DATE ISSUED: February 20, 2002 REPORT NO. 02-039

ATTENTION: Honorable Mayor and City Council
Docket of February 26, 2002

SUBJECT: Conversion of Street Lighting from Low Pressure Sodium Vapor (LPS) to High Pressure Sodium Vapor (HPS)

REFERENCE: Manager's Reports No. 82-351; 93-185; 94-310; 01-128 and 02-021

SUMMARY

Issues - Shall City Council amend the policy for street lighting to expand the areas where HPS or other broad-spectrum street lighting will be used?

1. Shall the City Manager be directed to amend all relevant standards, specifications, guidelines, brochures, forms, and other documents, to conform to the amended street lighting policy?

2. Shall the City Manager be directed to develop a plan to convert existing LPS street lights to HPS street lights over the course of three years, with the conversion scheduled according to the availability of funds, and prioritized by

   a) crime statistics,
   b) traffic counts,
   c) proximity to schools and parks,
   d) population density,
   e) community request and as they burn out?

3. Shall the City Manager be directed to install full cutoff HPS fixtures where converting from LPS and require semi-cutoff HPS fixtures for new acorn installations?

Manager's Recommendations - Amend the policy for street lighting to expand the use of "white light" broad-spectrum lamps, including HPS and QL induction lamps, to areas north of Interstate 8 outside a 30-mile radius from Mt. Palomar Observatory, while retaining the use of LPS lighting within the 30-mile radius. (See attached map.)

1. Direct the City Manager to amend all relevant documents.

2. Direct the City Manager to develop a plan to convert existing LPS street lights to

HPS over three years and as they burn out.

3. Direct the City Manager to install full cutoff HPS luminaires where converting from LPS and require all new acorn installations to be semi-cutoff HPS fixtures.

4. Direct the City Manager to study ways to reduce energy expenses for street lighting.

Other Recommendations - The Public Safety & Neighborhood Services Committee, on June 20, 2001, adopted the following actions relative to the conversion of LPS street lights to HPS lights:

1. To adopt a standard of high pressure sodium (HPS) lights Citywide.

2. To direct the City Manager to develop a plan for retrofitting all low pressure sodium to HPS over the course of three years, with conversion to be scheduled according to the availability of funds, prioritized by:

   a) Crime statistics
   b) Traffic counts
   c) Proximity of schools and parks
   d) Population density
   e) Community request

3. Further, concurrent with the phased replacement schedule, lights in all areas shall be retrofitted to HPS as they burn out and are replaced.

The ad-hoc committee for the revision of the Street Design Manual recommends that broad-spectrum street lighting be used throughout the City, excluding the continued use of LPS street lighting.

Fiscal Impact - The total fiscal impact of this action would be a one-time cost of $3,072,506 for conversion of 23,967 LPS street lights and an annual increase in energy cost of $889,296. The number of LPS street lights maintained by the General Fund is 26,005.

For the alternative of converting all street lights in the City from LPS to HPS, the conversion cost is $3,298,010, and the additional annual energy cost is $968,247.

BACKGROUND

History of LPS and HPS

In 1982 (Manager's Report 82-351), the City Council voted for LPS over HPS to be the City-

wide standard. This was primarily based on the lower energy costs of LPS, and was supported by the Director of the Palomar Observatory. In 1993 (Manager's Report 93-185), the Council amended this policy to allow for HPS for all high-crime areas south of Interstate 8 plus Centre City; Golden Hill Revitalization Area; Skyline Drive (from 58th Street to East Skyline Drive) and Imperial Avenue (from Euclid Avenue to 69th Street). In 1994 (Manager's Report 94-310), it was further amended to allow HPS south of Interstate 8 on all 2-lane collectors and higher classifications which are at least 40' wide and have a minimum of 5,000 vehicles per day (i.e. ADT).

On January 23, 2002, Manager's Report No. 02-021 was presented to the Public Safety & Neighborhood Services Committee. Attached to the Manager's Report was a draft of the section of the Street Design Manual pertaining to street lighting. The second sentence stated, in part, "All street lights shall have a broad-spectrum light source...." The draft also specifies a minimum lumen output for street lights in certain vehicular roadway lighting locations which assumes that all street lights are HPS.

Current City Policies for Street Lights

LPS street lights exist north of Interstate 8 at essentially all intersection and mid-block locations. The current exception is Mission Boulevard south of Pacific Beach Drive, which are HPS. The request was originated by the Mission Beach Town Council and the Mission Beach Precise Planning Committee. LPS street lights also exist south of Interstate 8 in non-high-crime census tracts at intersections and mid-block locations on local residential and commercial streets, on industrial streets, and on collectors and higher-classification streets which have not yet been converted to HPS.

DISCUSSION

Low Pressure Sodium Vapor Lamps

LPS lamps are mono-chromatic. They emit light in a very narrow band of the visible spectrum. Because of this characteristic, it is impossible for the human eye to detect variations in the color of objects when LPS light is the only source of light. Mayor Dick Murphy testified that, in his experience as a judge in a courtroom, witnesses had difficulty describing the colors of vehicles and people's clothing to police investigators in areas of the City where LPS lights are used. The mono-chromatic characteristic of LPS lamps is the main reason that they are favored by most astronomers. In an otherwise dark sky, light pollution in the atmosphere can be filtered out from LPS light sources leaving all of the rest of the visible spectrum for astronomers to carry out their observations. LPS street light lamps are also the most energy-efficient lighting source, using less energy to produce an equivalent amount of lumens of light output.

Broad-spectrum Lamps

The City currently uses two types of broad-spectrum lamps for street lighting. HPS lamps are the most energy efficient of the broad-spectrum types, and come in sizes ranging from 70 watts to 1,000 watts. The most common sizes used in the City are 100 watts in alleys, 150 watts on two-lane local streets, and 250 watts on wider, higher-volume streets. The color of the HPS lamp can range from orangish to pinkish (most common) to near-white. The range of colors is due to

manufacturing variances.

In order to minimize light pollution, all cobra-head LPS street light luminaires will be converted to full cutoff HPS luminaires. No light energy would be emitted above the horizontal plane passing through the luminaire. In addition, for new HPS street lights with acorn luminaires, semi-cutoff fixtures will be required. These new acorns will allow no more than 5% of the light energy to be emitted above the horizontal plane.

QL induction lamps are used in the Gaslamp 5-globe street lights. Each globe contains a 55 watt QL induction lamp and has a near-white color. Other types of lamps with street lighting applications which are not provided as a City standard for street lights are Metal Halide (MH) and Mercury Vapor (MV). MH lamps are used for lighting athletic fields and have a near-white color. MV lamps were used in the City prior to 1982 and have a bluish color. MV lamps are the least efficient of the above-named lamps.

Conversion of LPS to HPS

Expanding the conversion area to a 30-mile radius of Mt. Palomar Observatory, an additional 23,967 LPS street lights would be converted. The 30-mile radius is selected because it is consistent with an ordinance in Riverside County which calls for LPS street lighting within the 30-mile radius and allows HPS street lighting outside the 30-mile radius. The additional cost to convert these street lights is $3,072,506, and the additional annual energy cost would be $889,296.

The LPS street lights maintained by Maintenance Assessment Districts (MADs) will not be converted by this plan. MADs should make their own decisions on whether to convert, on paying for the conversion costs, and on paying for the additional energy costs that would result from the conversion.

Street Division will develop a phasing plan to carry out the conversion of LPS street lights to HPS street lights. The phasing plan will be prioritized based on crime statistics, traffic counts, proximity of schools and parks, population density, and community requests. The LPS street lights will also be converted to HPS when they burn out.

In the process of replacing street lights in the 15-20 miles of overhead/underground utility conversion projects each year, HPS street lights will be installed.

NEW ENERGY SAVING ALTERNATIVE TECHNOLOGIES

Staff is in the process of negotiating a consultant agreement with an electrical engineering consulting firm to research and demonstrate solar electric applications for street lighting. This project should take about two months from the notice-to-proceed date. The project will research the current state-of-the-art in solar electric power generation with applications for street lighting, and provide staff with demonstrations of the various manufacturers' components.

Staff is also working with a local (Southern California) manufacturer to develop a street lighting product using light-emitting diodes (LEDs). LEDs are currently being used in the red and green

traffic signal indications, with excellent energy savings. Staff is hoping to develop the street lighting product with a similar potential for energy savings.

ALTERNATIVES

1. Convert the entire City. This alternative would cost $3,298,010 and the additional annual energy cost would be $968,247.

2. Do not convert any additional areas of the City at this time.

Respectfully submitted, D. Cruz Gonzalez Director, Transportation		Approved: George I. Loveland

LOVELAND/AH

Attachments: 1. Mt. Palomar Observatory 30-mile Radius, SR-52 and I-8
2. LPS Conversion Cost Information