

DATE ISSUED: January 22, 2003

REPORT NO: 03-012

ATTENTION: Honorable Mayor and City Council
Council Docket of January 28, 2003

SUBJECT: San Diego Police Department Headquarters Building Energy Efficiency
and Generation Project

SUMMARY

Issue – Should the City Council approve a multi-faceted energy efficiency and energy generation project to make the Police Headquarters Building energy independent?

Manager's Recommendation - Authorize the City Manager to:

- 1) Enter into a Fourth Amendment to Master Energy Efficiency Services Agreement with Onsite Energy Corporation for the purpose of implementing energy savings and self-generation measures at the Police Headquarters Building.
- 2) Accept self-generation and energy efficiency buy-down incentives from the San Diego Regional Energy Office and San Diego Gas & Electric in the amount of \$718,842 to partially offset the cost of implementing these energy efficiency and self-generation measures.
- 3) Use energy savings, not to exceed the “guaranteed savings” amount from the Police Department energy budget to pay the costs associated with the master lease agreement with Onsite Energy Corporation for a period of 12 years.

Other Recommendations - None.

Fiscal Impact – In Fiscal Year 2001, energy costs for the Police Headquarters Building were approximately \$768,000. The cost to the City for the proposed energy efficiency improvement and self-generation project will not exceed \$6,373,170 (including financing costs). As a part of this agreement, the project will be financed by Onsite Energy Corporation and paid back solely through energy savings, energy efficiency and the one time self-generation, buy-down incentives totaling \$718,842, with project costs being fully amortized over 12 years.

The Police Department will contribute an amount equivalent to the net costs (capital costs, less any buy-down incentives) each year until the project-pay back is complete. The net annual lease payment will vary between \$324,050 and \$477,267 to ensure a positive net cash flow to the General Fund after each annual payment for the 12 year term of the agreement. Energy costs for the Police Headquarters Building were approximately \$768,000 last fiscal year. There will be no immediate impacts to the Police Department energy budget other than a three percent escalation in gas and electric costs beginning in year four. The project is estimated to save almost \$400,000 during the payback period, while providing a new highly efficient system that also helps to meet the Mayor's Goal 9 – Pursue Energy Independence.

Based on the results from similar projects, it is anticipated that the annual energy savings will exceed the annual lease payment; (See Attachment: Cogeneration – Energy Efficiency Measures (ECM 8-1)). Additional annual energy savings could be used to pay down the annual lease payment, reducing the term of the lease and financing costs for the project.

BACKGROUND

The seven story, 165,000 square foot Police Headquarters Building at 1401 Broadway was completed in November of 1986. An additional 260,000 square feet of subterranean parking exists below the office space. The facility operates 24 hours per day, 7 days a week, houses the department's administrative and support staff, including the Chief's office, central communications, personnel, investigations, media services, fiscal services, police records and the crime laboratory, and is critical to the City's public safety programs.

The building's major mechanical systems are energy inefficient, beyond their expected life cycle, and are becoming extremely costly to maintain. This project would replace the major mechanical components and would introduce additional technologies into the facility such as a 500 KW Combined Heat and Power (CHP) system and a 30 kilowatt photovoltaic array.

In addition to generating approximately 90 percent of the facility's annual energy usage, this project would also replace major mechanical components including carbon monoxide monitoring and control systems in the parking garage, solar window film, lighting and lighting controls, chiller and cooling tower, air handler fan, replace the existing energy management systems and replace and upgrade the uninterruptible power system, which is critical to emergency operations of the facility's communications and management information systems.

In 1999, the City entered into a Master Energy Efficiency Services Agreement with Onsite Energy Corporation which initially covered four City facilities; the Crabtree Building, World Trade Center, Pump Station 2 and the Central Library. Onsite Energy Corporation conducted an assessment of each facility and determined all feasible energy upgrades and improvements that would increase energy efficiency and reduce overall energy costs. Onsite Energy Corporation then prepared a scope of work for each facility, performed the work and financed the project, with the cost being repaid through guaranteed energy savings. Individual projects under this agreement were done through amendments to the Master Agreement, with the last amendment in

June 2000, to upgrade energy efficiency in the City Administration Building and Community Concourse.

DISCUSSION

In support of the Mayor's Goal Number 9 – Pursue Energy Independence, the Environmental Services Department's (ESD) Energy Division, in conjunction with the Police Department and General Services (GS) Department's Facilities Maintenance Division, requested Onsite Energy Corporation to investigate what measures could be taken to reduce energy usage at the Police Headquarters Building. Through a series of cooperative meetings between the Police Department, ESD, GS and Onsite Energy Corporation, the group developed a combination of energy measures that would make the facility virtually independent from the local utility grid, promote energy security and reliability, significantly improve energy efficiency, enhance working conditions for employees and reduce overall energy and operations costs for the facility.

This project will be the Fourth Amendment to Master Energy Efficiency Services Agreement (ESA) with Onsite Energy Corporation. This agreement will include project design and installation for all of the energy systems and upgrades described below. The agreement also includes project financing, up to twelve years of operation and maintenance services for the combined heat and power generation system (to insure the equipment is operating at full efficiency) and guaranteed annual energy savings for the facility. The "Guaranteed Savings" is based upon 90 percent of the "Engineered Saving". The Guaranteed Savings is \$621,589 for the first three years, and escalates at a rate of three percent per year for the remaining term of the lease.

This project will be eligible for several different incentive programs including a self generation incentive from the San Diego Regional Energy Office (SDREO), (\$498,070), and a photovoltaic buy-down incentive from SDREO (\$135,000), and a San Diego Gas & Electric – Standard Performance Contract (SPC) incentive (\$85,772), for a total of \$718,842 which will be used to reduce the overall cost of the project.

As a part of determining the most cost effective energy conservation measures, Onsite Energy Corporation looked at the facility's daily operations, building envelope and all mechanical and lighting, as well as how to improve indoor air quality and temperatures. A total of eight energy conservation measures (ECM) will be implemented through this project as follows:

ECM # 1 Parking Garage Gas Monitoring and Control System

This measure will install a new carbon monoxide gas monitoring system in the building's underground parking facility. Five new variable speed fans will replace the original constant volume fans. A new control system will vary fan speed based on the level of carbon monoxide in the air. The system improves air quality in the garage area while using less electrical energy.

ECM # 2 Solar Control Film

New window film technologies will reduce glare from the sun and will reduce the amount of thermal transfer into the building by 55 percent. Reducing the amount of solar heat entering the facility will reduce cooling demand during peak summer energy use periods. This measure provides for removal of the existing window film on the south and west sides of the facility and

the installation of approximately 20,939 square feet of new solar window film. The current air conditioning system cannot maintain acceptable temperatures (75°-78°) in the building on hot summer days. This measure provides an additional benefit of improved working conditions for Police Department staff.

ECM # 3 Lighting and Control Retrofit

This measure will replace all existing T-12 fluorescent light bulbs and fixtures with new higher energy efficiency T-8 lamps and electronic ballasts throughout the entire facility. Additionally, motion sensors would be installed in the parking garage and office areas to control lighting levels and reduce total hours of lighting operation.

ECM # 4 Combined Heat and Power System (CHP) and Chilled Water Plant

This measure will install a 500 KW natural gas fueled energy generation facility that will generate over 90 percent of the facility's electrical energy requirements independently of the local electrical utility grid. Additionally, the CHP system will recover exhaust heat from the generator's engines to provide the thermal energy required for an absorption chiller to cool the building in the summer or provide heating of the building during the colder winter months. The CHP system will be automatically controlled by an energy management system to optimize its operation and prevent self-generated electrical power from entering the local utility grid.

ECM # 5 Energy Management System (EMS)

This measure installs state-of-the-art energy management systems to control, optimize and monitor the operations of the facility's heating, ventilation and air conditioning, combined heat and power, and photovoltaic power generation systems. In addition, the EMS will also measure building performance and efficiency to validate the guaranteed annual energy savings.

ECM # 6

This measure replaces existing constant volume fans for interior air handlers with new variable speed fans. Variable speed fans adjust motor speed to match load demand and provide better temperature control throughout the facility. The reduced fan speed yields a significant reduction in energy usage.

ECM # 7 Uninterruptible Power System (UPS)

This measure replaces the building's existing lead acid battery UPS system with a state-of-the-art flywheel technology UPS to provide power reliability for communications and computer systems critical to the facility's operation. It is estimated that without this measure, batteries for the existing UPS would have to be replaced within a year at an estimated cost of \$150,000.

ECM # 8 Photovoltaic 30 Kilowatt Power Generation System

This measure will supplement the 500 KW Combined Heat and Power Generations System with an additional 30 kilowatts of photovoltaic (solar) power generation, a renewable energy system, that provides its power during peak energy demand periods.

CONCLUSION

Authorizing the Fourth Amendment to Master Energy Efficiency Services Agreement with Onsite Energy Corporation, will implement a project that will increase energy efficiency at the

Police Headquarters by 30 percent, allow the facility to produce approximately 90 percent of its total energy requirements, enhance energy security and reliability and be a major step in implementing the Mayor’s Goal Number 9 - Pursue Energy Independence.

ALTERNATIVE

- 1) Do not authorize the City Manager to enter into the Fourth Amendment to the Master Energy Efficiency Services Agreement with Onsite Energy Corporation for the purpose implementing energy saving, self-generation and renewable energy measures at the Police Headquarters Building.
- 2) Do not authorize the City Manager to accept self-generation and buy-down incentives in an amount of \$718,842 to partially offset the capital cost of implementing the self-generation and renewable energy measures.4)___
- 5)___
- 6)_3) Do not use “guaranteed savings” from the Police Department energy budget to pay the costs associated with the master lease agreement with Onsite Energy Corporation for a period of 12 years.

These alternatives are not recommended because they would result in continued higher energy consumption and costs to operate the Police Headquarters Building, which is one of the City’s most critical facilities.

Respectfully submitted,

Tom Blair
Energy Administrator

Robert A. Epler
Assistant Environmental Services Director

David Bejarano
Chief of Police

Approved: George I. Loveland
Senior Deputy City Manager

JH/jh

Attachment: [Cogeneration – Energy Efficiency Measures \(ECM 8-1\)](#)