VFDs and high efficiency motors	Completed	47,000	\$7,000
5	Long Canyon Tanks	Installed solar power for water mixing system	Completed	27,000	\$4,000
6	Buena Vista BPS	More efficient operation with the new 330 zone suction line.	Completed	73,000	\$11,000
7	Saticoy Treatment Plant	Reduced the Hp of a 500 Hp constant speed motor to 350 Hp and added a VFD and high efficiency motor	Completed	233,000	\$35,000
8	County Yard Well	Installation of VFD and high efficiency motor	Completed	247,000	\$37,000
9	330 BPS	Replaced 3 constant speed, soft-starts with 3 VFDs and high efficiency motors	Completed	80,000	\$12,000
10	Nye 11	Installation of VFD and high efficiency motor	Completed	7,000	\$1,000
11	Saticoy Well #2	Replaced well pump after pump efficiency testing	Completed	80,000	\$12,000
12	Victoria Well #2	Replaced well pump after pump efficiency testing	Completed	213,000	\$32,000
13	Seaward & Poli BPS	Replaced 3 inefficient pump motors with 3 energy efficient motors.	Completed	60,000	\$9,000
14	Various Facilities (Citywide)	Miscellaneous improvements	Completed	1,093,000	\$164,000
Total Savings to Date				3,093,000 KWh	\$464,000
Estimated CO₂ Reduction				900 Tons	

3,093,000 KWh is equivalent to powering 290 residential homes for an entire year

Non-Utility Energy Savings Project (Completed)

	Location	Description	Status	Approximate KWh Saved	Estimated Annual Cost Savings (2009 dollars)
1	San Jon Yard	Photovoltaic Project	Completed	167,000	\$25,000
2	San Jon Yard	Energy Efficient Lights and Motion Sensors	Completed	133,000	\$20,000
3	City Hall	Energy Efficient Florescent Ceiling Lights	Substantially Completed	180,000	\$27,000
4	City Hall North (1st Floor)	Energy Efficient Florescent Ceiling Lights	Completed	7000	\$1000
5	City Hall North (2 nd Floor)	Energy Efficient Florescent Ceiling Lights	Completed	7000	\$1000
6	City Hall North (3 rd Floor)	Energy Efficient Florescent Ceiling Lights	Completed	7000	\$1000
7	City Hall	HVAC Improvements: VSDs on 8 Air Handlers	Completed	113,000	\$17,000
8	Police/Fire HQ	T-8 Lights and Motion Sensors	Completed	113,000	\$17,000
9	Police/Fire HQ	Upgrade HVAC w/ Turbocor Oil-less Centrifugal Compressors, VSDs on Pumps and New Energy Mgmt Software	Completed	133,000	\$20,000
10	Downtown Parking Garages	T-8 Lights and Motion Sensors	Completed	73,000	\$11,000
11	Community Park	Installation of VFDs for each of the three pool circulation pumps	Completed	207,000	\$31,000
12	Street Lights (City Wide)	Installation of energy-efficient lights at City owned ballasts	Completed	1,000,000	\$150,000
13	Signalized Street Intersections (City wide)	LED/energy-efficient traffic signals	Completed	867,000	\$130,000
Total Savings to Date				3,007,000 KWh	\$451,000
Estimated CO₂ Reduction				875 Tons	

3,007,000 KWh is equivalent to powering 282 residential homes for an entire year

(\$ 0.15 per KWh at 2009 rates assumed for all calculations)

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ATTACHMENT 2

FUTURE POTENTIAL RENEWABLE ENERGY AND ENERGY
CONSRVATION PROJECTS

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Wastewater Energy Savings Projects (Future)

	Location	Description	Status	Approximate KWh Saved	Estimated Annual Energy Savings
1	Wastewater Plant	Aeration Basin Modifications / Nitrification and Denitrification Improvements	Pending	2,150,000	\$ 322,400
2	Wastewater Plant	Installation of energy-efficient T-8 ceiling lights as part of laboratory facility remodel	Pending	15,000	\$2,200
3	Wastewater Plant	Installation of New Energy –Efficient Aeration Blowers	Future	429,000	\$64,400
4	Wastewater Plant	Up to 500kw Photovoltaic Panels at Proposed Maintenance Storage Building and other Potential Locations	Future	835,000	\$125,000
5	Wastewater Plant	Dewatering Equipment Replacement	Future	133,000	\$20,000
<i>Future Additional Savings</i>				3,562,000 KWh	\$ 534,000
<i>Estimated CO₂ Reduction</i>				1,037 Tons	

3,562,000 KWh is equivalent to powering 334 residential homes for an entire year

(\$ 0.15 per KWh at 2009 rates assumed for all calculations)

Water Energy Savings Projects (Future)

	Location	Description	Status	Approximate KWh Saved	Estimated Annual Energy Savings
1	Hall Canyon BPS	Installation of VFD and replace pump control valves	In Progress	27,000	\$4,000
2	Golf Course #5	Replace well pump motor and install VFD	Future	113,000	\$17,000
3	Golf Course #6	Replace well pump motor and install VFD	Future	113,000	\$17,000
4	Golf BPS	Replace golf course BPS #3 & #4 motor and install VFD	Future	133,000	\$20,000
5	Nye Well #7	Replace well pump motor and install VFD	Future	13,000	\$2,000
6	Nye Well #8	Replace well pump motor and install VFD	Future	13,000	\$2,000
7	Golf Course BPS & Wells	Energy efficiency study / improvements	Future	107,000	\$16,000
8	Bailey Treatment Plant	Photovoltaics for supplemental power	Future	467,000	\$70,000
9	330 Zone BPS	Photovoltaics for supplemental power	Future	333,000	\$50,000
10	Corbett Tank/Kimball BPS	Photovoltaics for supplemental power	Future	80,000	\$12,000
11	AWTP	Photovoltaics for supplemental power	Future	667,000	\$100,000
Future Additional Savings				2,066,000 KWh	\$310,000
Estimated CO₂ Reduction				601 Tons	

2,066,000 KWh is equivalent to powering 194 residential homes for an entire year

(\$ 0.15 per KWh at 2009 rates assumed for all calculations)

Non-Utility Energy Savings Project (Future)

	Location	Description	Status	Approximate KWh Saved	Estimated Annual Cost Savings
1	Community Park	Activity Pool Cover	In Progress	n/a	\$10,000
2	San Jon Yard	HVAC Improvements	In Progress	133,000	\$20,000
3	San Jon Yard	Photovoltaic Project (Additional Panels) / ½ size of existing system	Future	87,000	\$13,000
4	City Hall	HVAC Improvements (westside chiller)	Pending	87,000	\$13,000
5	City Hall	Photovoltaic Panels (Rear and Upper Parking Lots and/or Grant Park Reservoir)	Future	800,000	\$120,000
6	Community Park	Wind Turbine, Solar Water Heaters and/or photovoltaic	Future	200,000	\$30,000
7	Community Park	Pool #2 – Convert Pole Lights to Fluorescent	Future	60,000	\$9,000
8	Various Parks	Energy Efficient Path and Parking Lot Lights	Future	133,000	\$20,000
9	Various Parks	Restroom Renovations (energy-efficient lighting / water saving fixtures)	Future	67,000	\$10,000
10	Westpark	Photovoltaic at existing/new gymnasium	Future	53,000	\$8,000
11	Westpark	Upgrade Metal Halide Lights	Future	33,000	\$5,000
12	Barranca Vista Community Ctr	Photovoltaic at existing building	Future	47,000	\$7,000
13	Senior Centers	Photovoltaic at existing Avenue Senior Center	Future	100,000	\$15,000
14	Police/Fire HQ	250 kw Photovoltaic at existing building	Future	333,000	\$50,000
15	Police/Fire HQ	Lighting Renovations	Future	113,000	\$17,000
16	Existing Fire Stations	Photovoltaic	Future	267,000	\$40,000
17	Existing Fire Stations	HVAC, Lights and Air Pumps	Future	93,000	\$14,000
18	Hillside Lighting District	Replace existing lights with new and more energy-efficient lights	Future	133,000	\$20,000
Future Additional Savings				2,739,000 KWh	\$421,000
Estimated CO₂ Reduction				797 Tons	

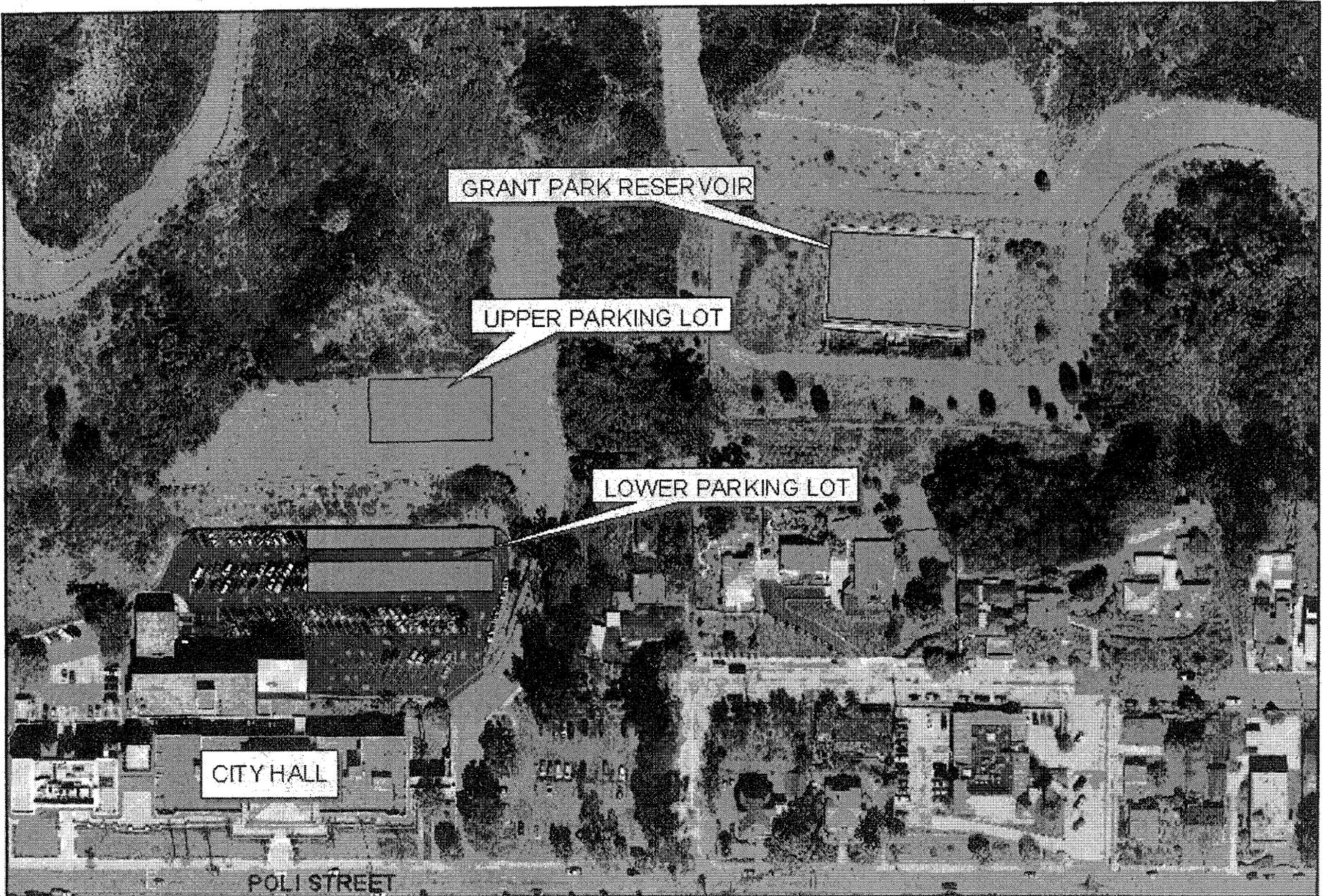
2,739,000 KWh is equivalent to powering 257 residential homes for an entire year (\$ 0.15 per KWh at 2009 rates assumed for all calculations)

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ATTACHMENT 3

**POTENTIAL LOCATIONS FOR
PHOTOVOLTAIC PANELS AT CITY HALL**

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POTENTIAL LOCATIONS FOR SOLAR PHOTOVOLTAIC PANELS AT CITY HALL



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1" = 150'

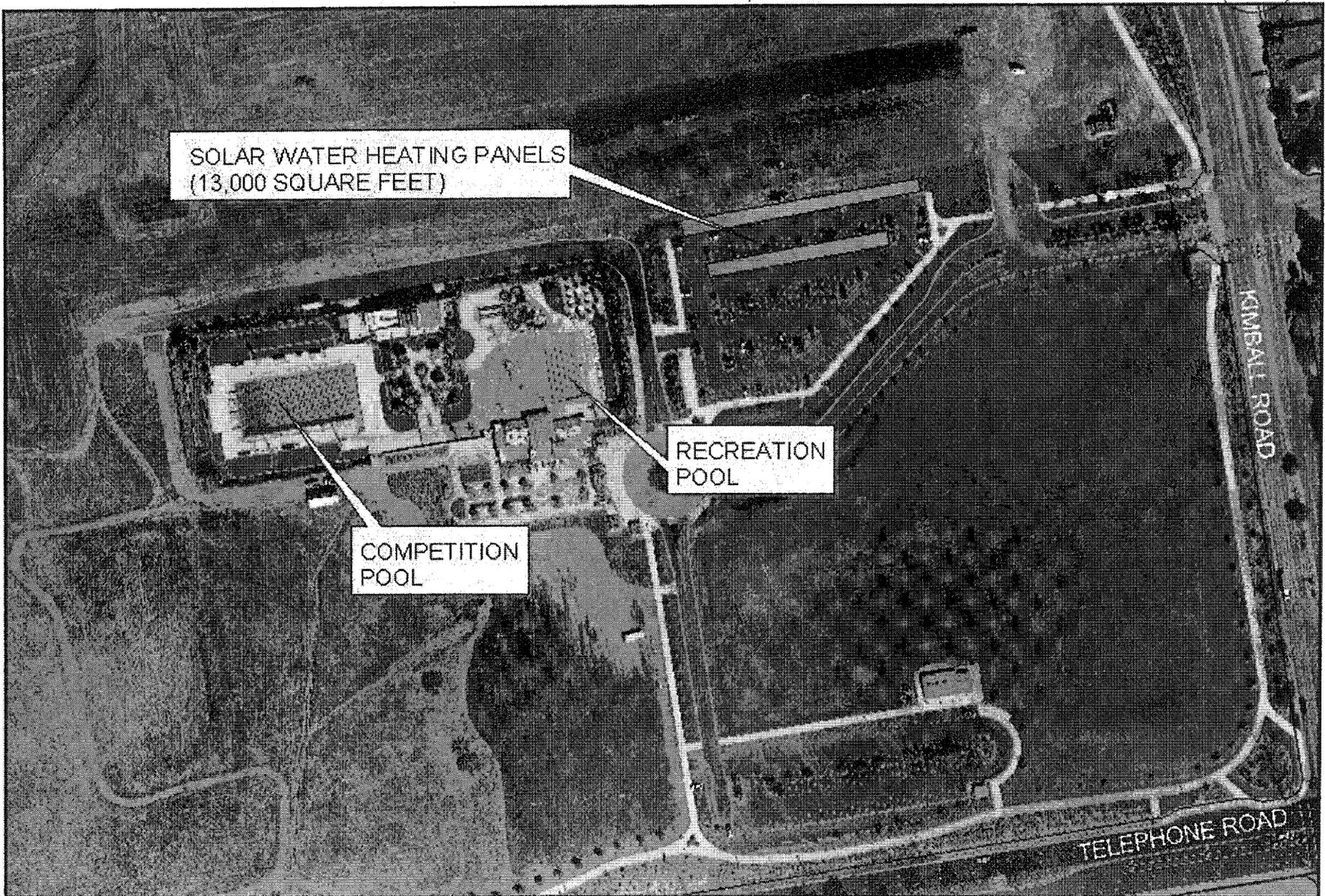
ATTACHMENT 3

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ATTACHMENT 4

**POTENTIAL LOCATION FOR
SOLAR HEATING PANELS AT COMMUNITY PARK**

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POTENTIAL SOLAR WATER HEATING PANELS AT COMMUNITY PARK



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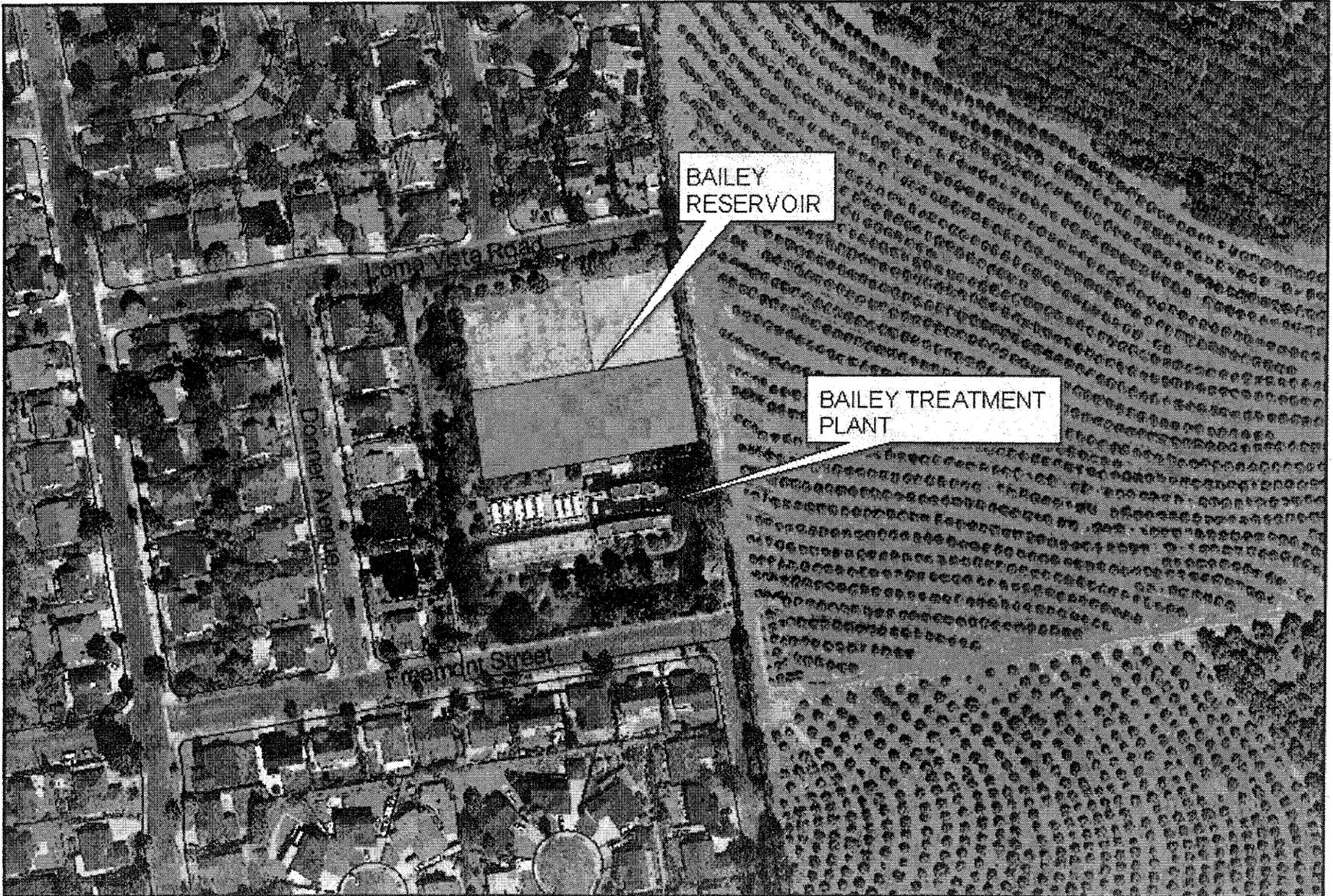
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ATTACHMENT 5

**POTENTIAL PHOTOVOLTAIC PANELS
AT BAILEY WATER TREATMENT PLANT**

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BAILEY
RESERVOIR

BAILEY TREATMENT
PLANT



POTENTIAL SOLAR PHOTOVOLTAIC PANELS AT BAILEY TREATMENT PLANT



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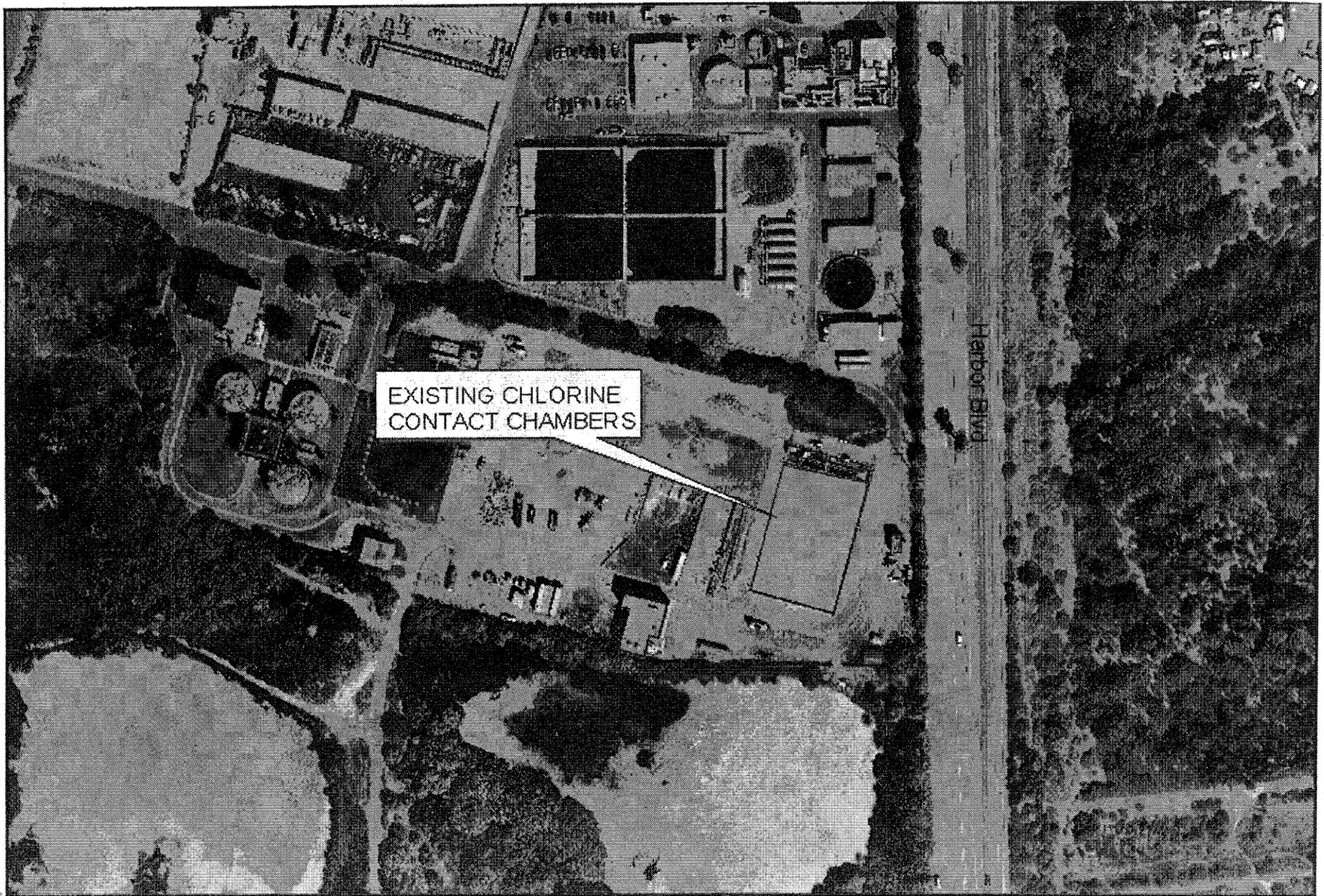
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ATTACHMENT 6

**POTENTIAL PHOTOVOLTAIC PANELS
AT THE WASTEWATER TREATMENT PLANT**

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EXISTING CHLORINE CONTACT CHAMBERS

Harbor Blvd

**POTENTIAL LOCATIONS FOR SOLAR PHOTOVOLTAIC PANELS
AT THE WASTEWATER TREATMENT PLANT**



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ATTACHMENT 7

CITY OPERATIONS GREEN HOUSE GAS EMISSIONS (2007)

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City Operations Greenhouse Gas Emissions (2007)

Group	Utility	Usage (Kwh or Therm)	CO2 Emissions (Metric Tons)	% of Total
Water Treatment	Electricity	3,295,518	958	6.79%
	Natural Gas	888	5	0.03%
			963	6.82%
Water Distribution	Electricity	11,298,984	3,285	23.28%
			3,285	23.28%
Waste Water	Electricity	8,900,073	2,588	18.34%
	Natural Gas	25,668	136	0.97%
			2,724	19.31%
Facilities	Electricity	3,486,025	1,014	7.18%
	Natural Gas	110,045	584	4.14%
			1,597	11.32%
Parks	Electricity	779,241	227	1.61%
	Natural Gas	310	2	0.01%
			228	1.62%
Parks - MADs	Electricity	102,699	30	0.21%
			30	0.21%
Parks - Comm. Park	Electricity	851,161	247	1.75%
	Natural Gas	159,169	845	5.99%
			1,092	7.74%
Engineering - Street Lights	Electricity	4,657,280	1,354	9.60%
			1,354	9.60%
Engineering - Signals	Electricity	583,905	170	1.20%
			170	1.20%
Golf Services	Electricity	357,043	104	0.74%
	Natural Gas	1,757	9	0.07%
			113	0.80%
Fuel	Gasoline	234,354	2,065	14.63%
	Diesel	44,073	447	3.17%
	Biodiesel	4,305	41	0.29%
			2,553	18.09%
	Electricity		9,976	70.71%
	Natural Gas		1,580	11.20%
	Fuel		2,553	18.09%
	Total		14,109	