THE CITY OF SAN DIEGO

REPORT TO THE CITY COUNCIL

DATE ISSUED: December 2, 2009 REPORT NO: 09-171

ATTENTION: Natural Resources and Culture Committee

SUBJECT: Proposed Broad Spectrum Street Lighting Project

REFERENCE: Broad Spectrum Street Lighting Conversion

REQUESTED ACTION:

Authorize Energy Sustainability and Environmental Protection Division (ESEP) of the Environmental Services Department (ESD) to pursue and accept a California Energy Commission (CEC) low interest rate loan in the amount of 3 million dollars.

Authorize ESEP Division of the Environmental Services Department to combine and leverage the CEC loan financing with 2 million dollars of Energy Efficiency and Conservation Block Grant from the US Department of Energy (EECBG) for a street light conversion program.

Authorize the ESEP Division of the Environmental Services Department to advertise and award the installation of a Broad Spectrum Street Light Conversion project not to exceed 5 million dollars.

Authorize ESEP Division of the Environmental Services Department to pursue and apply for additional funding sources from Federal or State sources for street lighting conversions beyond the initial 5 million dollars requested. This authorization would be subject to Council ratification prior to acceptance of funds that require unbudgeted City funding.

Modify the Street Lighting section of the Street Design Manual to authorize use of induction or LED lighting as a broad spectrum street light technology where deemed appropriate by the City Engineer.

Authorize use of broad spectrum "white" street lighting. This street light conversion will convert existing street lights outside a 30 mile observatory radii with 3000 Kelvin Correlated Color Temperature (CCT) induction technology with full cut off distribution. Induction technology is currently proposed, however future projects will not be limited to induction technology as broad spectrum lighting technology continues to evolve.

Authorize the ESEP Division of the Environmental Services Department to coordinate with all the City Council Districts for specific street lighting conversion locations as recommended by

City staff from E&CP, Transportation Division; and General Services, Street Division based on expected life of the existing systems, energy savings, and public need.

Authorize the integration of adaptive technology with SDG&E smart grid technology to capture additional energy savings by utilizing dimming in selected areas.

BACKGROUND:
On February 26, 2002 City Council adopted Resolution R-29614 which approved use of broad-spectrum lighting outside a 30 mile Mount Palomar radius. The accompanying City Manager Report No. 02-039 suggested alternate streetlight technologies be further studied, in particular broad spectrum lighting. Recent advances in street lighting, in particular LED and induction technologies offer enhanced visual performance over incumbent Low Pressure Sodium and High Pressure Sodium (HPS and LPS) technologies while increasing energy savings and reducing maintenance costs.

ESD observed the advancement of the broad-spectrum lighting phenomena during interior lighting energy retrofits of City facilities. To promote outdoor broad-spectrum lighting, ESD procured the professional services of Clanton and Associates, a nationally recognized lighting consulting to study both LED and induction lighting technologies and develop street lighting guidelines. To demonstrate the benefits of broad-spectrum lighting technology outdoors, ESD collaborated with SDG&E on a pilot project to identify the best technology. A portion of 6th Avenue, north and south of Laurel Street was chosen for the pilot project venue. The LED technology was installed north of Laurel Street and the induction street lights installed south of Laurel Street which is the entrance to Balboa Park. The 6th Ave pilot project was completed in late March 2009. ESD is also currently collaborating with CCDC to install induction streetlights at other downtown locations.

During late April of this year ESD and SDG&E mutually sponsored a public review of the 6th Avenue pilot project to identify which technology both LED and induction might emerge as most promising. There were two types of public surveys. The subjective survey asked questions of the public in a written format to identify how they felt about safety and lighting. The objective portion was conducted using a test vehicle that evaluated human response times to small targets placed in the roadway. It was determined there was no significant visual performance difference amongst the 250 watt HPS and the lower wattage (150 to 190 watt LED and induction) technologies. The draft street light report authored by Clanton and Associates document the study parameters and results. The final version is being reviewed by SDG&E legal staff.

All visual performance test results being equal, a life cycle cost analysis was developed to identify the economic parameters for long term cost evaluation. In accordance with the attached life cycle cost spread sheet, induction emerged as having the lowest life cycle costs. We also solicited input from the astronomy community, as unmitigated broad spectrum light is not desirable in the vicinity of the observatories. We received comments from the astronomy community and incorporated their comments into the new lighting guidelines. In summary the project will convert lights outside the 30 mile radii of the observatories with 3000 Kelvin Color Correlated Temperature (CCT) full cut-off distribution induction street lights. The astronomy community does not object to the lighting conversion with these self imposed constraints.

City Council approved the EECBG (Energy Efficiency Community Block Grant), federal stimulus funding under the American Recovery Act (ARA) (R-305276 Dated October 14, 2009) that authorized EECBG funding for a streetlight conversion project. The California Energy Commission (CEC) is presently accepting applications from municipalities for low interest rate energy improvements loans. An opportunity now exists to leverage funding sources and move forward with the first phase of a broad spectrum street light conversion project. The request for City Council approval to apply and execute an agreement with the CEC for a low interest loan allows combined EECBG and CEC funds to accomplish $5 million to initiate the first phase of street lighting retrofits.

DISCUSSION:

Phase I of street lighting conversions would save an estimated 4.3 million kilowatt-hours (kWh) annually for an immediate annual energy cost savings of $586,000. An SDG&E onetime incentive will provide an estimated $215,000 in additional savings. The combined "after installation savings" to the general fund would be $780,000. The lamp life of induction technology lighting is estimated to be at least 20 years. Maintenance costs will be significantly reduced by not having to change street light lamps for a generation. City street lights in the Gas Lamp area have operated for 12 years without replacement. City Street Division maintenance staff has expressed their satisfaction and endorsement of induction lighting.

Presently an advanced pilot induction project is being planned and constructed. This small pilot project will use select induction fixtures to provide the necessary installation experience for developing specifications. It is anticipated that the induction fixture procurement and construction labor will be advertised independently for maximum effectiveness. In the long term, five to ten years, we anticipate that the cost and technological evolvement of LED technology to be competitive with induction technology. Presently LED has a high CCT Kelvin temperature such that astronomy community objects to their use. The LED technology has higher initial costs, presently making induction the preferred technology.

Although the 2002 City Council resolution provided an endorsement of broad-spectrum lighting, it was determined that HPS, the incumbent technology, was broad-spectrum. HPS compared with LPS is much closer to a "white light," however it is not considered broad-spectrum in the recent definition. The mechanism of changing the current street light guidelines to induction lighting involves modifying the Street Design Manual. Therefore, it is requested that the attached revised Street Design Manual pertaining to street lighting be approved to codify the new guidelines and authorize implementation of induction lighting. It is desirable to include LED lighting; however technical lighting specifications have not yet been fully developed. As LED technology evolves, we will continue to evaluate street lighting best street light practices. This includes evaluating a new Recommended Practice (IES RP 8) street light design by IES, the ANSI lighting authority, anticipated to be published in the next three to six months. We will provide annual reports to NR&C and the Sustainable Energy Advisory Board (SEAB) to document street light retrofit progress and technological advances in the street lighting industry.

We intend to advertise the project in early spring 2010 and award contracts in late spring or early summer, with completion in early 2011. The initial $5 million requested for Phase 1 will provide

the funding to convert approximately 9,500 streetlights which are about 20% of the approximate 50,000 streetlights citywide. The kilowatt-hours savings equates to reductions of 1,700 tons of CO2 and 150 pounds of Methane annually. In summary, once this project is completed, we estimate a general fund savings of $780,000 annually considering both the energy and maintenance savings.

FISCAL CONSIDERATIONS:
The funding for projects executed under this first phase will be limited to an amount not to exceed 5 million dollars from federal EECBG Stimulus Revolving funding in conjunction with CEC low interest loans. Long term fiscal considerations include reduced annual street lighting costs due to increased energy and maintenance savings. The estimated annual energy savings for this phase is estimated to be $586,000, with an additional maintenance savings of $194,000 for a combined general fund savings of $780,000 annually.

PREVIOUS COUNCIL and/or COMMITTEE ACTION:
Resolution No 305276 adopted October 14, 2009, Authorize the Mayor or his representative to secure, implement, administer, monitor and manage EECBG funding up to $12,540,700. Council Resolution R-296141 adopted February 26, 2002, approved use of broad-spectrum lighting outside a Mt. Palomar 30-mile radius, in accordance with the Resolution and Managers Report, 02- 039 dated February 20, 2002.

EQUAL OPPORTUNITY CONTRACTING:
Agreements associated with this project will be subject to the City's Equal Opportunity Contracting (San Diego Ordinance No. O-18173, Sections 22.2701 through 22.2708 and Non-Discrimination in Contracting Ordinance (San Diego Municipal Code Sections 22.3501 through 22.3517).

COMMUNITY PARTICIPATION AND PUBLIC OUTREACH EFFORTS:
The public was invited to and participated in the evaluation of a pilot street light conducted April 28, 2009 along 6th Avenue. An additional pilot induction street light project is being planned.

KEY STAKEHOLDERS AND PROJECTED IMPACTS:
The City of San Diego and its citizens and tax payers in the City of San Diego.

Chris Gonaver
Director Environmental Services

David Jarrell
Deputy Chief of Public Works