



CITY OF PACIFIC GROVE
300 Forest Avenue, Pacific Grove, California 93950

AGENDA REPORT

TO: Honorable Mayor and Members of City Council
FROM: Daniel Gho, Public Works Director, Wendy Lao, Associate Planner
MEETING DATE: April 18, 2018
SUBJECT: LED Streetlight Upgrade Program
CEQA: Initial Study/ Mitigated Negative Declaration

RECOMMENDATION

Adopt an Initial Study/Mitigated Negative Declaration for the PG&E LED Streetlight Upgrade Project, file the Notice of Determination, and approve PG&E installation of LED lights along the Highway 68 corridor from Presidio Boulevard to Asilomar Boulevard, and along Lighthouse Avenue from Lobos Avenue to Asilomar Boulevard, as part of Phase 1 of the LED streetlight replacement project.

BACKGROUND

The City of Pacific Grove was approached by PG&E in the fall of 2016 regarding the discontinuance of the High Pressure Sodium (HPS) streetlights and introduction of a program that would replace PG&E's 514 eligible fixtures, with LED technology.

To gain public input on the potential lighting change, PG&E initiated two test areas with sample LED lights. The first sample areas consisted of switching over a pole by the Community Center (515 Junipero Avenue), a pole by Forest Grove Elementary School (1065 Congress Avenue), and a pole at the entrance to the Point Pinos Lighthouse (80 Asilomar Avenue). The City received minimal public feedback from the first trial, prompting a second trial to occur in the summer of 2017. The second trial, located adjacent to the Asilomar Avenue and Lighthouse Avenue intersection, demonstrated four different lights: a 3000 Kelvin 36-watt light, an original HPS 100-watt light and a 3000 Kelvin 28-watt light. The survey received 54 respondents, and the consensus was that the 3000 Kelvin 28-watt light was the preferred option.

At the February 21, 2018 City Council Meeting, PG&E gave a presentation regarding the LED program and the potential for a phased approach. It was determined that Phase 1 would replace 50 lights, and then ultimately, Phase 2 would replace the remainder of HPS PG&E lights in the City. It was also specified that an environmental document would need to be initiated, so the City has drafted an Initial Study/ Mitigated Negative Declaration. That document has been circulated, and the public review period concluded on April 6, 2018.

CEQA

The City of Pacific Grove is the Lead Agency for the proposed Project evaluated in the Initial Study/Mitigated Negative Declaration and independently reviewed and analyzed in the Draft

Mitigated Negative Declaration (MND) and Final MND for the Project. The [Draft MND](#) has been available at the Pacific Grove Public Library and City Hall's Community and Economic Development Department, and is posted on the City's website.

The CEQA Document provides objective information to assist the decision-makers and the public at large in their consideration of the environmental consequences of the proposed project. The public review period provided all interested jurisdictions, agencies, private organizations, and individuals the opportunity to submit comments made during the public review period. The Notice of Intent and the Draft MND were circulated for public review. The public review period for the Draft MND was open for 30 days from March 7, 2018 through April 6, 2018. The State Clearinghouse received and posted the Draft MND on March 6, 2018 and their review period concluded April 4, 2018.

Pursuant to CEQA, the environmental document evaluated the following impacts: (1) aesthetics; (2) agricultural resources; (3) air quality; (4) biological resources; (5) cultural resources; (6) geology/soils; (7) greenhouse gas emissions; (8) hazards and hazardous materials; (9) hydrology and water quality; (10) land use and planning; (11) mineral resources; (12) noise; (13) population and housing; (14) public services; (15) recreation; (16) transportation/traffic; (17) tribal cultural resources; (18) utilities and service systems and (19) mandatory findings of significance.

The City received and evaluated comment letters from members of the public who reviewed the Draft MND. In accordance with CEQA, the City prepared written responses describing the disposition of significant environmental issues raised. The Final MND provides adequate, good faith and reasoned responses to the comments. The City reviewed the comments received and has determined that the comments do not add significant new information to the Draft MND, regarding adverse environmental impacts. The City has based its actions on full appraisal of all viewpoints concerning the environmental impacts identified and analyzed in the Final MND. The responses to the comments on the Draft MND, which are contained in the Final MND, clarify and amplify the analysis in the Draft MND.

The Mitigation and Monitoring Reporting Program (MMRP) includes all of the mitigation measures identified in the CEQA Document and has been designed to ensure compliance during implementation of the project. The MMRP provides the steps necessary to ensure that the mitigation measures are fully enforceable. The MMRP designates responsibility and anticipated timing for the implementation of mitigation; the City will serve as the MMRP Coordinator.

DISCUSSION

Per discussions with PG&E, the project proposes 3000-Kelvin CCT light bulbs all throughout the city, with the exception of one predominantly-commercial area where 4000-Kelvin light bulbs are proposed. The only predominantly-commercial area where the 4000-Kelvin light bulbs are proposed is a portion of the Highway 68 corridor from Sunset Drive to the northwest through Presidio Boulevard to the southeast. The appropriate wattage will be installed by PG&E for the location that will be comparable to the existing HPS bulb. LED replacement street lighting fixtures shall be selected and adjusted to provide appropriate lighting levels based upon public safety considerations while also minimizing aesthetic impacts and glare.

City staff has specified two locations for Phase 1 of the LED installation: the Highway 68 corridor from Presidio Boulevard to Asilomar Boulevard, and Lighthouse Avenue from Lobos Avenue to Asilomar Avenue. These two locations contain 48 light poles. The HPS streetlights along the

Highway 68 corridor would be replaced with the 4000 Kelvin lights from Sunset Drive to Presidio Boulevard, which is considered the predominantly-commercial section of the corridor. The remaining lights along Highway 68 and Lighthouse Avenue would be replaced with the 3000 Kelvin, LED light. Both the 4000 and 3000 Kelvin wattage will be selected to meet the appropriate lighting levels for public safety considerations, and will be comparable to the wattage of the replaced HPS bulb.

The two phases are contingent on the approval of the Initial Study and the Mitigated Negative Declaration.

FISCAL IMPACT

Upon full implementation the City may see a reduction of utility cost for the streetlights that may be up to \$2,000 per month.

OPTIONS

1. Do nothing
2. Do not approve the transition to LED
3. Suggest a different location for Phase 1

CITY COUNCIL GOAL

Infrastructure

ATTACHMENTS

1. Final Initial Study/Mitigated Negative Declaration
 - a. Public Comments and City Response
2. Mitigation and Monitoring Reporting Program

RESPECTFULLY SUBMITTED,

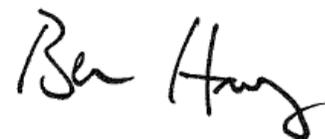


Daniel Gho, Public Works Director



Wendy Lao, Associate Planner

REVIEWED BY,



Ben Harvey, City Manager

CITY OF PACIFIC GROVE

PG&E LED STREETLIGHT UPGRADE PROJECT

INITIAL STUDY & MITIGATED NEGATIVE DECLARATION



Prepared by:
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300 FOREST AVE.
PACIFIC GROVE, CA 93950

APRIL 11, 2018

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INITIAL STUDY / ENVIRONMENTAL CHECKLIST FORM

1. **Project Title:** PG&E LED Streetlight Upgrade Project
2. **Lead Agency Name and Address:** City of Pacific Grove, 300 Forest Ave., Pacific Grove, CA 93950
3. **Lead Agency Contact Person and Phone Number:** Wendy Lao, Associate Planner, T: 831-648-3185 E: wlao@cityofpacificgrove.org
4. **Project Location:** Public right-of-ways throughout the City of Pacific Grove, Monterey County, CA.
5. **Project Applicant(s):** Geoff Pollard, Pacific Gas and Electric Company (PG&E), Customer Care Program Manager, Expert Customer Impact – Electric Reliability. E-mail: G1P9@pge.com. Telephone: (415) 535-7045. Address: 1850 Gateway Boulevard. Concord, CA 94520.
6. **General Plan (GP)/Land Use Plan (LUP) Designations:** Not applicable (public right-of-way).
7. **Zoning:** Not applicable (public right-of-way).
8. **Project Description:** The proposed project is part of an energy efficiency incentive program sponsored by the U.S. Department of Energy and the California Public Utilities Commission. The project would replace approximately 514 of the City's existing High Pressure Sodium (HPS) streetlights with energy-efficient Light-Emitting Diode (LED) fixtures. The purpose of the project is to reduce energy consumption, which would also result in the reduction of greenhouse gas emissions and other air pollutants from non-renewable electrical generating facilities. Since LED fixtures use less energy and have a longer life, operational costs would also be reduced. LED technology also avoids the use of toxic substances, such as mercury and lead, which are contained in some other types of light fixtures. In addition, LED fixtures may be specifically aimed down to illuminate defined areas on the ground. The lights are also proposed to include shielding as needed in order to reduce glare on adjacent properties. No ground disturbance or new construction would occur because only the existing light fixtures will be retrofitted. No new light poles are proposed.

After installation of the replacement LED fixtures affected persons may request modifications to fixture wattage and/or shields by contacting the City. The City will then consult with PG&E, and if the City determines that the requested change would not adversely affect public safety, modifications to fixture specifications or shielding will be made.

9. Surrounding Land Uses and Setting: *(Briefly describe the project's surroundings)*

The project site is located along streets throughout the City of Pacific Grove. Light fixture replacements are proposed where existing PG&E street lights are located. Some of the streetlights are located in the Coastal Zone, the Environmentally Sensitive Habitat Area, the Area of Special Biological Significance Watershed, and/or the Archaeologically Sensitive Area.

10. Other public agencies whose approval is required: California Coastal Commission (CCC).

11. Review Period: March 7, 2018 through April 6, 2018, 5:00 p.m.

Environmental Factors Potentially Affected:

The environmental factors checked below (✓) would be potentially affected by this project, involving at least one impact that is a “Potentially Significant Impact” as indicated by the checklist on the following pages.

	Aesthetics		Greenhouse Gases		Population/Housing
	Agricultural Resources		Hazards & Hazardous Materials		Public Services
	Air Quality		Hydrology/Water Quality		Recreation
	Biological Resources		Land Use/Planning		Transportation/Traffic
	Cultural Resources		Mineral Resources		Utilities/Service Systems
	Geology/Soils		Noise		Mandatory Findings of Significance
	Tribal Cultural Resources				

CEQA Environmental Checklist

This checklist identifies physical, biological, social and economic factors that might be affected by the proposed project. In many cases, background studies performed in connection with the projects indicate no impacts. A NO IMPACT answer in the last column reflects this determination. Where there is a need for clarifying discussion, the discussion is included either following the applicable section of the checklist or is within the body of the environmental document itself. The words "significant" and "significance" used throughout the following checklist are related to the California Environmental Quality Act (CEQA), not the National Environmental Policy Act (NEPA), impacts. The questions in this form are intended to encourage the thoughtful assessment of impacts and do not represent thresholds of significance.

Evaluation of Environmental Impacts

Each of the responses in the following environmental checklist take account of the whole action involved, including project-level, cumulative, on-site, off-site, indirect, construction, and operational impacts. A brief explanation is provided for all answers and supported by the information sources cited.

1. A “No Impact” answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone).
2. A “Less Than Significant Impact” applies when the proposed project would not result in a substantial and adverse change in the environment. This impact level does not require mitigation measures.
3. A “Less Than Significant Impact With Mitigation Incorporated” applies when the proposed project would not result in a substantial and adverse change in the environment after mitigation measures are applied.
4. “Potentially Significant Impact” is appropriate if there is substantial evidence that an effect is significant. If there are one or more “Potentially Significant Impact” entries when the determination is made, an Environmental Impact Report is required.

1. AESTHETICS

A. Would the project have a substantial adverse effect on an identified scenic vista?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
			✓	

Item A Discussion: The project would have a **less than significant impact** on an identified scenic vista. A scenic vista is generally described as a clear, expansive view of the natural environmental, historic and/or architectural features, usually from an elevated point or open area, which possesses visual and aesthetic qualities of value to the community. Scenic vistas within the City of Pacific Grove may be views of the Pacific Ocean, historic structures and/or open space lands.

The Pacific Grove Local Coastal Program’s Land Use Plan (LUP) contains Policy 2.5.4.1 which states, “It is the policy of the City of Pacific Grove to consider and protect the visual quality of scenic areas as a resource of public importance. Pacific Grove’s coastal zone designates scenic areas including: All areas seaward of Ocean View boulevard and Sunset Drive, Lighthouse Reservation lands, Asilomar Conference Ground dune lands visible from Sunset Drive, lands fronting on the east side of Sunset Drive; and the forest-front zone between Asilomar Avenue and the crest of the high dune (from the north side of the Pico Avenue intersection to Sinex Avenue).” Some existing streetlights are located in areas with formally designated “ocean views” according to the LUP Figure 5, Shoreline Access Map. Most of these formally designated ocean views provide a view of the ocean along the public right-of-way or from public property.

There are also existing streetlights located adjacent to designated scenic areas and ocean views. However, no change is proposed to streetlight poles and only the existing HPS light fixtures would be replaced with LED bulbs, which would not affect views of scenic areas. Furthermore, because scenic vistas are viewed during the day and the streetlights are only operational at night, impacts on scenic views would be **less than significant**.

B. Would the project substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
			✓	

Item B Discussion: As discussed in 1.A. above, the proposed project is located in an area with scenic resources; however, no change is proposed to streetlight poles and only the existing HPS light fixtures would be replaced with LED bulbs. Because natural scenic resources are viewed during the day and the streetlights are only operational at night, no significant impacts to natural scenic resources occur. Nighttime lighting of scenic historic resources that are located near existing HPS

streetlights would not change substantially with the new LED fixtures. Impacts would be **less than significant**.

C. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
		✓		

Item C Discussion: No change is proposed to the number, size or location of street light poles, and only the existing HPS bulbs would be replaced with LED bulbs. LED bulbs are available in a range of power levels and “correlated color temperatures” (CCT). If excessively bright replacement LED bulbs were used, the proposed project could have the potential to substantially degrade the existing visual character by creating increased glare as compared to the existing HPS bulbs (see also 1.D below). However, an advantage of LED technology is that bulbs are available in different CCTs, which may be perceived as “warmer” or “cooler” shades of white. LED light fixtures may be specifically aimed down to illuminate distinct areas on the ground. In addition, in some locations, such as residential neighborhoods or sensitive wildlife areas, unwanted light intrusion onto adjacent properties could cause adverse impacts unless the light fixtures are fitted with “cutoff shields” to prevent excessive glare on adjacent properties. The following mitigation measures would reduce potential impacts to a level that is **less than significant**.

Mitigation Measures

1. The selection and directional orientation of LED replacement street lighting fixtures and bulbs shall be approved by the Public Works Director or designee, in consultation with the Police Chief to provide appropriate lighting levels based upon public safety considerations while also minimizing aesthetic impacts and glare. The current bulbs will be replaced with LED bulbs of comparable wattage. The project proposes 3000-Kelvin CCT light bulbs all throughout the city, with the exception of one predominantly-commercial area where 4000-Kelvin light bulbs are proposed. The only predominantly-commercial area where the 4000-Kelvin light bulbs are proposed is a portion of the Highway 68 corridor from Sunset Drive to the northwest through Presidio Boulevard to the southeast. In addition, where feasible, lower CCT bulbs and reduced lighting levels will be used near sensitive wildlife habitat.

2. Light fixtures shall be installed in a manner approved by the Public Works Director or designee, in consultation with the Police Chief to aim light onto the public right-of-way, and fixtures in residential areas or adjacent to sensitive wildlife habitat shall be fitted with cutoff shields to block light rays from shining directly onto residential properties or wildlife habitat areas in the vicinity of each streetlight.

D. Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
		✓		

Item D Discussion: Street lighting is provided in urban areas to improve public safety for motorists, cyclists and pedestrians. HPS street lights are currently provided in Pacific Grove, and the primary purposes of the proposed project are to reduce environmental impacts by reducing energy use and greenhouse gas emissions while also reducing the energy and maintenance cost to taxpayers.

With street lighting, there is a tradeoff between public safety and aesthetics. While some may prefer less, or no, nighttime street lighting for aesthetic or other reasons, the result could be increased risks to public safety. In determining the appropriate type and configuration of street lighting, the City must balance public health and safety against aesthetic and other concerns. Some recent studies have raised concerns regarding potential adverse health effects, such as interference with human sleep patterns, that could be caused by certain types of lighting. In its report Human and Environmental Effects of Light Emitting Diode (LED) Community Lighting the American Medical Association Council on Science and Public Health (AMA, 2016) addressed potential health concerns related to LED street lighting and adopted the following recommendations:

1. That our American Medical Association (AMA) support the proper conversion to community-based Light Emitting Diode (LED) lighting, which reduces energy consumption and decreases the use of fossil fuels.
2. That our AMA encourage minimizing and controlling blue-rich environmental lighting by using the lowest emission of blue light possible to reduce glare.
3. That our AMA encourage the use of 3,000K or lower lighting for outdoor installations such as roadways. All LED lighting should be properly shielded to minimize glare and detrimental human and environmental effects, and consideration should be given to utilize the ability of LED lighting to be dimmed for off-peak time periods.

Street lighting of any type (LED, HPS, etc.) has the potential to produce undesirable amounts of light or glare. Since no additional light fixtures are proposed, the only potential impacts associated with the proposed project would result from the difference in light characteristics between the current HPS fixtures and the proposed LED fixtures. In order to balance public health and safety concerns and other concerns such as aesthetics and wildlife impacts, mitigation measures 1 and 2 are proposed (see 1.C, above). Those mitigation measures would be consistent with the recommendations of the AMA and would reduce potential impacts to a level that is **less than significant**.

2. AGRICULTURE AND FORESTRY RESOURCES

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state’s inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board.

Would the project:

A. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

B. Conflict with existing zoning for agricultural use, or a Williamson Act contract?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

C. Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

D. Result in the loss of forest land or conversion of forest land to non-forest use?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

E. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

Items A, B, C, D, E Discussion: According to the California Department of Conservation’s Farmland Mapping and Monitoring Program, the City of Pacific Grove is located on land identified as urban and built-up land and other land. There are no agriculture or forestry resources within or surrounding the project site, therefore **no impact** would occur.

3. AIR QUALITY

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:

A) Conflict with or obstruct implementation of the applicable air quality plan?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
			✓	

Item A Discussion: PG&E estimates that the proposed LED upgrade project would result in a reduction in energy use of approximately 50 million kWh per year throughout PG&E’s project area as compared to existing HPS lighting, with a reduction in air pollutants. (PG&E, 2018) During the installation phase of the project, vehicle trips would be required to replace the light fixtures. However, periodic maintenance and bulb replacement for the current light fixtures also requires periodic vehicle trips. PG&E estimates that LED fixtures have a life expectancy of up to four times longer than HPS fixtures; therefore, no substantial increase in long-term vehicle trips or related emissions would be expected to occur as a result of the project. Potential impacts on implementation of the air quality plan would be **less than significant** and no mitigation measures are required.

B) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

			✓	
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Item B Discussion: The proposed project consists of the replacement of HPS lights with energy-efficient LED lights and does not involve any construction activities. As noted in Item 3.A above, no substantial increase in vehicle trips or related emissions would be expected to occur as a result of the project. Therefore, the project would have a **less than significant impact** on ambient air quality and/or existing air quality violations, and no mitigation measures are required.

C) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
			✓	

The proposed project would be expected to result in a long-term reduction in criteria pollutants because of the reduced energy usage of LED lights as compared to the existing HPS lights. In addition, the proposed project does not involve construction activity or ground disturbance, and therefore would not generate fugitive dust. As a result, potential impacts would be **less than significant**.

D) Expose sensitive receptors to substantial pollutant concentrations?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
			✓	

A sensitive receptor is generally defined as a location such as a residence, school, retirement facility, or hospital, where sensitive populations (e.g., children, the elderly, and people with respiratory or related health problems) could reasonably be exposed to continuous emissions. Although sensitive receptors are located in the project vicinity, the project would reduce total emissions from electrical power plants due to lower energy usage. As noted in 3.A above, project implementation would require vehicle trips during installation and maintenance; however, the number of trips would not be substantially greater than current trips for routine maintenance of the existing HPS lights due to the longer life expectancy of LED fixtures. Potential air quality impacts to sensitive receptors would be **less than significant**.

E) Create objectionable odors affecting a substantial number of people?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

Item E Discussion: The project entails light fixture replacements and would not generate any objectionable odors. Thus, the project will result in **no impact** related to objectionable odors.

4. BIOLOGICAL RESOURCES

Would the project:

A. Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the [California Department of Fish and Game](#) or [U.S. Fish and Wildlife Service](#)?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
		✓		

Item A Discussion: The Asilomar Dunes planning area is identified in the Pacific Grove General Plan and Local Coastal Program Land Use Plan as a land habitat of great sensitivity. The entire Asilomar Dunes area provides existing and potential habitat for several indigenous species and plants that have adapted specifically to local environmental factors including salt-laden and desiccating winds, and shifting, nutrient-poor soils that are endemic to the Asilomar Dunes area. Because of the rarity of many of the plant and animal species and the fragile nature of the dunes habitat, the California Coastal Commission has designated the Asilomar Dunes as an “environmentally sensitive habitat area (ESHA)” under which the California Coastal Act requires a higher level of environmental protection and restriction on development. The dunes provide habitat for ten plant and five animal species of special concern. Species of special concern are those that are endangered, rare, or threatened. The five animal species of special concern include the black legless lizard, Monarch butterfly, white-tailed kite, Smith’s blue butterfly, the American peregrine falcon, and raptors.

The United States Department of Energy acknowledges that the medical community has learned much about the LED “blue light” role in physiology of plants and animals. Their [Street Lighting and Blue Light Frequently Asked Questions](#) (DOE, 2017) report states, “Researchers have demonstrated, for example, the ability of such light to affect circadian rhythm (the 24-hour ‘biological clock’). Humans and other organisms have evolved this biological response to regular periods of daylight and darkness... Because of the rise of white LEDs for outdoor lighting, and their relatively greater short-wavelength content compared to the high-pressure sodium (HPS) products they’re typically replacing, concerns have arisen that the potentially increased presence of short

wavelengths in the night environment may be detrimental to health. However, it’s important to note that the spectral content of LEDs can be engineered to provide any spectrum desired.” The American Medical Association (AMA, 2016) has recommended a maximum of 3000K CCT lighting in order to have less of an impact on wildlife.

As noted in Section 1-Aesthetics, street lighting is provided for public health and safety purposes. In determining the appropriate type and placement of street lights, the City must balance competing objectives including the safety of motorists, cyclists and pedestrians on public streets, potential impacts related to aesthetics and wildlife, and the cost to taxpayers. The City will select LED replacement lights and set lighting intensity at levels necessary for safety while minimizing potential impacts on sensitive wildlife, as described in Mitigation Measures 1 and 2. These mitigation measures would reduce potential impacts to a level that is **less than significant**.

Mitigation Measures

1. The selection and directional orientation of LED replacement street lighting fixtures and bulbs shall be approved by the Public Works Director or designee, in consultation with the Police Chief to provide appropriate lighting levels based upon public safety considerations while also minimizing aesthetic impacts and glare. The current bulbs will be replaced with LED bulbs of comparable wattage. The project proposes 3000-Kelvin CCT light bulbs all throughout the city, with the exception of one predominantly-commercial area where 4000-Kelvin light bulbs are proposed. The only predominantly-commercial area where the 4000-Kelvin light bulbs are proposed is a portion of the Highway 68 corridor from Sunset Drive to the northwest through Presidio Boulevard to the southeast. In addition, where feasible, lower CCT bulbs and reduced lighting levels will be used near sensitive wildlife habitat.
2. Light fixtures shall be installed in a manner approved by the Public Works Director or designee, in consultation with the Police Chief to aim light onto the public right-of-way, and fixtures in residential areas or adjacent to sensitive wildlife habitat shall be fitted with cutoff shields to block light rays from shining directly onto residential properties or wildlife habitat areas in the vicinity of each streetlight.

B. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the [California Department of Fish and Game](#) or [US Fish and Wildlife Service](#)?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
		✓		

Item B Discussion: Please see discussion in 4.A, above. Mitigation Measures 1 and 2 would reduce potential impacts to a level that is **less than significant**.

C. Have a substantial adverse effect on federally protected wetlands as defined by [Section 404 of the Clean Water Act](#) (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

Item C Discussion: No construction or ground disturbance is proposed as part of the proposed project; therefore, **no impact** to wetlands would occur.

D. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
		✓		

Item D Discussion: Please see discussion in 4.A, above. Mitigation Measures 1 and 2 would reduce potential impacts to a level that is **less than significant**.

E. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
		✓		

Item E Discussion: Please see discussion in 4.A, above. Mitigation Measures 1 and 2 would reduce potential impacts to a level that is **less than significant**.

F. Conflict with the provisions of an adopted [Habitat Conservation Plan](#), [Natural Community Conservation Plan](#), or other approved local, regional, or state habitat conservation plan?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

Item F Discussion: The project site is not within a habitat conservation plan area. **No impact** would occur.

5. CULTURAL RESOURCES

Would the project:

A. Cause a substantial adverse change in the significance of a [historical resource](#) as defined in [§ 15064.5](#)?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

B. Cause a substantial adverse change in the significance of an archaeological resource pursuant to [§ 15064.5](#)?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

C. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

D. Disturb any human remains, including those interred outside of dedicated cemeteries?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

Items A, B, C, and D Discussion: The proposed project would not alter any historical, archaeological, paleontological, resources, unique geological feature, nor disturb any human remains. **No impact** would occur.

6. GEOLOGY AND SOILS

Would the project:

A) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

(i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

(ii) Strong seismic ground shaking?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

(iii) Seismic-related ground failure, including liquefaction?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

(iv) Landslides?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

B) Result in substantial soil erosion or the loss of topsoil?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

C) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

				✓
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D) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

E) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

Items A, B, C, D and E Discussion: The project proposes to replace the light fixtures of existing streetlights. No new construction is proposed; therefore, the project would not alter any geological features, including seismic activities and soil erosion, or wastewater disposal systems. **No impact** would occur.

7. GREENHOUSE GAS EMISSIONS

Would the project:

A) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
			✓	

B) Conflict with an applicable plan, policy or [regulation](#) adopted for the purpose of reducing the emissions of greenhouse gases?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
			✓	

Discussion: Items A and B: A primary purpose of the proposed LED upgrade project is to reduce energy use and greenhouse gas emissions. Since LED fixtures of comparable light output use less energy than the existing HPS fixtures, total long-term energy usage and greenhouse gas emissions would be reduced. As noted in 3.A (Air Quality) above, project implementation would require vehicle trips; however, because of the longer life expectancy of LED fixtures the number of trips would not be substantially greater than current trips for routine maintenance of the existing HPS lights. Potential impacts would be **less than significant**.

8. HAZARDS AND HAZARDOUS MATERIALS

Would the project:

A) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

B) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

C) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

D) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

				✓
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E) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

F) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

G) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
			✓	

H) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

Discussion: Items A-F, and H: The proposed project would not involve the use, transport or disposal of hazardous materials. The project site is not included on a list of hazardous materials site compiled pursuant to Government Code Section 65962.5. The project would have no effect on aircraft operations. Additionally, the proposed project is not located within or adjacent to a wildland fire hazard area. This would result in **no impact**.

Discussion: Item G: During the installation phase of the project, temporary lane closures may be required to accommodate utility trucks; however, existing regulations require that any such closures

comply with City regulations for work conducted in the public right-of-way, including maintaining emergency access. This would result in a **less than significant** impact.

9. HYDROLOGY AND WATER QUALITY

Would the project:

A) Violate any [water quality standards or waste discharge requirements](#)?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

B) Substantially deplete [groundwater](#) supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

C) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

D) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

E) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

F) Otherwise substantially degrade water quality?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

G) Place housing within a 100-year flood hazard area as mapped on a [federal Flood Hazard Boundary](#) or [Flood Insurance Rate Map](#) or other flood hazard delineation map?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

H) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

I) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

J) Inundation by seiche, tsunami, or mudflow?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

Items A-J Discussion: The proposed light fixtures replacement would not involve any new construction or ground disturbance; therefore, **no impact** would occur.

10. LAND USE AND PLANNING

Would the project:

A. Physically divide an established community?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

B. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
		✓		

C. Conflict with any applicable habitat conservation plan or natural community conservation plan?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

Discussion

Item A: The project proposes to replace the light fixtures of existing streetlights. This would not physically divide an established community. This results in **no impact**.

Item B: As discussed in 4.A (Biology), the Pacific Grove Local Coastal Program Land Use Plan includes policies to protect sensitive wildlife species. The City will select LED replacement lights and set lighting intensity at levels necessary for safety while minimizing potential impacts on sensitive wildlife, as described in Mitigation Measures 1 and 2. These mitigation measures would reduce potential impacts to a level that is **less than significant**.

Mitigation Measures

1. The selection and directional orientation of LED replacement street lighting fixtures and bulbs shall be approved by the Public Works Director or designee, in consultation with the Police Chief to provide appropriate lighting levels based upon public safety considerations while also minimizing aesthetic impacts and glare. The current bulbs will be replaced with LED bulbs of comparable wattage. The project proposes 3000-Kelvin CCT light bulbs all throughout the city, with the exception of one predominantly-commercial area where 4000-Kelvin light bulbs are proposed. The only predominantly-commercial area where the 4000-Kelvin light bulbs are proposed is a portion of the Highway 68 corridor from Sunset Drive to the northwest through Presidio Boulevard to the southeast. In addition, where feasible, lower CCT bulbs and reduced lighting levels will be used near sensitive wildlife habitat.

2. Light fixtures shall be installed in a manner approved by the Public Works Director or designee, in consultation with the Police Chief to aim light onto the public right-of-way, and fixtures in residential areas or adjacent to sensitive wildlife habitat shall be fitted with cutoff shields to block light rays from shining directly onto residential properties or wildlife habitat areas in the vicinity of each streetlight.

Item C: The project site is not located within a habitat conservation plan or natural community conservation plan area. **No impacts** would occur.

11. MINERAL RESOURCES

Would the project:

A. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

B. Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

Items A and B discussion: The project proposes to replace the light fixtures of existing streetlights. Furthermore, according to the City’s General Plan, there are no known mineral resources located in Pacific Grove. Therefore, the project would have **no impact** on mineral resources.

12. NOISE

Would the project result in:

A) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

B) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

C) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

D) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

E) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

F) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
			✓	

Discussion

Items A, B, C, D: The project proposes to replace HPS light fixtures with LED fixtures. During operation, LED fixtures do not generate a substantial amount of noise. Minor and temporary noise could occur during installation of the new fixtures. Potential impacts would be **less than significant**.

Items E, F: The project site is not located within two miles of an airport or within an airport land use plan, nor is the project in the vicinity of a private airstrip. This results in **no impact**.

13. POPULATION AND HOUSING

Would the project:

A) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

B) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

C) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

Discussion

Items A, B and C: The proposed replacement of existing light fixtures would not induce population growth or displace housing. **No impact** would occur.

14. PUBLIC SERVICES

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

A) Fire protection?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

B) Police protection?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

C) Schools?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

D) Parks?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

E) Other public facilities?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

Discussion

Items A-E: The proposed replacement of existing light fixtures would have no effect on demand for fire protection, police protection, schools, parks, or other public facilities. This results in **no impact**.

15. RECREATION

A) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

B) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

Discussion

Items A and B: The proposed replacement of existing light fixtures would have no effect on the use of recreational facilities or demand for expansion or addition of parks or other recreation facilities. This results in **no impact**.

16. TRANSPORTATION/TRAFFIC

Would the project:

A) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

B) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

C) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

D) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact

				✓
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E) Result in inadequate emergency access

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
			✓	

F) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

Discussion

Items A, B, C, F: The proposed LED upgrade project would have **no impact** on transportation, air traffic, public transit, bicycle or pedestrian facilities.

Item D: Glare from excessively bright streetlights could have the potential to create a safety hazard. However, the purpose of street lighting is to improve public safety for motorists, cyclists and pedestrians due to better nighttime visibility. As discussed in Section 1 (Aesthetics) LED fixtures are available in a range of power levels and color temperatures, and may be specifically aimed down to illuminate defined areas on the ground. As described in Mitigation Measure 1, the City will select and adjust the light fixtures to provide appropriate lighting levels based upon public safety considerations while also minimizing aesthetic impacts and glare. This mitigation measure would reduce potential safety impacts to a level that is **less than significant**.

Mitigation Measure

1. The selection and directional orientation of LED replacement street lighting fixtures and bulbs shall be approved by the Public Works Director or designee, in consultation with the Police Chief to provide appropriate lighting levels based upon public safety considerations while also minimizing aesthetic impacts and glare. The current bulbs will be replaced with LED bulbs of comparable wattage. The project proposes 3000-Kelvin CCT light bulbs all throughout the city, with the exception of one predominantly-commercial area where 4000-Kelvin light bulbs are proposed. The only predominantly-commercial area where the 4000-Kelvin light bulbs are proposed is a portion of the Highway 68 corridor from Sunset Drive to the northwest through Presidio Boulevard to the southeast. In addition, where feasible, lower CCT bulbs and reduced lighting levels will be used near sensitive wildlife habitat.

Item E: During the installation phase of the project, temporary lane closures may be required to accommodate utility trucks; however, existing regulations require that any such closures comply with City regulations for work conducted in the public right-of-way, including maintaining emergency access. This would result in a **less than significant** impact.

17. TRIBAL CULTURAL RESOURCES

A. Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

1. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

2. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

Discussion

Items 1-2: The project proposes to replace the light fixtures of existing streetlights. This would not affect tribal cultural resources. This results in **no impact**.

18. UTILITIES AND SERVICE SYSTEMS

A. Would the project:

1. Exceed wastewater treatment requirements of the applicable [Regional Water Quality Control Board](#)?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

2. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

3. Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

4. Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

5. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

6. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

7. Comply with federal, state, and local statutes and regulations related to solid waste?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
				✓

Discussion

Items 1-7: The project proposes to replace the HPS light fixtures of existing streetlights with LED fixtures. This would have no effect on water, wastewater or solid waste facilities. This results in **no impact**.

19. MANDATORY FINDINGS OF SIGNIFICANCE

1. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
		✓		

2. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
		✓		

3. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

IMPACT	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
		✓		

Discussion

Item 1: As discussed above, no construction or ground disturbance is proposed as part of the LED upgrade project since no change to existing streetlight poles is proposed. However, the replacement of HPS bulbs with LED bulbs has the potential to result in impacts due to glare, interference with human sleep patterns, nocturnal wildlife and the safety of motorists unless the type and intensity of replacement bulbs are properly selected, installed and operated. The mitigation measures described herein would ensure a balance between public health and safety objectives and concerns regarding aesthetics, wildlife disturbance and interference with human sleep patterns, and would reduce potential impacts to a level that is less than significant.

Item 2: Similar LED streetlight replacement projects have occurred throughout the nation in order to reduce energy consumption and greenhouse gas emissions. Approval of the proposed project in Pacific Grove would be consistent with federal and state policy as well as the actions of numerous cities and counties throughout the country. The mitigation measures described herein would reduce potential impacts in Pacific Grove to a level that is less than significant.

Item 3: As discussed in Items 1 and 2, above, the mitigation measures described herein would reduce potential impacts on human beings to a less than significant level.

SUMMARY OF PROPOSED MITIGATION MEASURES

1. The selection and directional orientation of LED replacement street lighting fixtures and bulbs shall be approved by the Public Works Director or designee, in consultation with the Police Chief to provide appropriate lighting levels based upon public safety considerations while also minimizing aesthetic impacts and glare. The current bulbs will be replaced with LED bulbs of comparable wattage. The project proposes 3000-Kelvin CCT light bulbs all throughout the city, with the exception of one predominantly-commercial area where 4000-Kelvin light bulbs are proposed. The only predominantly-commercial area where the 4000-Kelvin light bulbs are proposed is a portion of the Highway 68 corridor from Sunset Drive to the northwest through Presidio Boulevard to the southeast. In addition, where feasible, lower CCT bulbs and reduced lighting levels will be used near sensitive wildlife habitat.
2. Light fixtures shall be installed in a manner approved by the Public Works Director or designee, in consultation with the Police Chief to aim light onto the public right-of-way, and fixtures in residential areas or adjacent to sensitive wildlife habitat shall be fitted with cutoff shields to block light rays from shining directly onto residential properties or wildlife habitat areas in the vicinity of each streetlight.

DETERMINATION:

On the basis of this initial evaluation:

I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.	
I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.	✓
I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.	
I find that the proposed project MAY have a “potential significant impact” or “potentially significant unless mitigated” impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.	
I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.	



Wendy Lao, Associate Planner
City of Pacific Grove

March 5, 2018

Date

REFERENCES:

- American Medical Association, Human and Environmental Effects of Light Emitting Diode (LED) Community Lighting (CSAPH Report 2-A-16), 2016 (<https://www.ama-assn.org/sites/default/files/media-browser/public/about-ama/councils/Council%20Reports/council-on-science-public-health/a16-csaph2.pdf>)
- Biological Survey Report for Kevin and Linda Smith (APN 007-031-017). Prepared by Thomas K. Moss, Coastal Biologist. Revised December 27, 2017
- California Department of Conservation. Farmland Mapping and Monitoring Program. (<http://www.conservation.ca.gov/dlrp/fmmp>)
- California Department of Transportation (Caltrans). California Scenic Highway Program. (<http://www.dot.ca.gov/design/lap/livability/scenic-highways/index.html>)
- City of Pacific Grove, Pacific Grove General Plan
- City of Pacific Grove, Pacific Grove Local Coastal Program Land Use Plan
- City of Pacific Grove, Pacific Grove Municipal Code Chapter 23.73
- Pacific Gas & Electric, LED Streetlight Replacement Program, 2018 (https://www.pge.com/en_US/business/save-energy-money/business-solutions-and-rebates/lighting/led-street-lighting/led-streetlight-replacement-program.page)
- Rensselaer Polytechnic Institute Lighting Research Center, Response to the 2016 AMA Report on LED Lighting, June 30, 2016 (<http://www.lrc.rpi.edu/resources/newsroom/AMA.pdf>)
- U.S. Department of Energy, True Colors: LEDs and the relationship between CCT, CRI, optical safety, material degradation, and photobiological stimulation, October 2014 (<https://www1.eere.energy.gov/buildings/ssl/pdfs/true-colors.pdf>)
- U.S. Department of Energy, Street Lighting and Blue Light: Frequently Asked Questions, February 2017 (<https://www.energy.gov/eere/ssl/downloads/street-lighting-and-blue-light-faqs>)

April 3, 2018

Via email

Mayor Bill Kampe, Mayor
City Council
City Hall
300 Forest Ave.
Pacific Grove, CA 93950

Re Pacific Grove initial study on LED streetlights

Dear Mayor Kampe and Council members:

I represent concerned Pacific Grove residents with regard to the proposed LED streetlights. This letter and the exhibits are in response to the city's proposed mitigated negative declaration. The negative declaration and initial study are inadequate and are not consistent with CEQA. I refer you to my June 2016 letter to the city and the attachments thereto. I may provide additional comments later.

Briefly, the two proposed mitigations are inadequate; they are indefinite, are not quantified, and improperly defer the metrics to a later unknown date by unknown persons using unknown and possibly inconsistent or arbitrary standards. The proposed mitigations are not reliable and do not have adequate performance standards. The mitigation #1 proposal is "LED replacement street lighting fixtures shall be selected and adjusted to provide appropriate lighting levels based upon public safety considerations while also minimizing aesthetic impacts and glare. Where feasible, lower CCT bulbs and reduced lighting levels such as 3000 Kelvin bulbs shall be used in residential areas and near sensitive wildlife habitat." The words "appropriate," "feasible" and "selected" and "adjusted" are not defined and no metrics or standards are provided.

Mitigation #2 fails to address the visibility of light emitting diodes and the glare that causes to drivers and pedestrians and occupants of hotels and businesses. The mitigation also claims to protect only "adjacent residential properties" and not non-adjacent residential properties.

Impacts to historic resources. The harsh glare, the cold blue light, and the visible exposed diodes can dramatically change the setting and context of historic districts and individual historic resources such as buildings, homes, and parks. The initial study fails to address this important issue for "the Last Home Town," Historic buildings in Pacific Grove will be seen under a very different, cold, piercing and glaring light, which Monterey residents described as "prison yard" and "used car lot."

The initial study's suggestion that views are not affected because there are no views at night is nonsense. Visitors and locals alike see Pacific Grove and its historic

structures at night, which is approximately half the time. Historic context did not include harsh blue glaring lights and such lights compromise and reduce the significance of the historic resources. Views of historic structures are protected at all times, including at night. The new proposed LED lights will cause significant impacts on PG's historic resources. The initial study fails to adequately address and mitigate these impacts.

Glare impacts on drivers and pedestrians. LED glare can cause temporary blindness in drivers, which presents major public health and safety issues. Glare is caused by seeing the light source: the light emitting diodes. Glare should be eliminated from all viewing angles with the exception of looking straight up when standing directly beneath the streetlight. This requires recessing the diodes in the luminaire, shielding them with side shields, or other steps. Side shields on the side of private property do not prevent glare impacts on drivers and pedestrians on public streets and sidewalks. Many residents and businesses are not comfortable contacting city hall, even if their homes is being trespassed upon by bright lights, or if glare is compromising their ability to drive and walk. The initial study fails to adequately address this issue.

Light trespass on private property. LED streetlights have a more piercing light that easily gets through curtains and even around blackout shades. The photometrics also cause light trespass in ways not seen in other streetlights. Some options such as LED shields must be installed by the manufacturer or the warranty may be voided. The initial study does not adequately investigate the available mitigations and fails to adequately address this issue.

Color temperature. The bluer the light, the worse the impacts. Common complaints are that new LED streetlights emit bright and cold light that makes residential streets look like a prison yard or a used car lot. The initial study does not adequately investigate the available mitigations and fails to adequately address this issue.

Health impacts. Bright LED light affects melatonin, sleep and health in ways not seen with other streetlights. The initial study does not adequately investigate the available mitigations and fails to adequately address this issue.

Community participation in decision making. The city should require test installations of at least a full block's worth of each LED streetlight under consideration for a week. I urge the City to redo its past tests, and to involve residents, businesses, and historic preservation organizations in any consideration of LED streetlights. Publicize the installations so the public can view them and provide feedback.

Evaluate Environmental Impacts. Consider all environmental impacts in a thoughtful written document. Hold public forums for information, questions, and demonstrations. While LED streetlights save energy, they can have many harmful impacts that decision makers should evaluate carefully before any decision is made.

These are important matters. The technology is changing rapidly, and the city can consider the decision in the future with more information and better technology. The current initial study and proposed CEQA determination falls short.

Here are links to articles that address some of these important issues. A simple online search of "LED streetlight problems" will produce additional information that may assist the city..

- <http://www.darksky.org/5-popular-myths-about-led-streetlights/>
- <http://repository.cmu.edu/cgi/viewcontent.cgi?article=1080&context=architecture>
(2011 Pittsburgh LED Street Light Research Project that could be a model for other cities)
- <http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2486.2012.02705.x/full>
- <https://www.sciencedaily.com/releases/2017/02/170206083902.htm>
- <http://www.darksky.org/light-pollution/wildlife/>
- <http://www.scienceworldreport.com/articles/56945/20170208/nature-check-led-streetlights-impact-wildlife-researchers-warn.htm>
- <https://spectrum.ieee.org/green-tech/conservation/led-streetlights-are-giving-neighborhoods-the-blues>
- https://www.washingtonpost.com/national/health-science/some-cities-are-taking-another-look-at-led-lighting-after-ama-warning/2016/09/21/98779568-7c3d-11e6-bd86-b7bbd53d2b5d_story.html?utm_term=.2e9e4bbee0ad
- <https://www.sfgate.com/bayarea/article/Are-San-Francisco-s-new-LED-streetlights-too-12317593.php>
- <https://www.cnn.com/2016/09/29/health/streetlights-improve-health/index.html>

I also attach some articles and studies that support the comments made in this letter. I urge you to read them. The city should not adopt the proposed initial study. The city should reconsider these issues and revise and recirculate the initial study. The impacts of LED streetlights can be mitigated when done right and with advance consideration.

Request for Notice

Please place me on the distribution list for all notices regarding this project, including all notice under Public Resources Code section 21092.2.

Offer to Meet

I would be happy to meet with you to discuss these important issues before the city takes action on the project and the CEQA document. The city controls the schedule, not the public. Now is the time to consider these issues carefully. Thank you.

Very truly yours,

STAMP | ERICKSON

/s/ Molly Erickson

Molly Erickson

Attachments: as stated

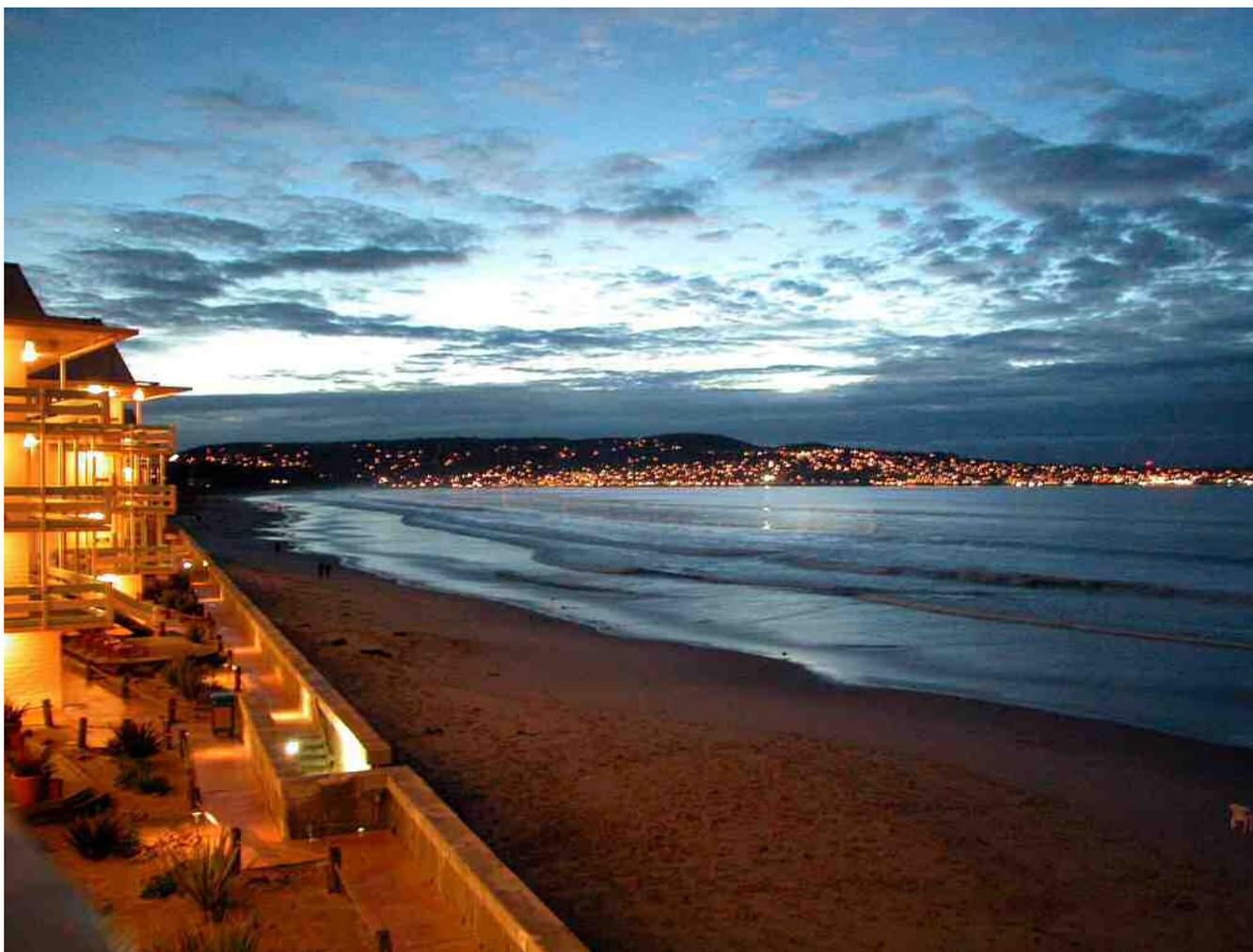


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Judge Ruled Against City of Monterey Over LED Conversion

on JANUARY 9, 2017



Night over Monterey Bay. Photo by Gail Frederick.

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Recently, a judge ruled against the city of Monterey, stating they violated the California Environmental Quality Act and the Brown Act when they began their LED streetlight conversion in 2009. A group of Monterey residents calling themselves, Turn Down The Lights, brought the case to court. They claimed the city had neglected to follow through on an environmental review before beginning the LED conversion. The group is also claiming the LED bulbs were notably brighter than the original fixtures.

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Molly Erickson, an attorney representing the group, Turn Down The Lights, cited the June 2016 [report](#) released by the American Medical Association that warns of negative effects blue-rich LED's. The report presents significant implications for the ongoing, worldwide transition to LEDs as the outdoor lighting technology of choice.

"The AMA's study not only provides additional rigorous scientific evidence to buttress IDA's longstanding efforts to raise awareness of the potential hazards of blue-rich light, but also speaks to the bold leadership that the medical community has consistently demonstrated on this critical human health and environmental issue," IDA Executive Director J. Scott Feierabend noted.

The city of Monterey argued that the installation had been exempt from both environmental act's. The judge found that claim to be inaccurate and found the city to be in violation of the Brown Act.

The city was able to save \$70,000 in annual energy costs since July 2016 but simultaneously accrued \$80,000 so far in fighting the court case.

While the AMA report supports the use of LED lighting to reduce energy consumption and the use of fossil fuels, it recognizes that some LED lights are harmful. The report details findings from an increasing body of scientific evidence that implicates exposure to blue-rich white light at night to increased risks for cancer, diabetes and cardiovascular disease.

The final decision is expected to come from the judge in the coming months. It is likely to the city will be required to complete the public environmental reviews for the LED lights installed in 2012 and earlier.

Related Posts



Cities take a second look at LED streetlights after AMA warning

Michael Ollove, Special To The Washington Post Updated 7:28 am, Monday, September 26, 2016 Agenda No. 12A, Attachment 1a
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IMAGE 1 OF 6

An LED fixture (below) is displayed next to an older streetlight August 3, 2011 in Las Vegas, Nevada. The city is replacing 6,600 existing streetlights with the new energy-efficient LEDs, which are expected to ... [more](#)

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If people are sleepless in Seattle, it may not be only because they have broken hearts.

The American Medical Association issued a warning in June that high-intensity LED streetlights - such as those in Seattle, Los Angeles, New York, Houston, San Francisco and elsewhere - emit unseen blue light that can disturb sleep rhythms and possibly increase the risk of serious health conditions, including cancer and cardiovascular disease. The AMA also cautioned that those light-emitting-diode lights can impair nighttime driving vision.

Similar concerns have been raised over the past few years, but the AMA report adds credence to the issue and is likely to prompt cities and states to re-evaluate the intensity of LED lights they install.

Nearly 13 percent of area/roadway lighting is now LED, according to a report prepared last year for the Department of Energy, and many communities that haven't yet made the switch plan to do so. LEDs are up to 50 percent more energy-efficient than the yellow-orange high-pressure sodium lights they typically replace. They last for 15 to 20 years, instead of two to five. And unlike sodium lights, the LEDs spread illumination evenly.

Video: LED street lighting may pose health risks

Some cities say the health concerns are not convincing enough to override the benefits of the first-generation bright LED lights that they installed in the past three to eight years. New York is one of them, although it has responded to

resident complaints by replacing the high-intensity, white LED bulbs with a lower-intensity bulb that the AMA considers safe.

ADVERTISEMENT

Scott Thomsen, a spokesman for Seattle City Lights, which is responsible for the city's exterior illumination, dismissed the health concerns about bright-white LED lights, noting that they emit less of the problematic blue wavelengths than most computers and televisions.

After a year and a half of discussion and sampling, Lake Worth, Florida, is replacing its sodium streetlights with about 4,150 LED lights with an amber glow. "We found a color that made sense for the health of our city, and we're proud of the choice we've made," Michael Bornstein, the city manager, said.

Mark Hartman, Phoenix's chief sustainability officer, said the city might go with a mix of the intense lights for major intersections and ballpark areas that need very bright light and a softer light for residential areas. He said the city would consider the health arguments, although he too mentioned the glow from computers and televisions. "Nobody says don't watch television or use your computer after 9 p.m. because of blue lights," he said.

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The first generation

Almost as soon as outdoor LEDs were made available, the federal government encouraged states and municipalities to use them, calling LEDs highly efficient for applications such as traffic lights and exit signs. But critics say federal authorities were too quick to endorse LEDs.

RELATED STORIES



S.F. replacing old streetlights with cheaper, better LED bulbs



How the Space Needle shrunk over time

Dog finds shock hazard in Seattle streetlight

The Department of Energy and the Environmental Protection Agency "put a lot of push into them," said Michael Siminovitch, director of the California Lighting Technology Center at the University of California at Davis. "I call it a rush."

Siminovitch said the light from early-generation LEDs "really negatively impacts people's physiological well-being."

Lighting is measured by color temperature, which is expressed in "kelvin," or "K." The original LED streetlights had temperatures of at least 4000K, which produces a bright white light with a high content of unseen blue light.

Now, however, LEDs are available with lower kelvin ratings and roughly the same energy efficiency as those with higher ratings. They don't emit as much potentially harmful blue light, and they produce a softer, amber hue.

When 4000K and 5000K LEDs were installed, they drew mixed responses. Police and traffic-safety officials and many motorists liked them because they created a bright light that sharply illuminated the ground they covered.

But in many places, including New York City and Seattle, residents complained that the bright white light they emitted was harsh, even lurid. People described them as invasive, cold and unflattering.

Even before the AMA warning, some researchers raised health concerns. Some noted that exposure to the blue-rich LED outdoor lights might decrease people's secretion of the hormone melatonin. Secreted at night, melatonin helps balance the reproductive, thyroid and adrenal hormones and regulates the body's circadian rhythm of sleeping and waking.

"As a species, we weren't designed to see light at night," Siminovitch said.

Meanwhile, the "dark sky" movement criticizes LEDs as a major contributor to what it calls the "light pollution" that humans cast into the night sky.

Setup Timeout Error: Setup took longer than 30 seconds to complete.

Effect on sleep cycles

In its warning, the AMA cited the melatonin issue, noting that studies have linked bright LEDs to reduced sleep time, poor sleep quality and

ii



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ght at night might increase the risk of cancer, diabetes,

cardiovascular disease and obesity. And it cautioned that intense LEDs have been associated with "discomfort and disability glare," which might impair nighttime vision for drivers.

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Finally, the AMA cautioned about the harmful effects of bright LEDs on wildlife, particularly nocturnal animals, birds and insects.

"These lights aren't just bad for us," said Mario Motta, one of the authors of the AMA report, "they're bad for the environment, too."

The AMA did commend LEDs for their energy efficiency and effectiveness, but it urged cities to minimize blue-rich outside lighting and recommended the use of LEDs no brighter than 3000K.

Tony Dorsey, a spokesman with the American Association of State Highway and Transportation Officials, said that the organization's environmental committee is studying the AMA's report but that association members haven't seemed concerned about the use of 4000K LEDs on roadways.

The Department of Energy said LEDs should be used with "prudence" but praised their overall performance. It said the AMA had added "another influential voice" to the issue.

Others, including the Lighting Research Center at Rensselaer Polytechnic Institute in Troy, N.Y., said the lights pose less risk than the AMA suggests. The research center pointed out that the AMA report is based on extended exposure to high-intensity LEDs, and said the blue-light hazard of LEDs "is probably not a concern to the majority of the population in most lighting applications."

Motta stood by the AMA's concerns about high-intensity LEDs and said there is no downside - either in cost or efficiency - to choosing a lower-intensity light.

Sleeping in Seattle

Some cities are satisfied with their higher-intensity LED streetlights.

In Seattle, which has installed about 41,000 new lights since 2010, Thomsen, the spokesman for Seattle Light, attributed the early complaints to residents' surprise at the sharp difference in brightness between the old sodium lights and the new LEDs.

Light from the new fixtures is comparable to moonlight and provides excellent visual acuity for drivers, Thomsen said. Police especially like them, he said, because they enable people to distinguish colors at night. "The police say they get much better witness descriptions," Thomsen said.

Thomsen also noted that even though the Seattle LEDs are rated at 4100K, significantly lower than most computer screens, laptops and televisions.

But Pete Strasser, technical director at the International Dark-Sky Association, said moonlight contains far less blue light than high-intensity LED lights.

A little more than a year ago, Gloucester, Mass., was on its way to replacing its sodium streetlights with new

4000K LEDs. But then city planner Matt Coogan began reading about health and environmental warnings. He also had residents sample the 4000K lights against 3000K models.

Next month, the city is expected to finish installing its LEDs, but they will be 3000K rather than 4000K.

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Coogan knows the debate over the health risks of LEDs rages on. But he doesn't want to be on the wrong side of history.

"I didn't want to get 10 or 15 years down the road and find out we had exposed our people to a health risk," Coogan said.

This article was produced by Stateline, an initiative of the Pew Charitable Trusts.

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H E A R S T

Filing CEQA Exemption for Municipal LED Streetlight Projects

For cities electing to complete municipal streetlight projects, a recent concern has been the threat of a lawsuit under CEQA. Of the many dozens of LED streetlight projects in the San Francisco Bay Area there is only one known case of litigation which is occurring in the City of Monterrey. The first line of defense is a well-designed installation. This includes considering technical factors in the planning process such as color temperature of the luminaires, directionality of the light, and shielding in residential areas to prevent light scatter. It also highly recommended do include community engagement in the planning process: increase public awareness and consider signage of new fixtures in a pilot project; soliciting feedback on the pilot project and adjusting the project design where appropriate. Taking these steps will minimize negative reception upon large-scale deployment and thereby significantly reduce the likelihood of a lawsuit.

Streetlight projects are discretionary actions potentially subject to environmental review because replacement of existing luminaires with a different kind of luminaire involves discretion. Therefore, it is advisable to file a "Notice of Exemption ("NOE") under CEQA for municipal streetlight projects. Below is an overview of the process, including how to choose and file an exemption, what to do if the exemption is challenged, how to move forward after the exemption, examples of cities handling the process in the Bay Area, and a sample filing form. *Consult with your legal counsel regarding your specific needs.*

Choosing an exemption

Under CEQA Guidelines Article 19, there are three categorical exemption options pertinent to streetlight projects.¹ Class 1 exemption (§15301) allows for the repair, maintenance or minor alteration of existing facilities, a good choice for retrofit projects. Class 2 (§15302) applies to replacement or reconstruction of existing facilities, useful in one-to-one fixture replacement projects. Class 3 (§15303) allows new construction or conversion of small structures ("small" meaning as large as a single-family home) and is a viable option for installation of new fixtures where there were none prior. In addition, §15061(b)(3), allows for exemptions where "it can be seen with certainty" that there is no environmental impact. It is of course best to consult the City Attorney to determine the most applicable exemption for a given project.

Filing an exemption

Once an exemption is chosen, the planning department should file a one-page "Notice of Exemption" with the County Clerk.² This will remain on file for 35 days, after which any lawsuit under CEQA will be barred.³ The City need not wait for completion of the period to move forward with the project.

¹ The CERES site is an excellent resource for navigating CEQA: <http://ceres.ca.gov/ceqa/>. For text of the categorical exemptions, see <http://ceres.ca.gov/ceqa/guidelines/art19.html>. Of particular note are §15300-§15303.

² See p.3 for a sample Notice of Exemption. Alternatively: http://ceres.ca.gov/ceqa/guidelines/pdf/appen_e.pdf.

³ Note: citywide projects are generally approved by the City Council, though if the project is not structured as a council action, the Public Works Director can sign and submit the Notice of Exemption directly.

If the exemption is challenged

Again, the likelihood of this can be substantially minimized by requesting public feedback from a pilot project and tailoring the project concept to minimize complaints. Though if the exemption is challenged within the 35-day period it is on file, a Petition for a Writ of Mandate is filed with the Court. At this point you will be working closely with the City Attorney to defend the case. To aid in defense, prior to approval of the project the City should prepare supporting documents for a formal record of the project to be used by the Court.⁴ These documents should offer a comparative analysis of environmental impacts between existing fixtures/technology (e.g., HPS luminaires) and LED fixtures. The benefits of LED technology should be highlighted, as should clear evidence that the City has taken environmental impacts of the project into account; address not only the energy aspect, but also changes to ambient lighting levels, nighttime visibility, public safety, etc.

Case study: Berkeley Marina

The City of Berkeley's Marina LED Streetlight Replacement Pilot Project is an example of how to prepare a project that incorporates public opinion and minimizes negative reception for a future citywide deployment.⁵ The pilot project installed a small number of fixtures of different color temperatures (4100K – more red vs. 6000K – more blue) and carefully assessed technical factors including state standards for luminosity in roadway illumination, leading to the decision for a one-to-one replacement under CalTrans Standard.⁶ Further, the City requested community feedback to determine which lights residents prefer overall and in specific sectors (e.g., residential, commercial). The City is incorporating its technical findings and community response in a citywide deployment project and is preparing to file a CEQA exemption.⁷

Case study: Monterey citywide LED conversion

The City of Monterey recently pursued a one-to-one replacement of HPS to LED streetlights across nearly the entire city, including residential areas. In March 2012, a petition for Writ of Mandate was filed by a group of approximately 45 citizens referring to themselves as "Turn Down the Lights." Their complaints include safety hazards caused by excess glare from the LED lights and light scatter into individual homes. The City of Monterey is now facing litigation⁸ and attempting to mitigate the concerns through non-judicial means. While the benefits of LED streetlights in Monterey have been substantial, measures such as raising public awareness and garnering feedback via a pilot project, conducting a formal city review, and even filing an exemption may have prevented such a lawsuit. Careful planning, assessment of technical factors, and community engagement are important aspects of any project, even one with such straightforward benefits as streetlight conversion.

⁴ For an organized & interactive flowchart of steps to be taken by the City, see <http://ceres.ca.gov/ceqa/flowchart/index.html>.

⁵ For an overview of the project, see http://www.ci.berkeley.ca.us/uploadedFiles/Clerk/Level_3_-_City_Council/2011/06Jun/2011-06-28_Item_51_Marina_LED_Streetlight_Replacement.pdf.

⁶ For CalTrans Standard Plans, see http://www.dot.ca.gov/hq/esc/oe/project_plans/HTM/10_plans_disclaim_US.htm.

⁷ To learn more about the Berkeley Marina project, contact [Neal DeSnoo](#), Division Manager at the Office of Energy and Sustainable Development.

⁸ <http://en.china-led.net/daily-information/monterey-residents-sue-over-new-led-streetlights.html>

To: Office of Planning and Research
1400 Tenth Street, Room 121
Sacramento, CA 95814

From: (Public Agency) _____

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(Address) Page 14 of 38

County Clerk
County of _____

Project Title: _____

Project Location - Specific: _____

Project Location - City: _____ Project Location - County: _____

Description of Nature, Purpose, and Beneficiaries of Project:

Name of Public Agency Approving Project: _____

Name of Person or Agency Carrying Out Project: _____

Exempt Status: (check one)

- Ministerial (Sec. 21080(b)(1); 15268);
- Declared Emergency (Sec. 21080(b)(3); 15269(a));
- Emergency Project (Sec. 21080(b)(4); 15269(b)(c));
- Categorical Exemption. State type and section number:
- Statutory Exemptions. State code number:

Reasons why project is exempt: _____

Lead Agency

Contact Person: _____ Area Code/Telephone/Extension: _____

If filed by applicant:

1. Attach certified document of exemption finding.
2. Has a Notice of Exemption been filed by the public agency approving the project? Yes No

Signature: _____ Date: _____ Title: _____

Signed by Lead Agency

Date received for filing at OPR:

Signed by Applicant

Revised October 1989

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Dimmer LED Streetlights

STATELINE

Citing Health Concerns, Some Cities Consider Dimmer LED Streetlights

September 07, 2016

By Michael Ollove



© City of Fort Worth

An electrical foreman installs a new 2700K LED streetlight in Lake Worth, Florida.

Concerned about health risks, Lake Worth and some other cities have installed less-intense LED lights.

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In the last several years, New York, Los Angeles, Houston, Seattle and other U.S. cities have installed high-intensity, white LED streetlights. In all, at least 13 percent of outdoor lighting is now LED, and many communities that haven't yet made the switch are rushing to do so.

The LEDs are up to 50 percent more energy-efficient than the yellow-orange high-pressure sodium lights they replaced. They last for 15 to 20 years, instead of two to five. And unlike sodium lights, the LEDs spread illumination evenly, enhancing visibility for drivers and pedestrians.

But health concerns, heightened by a recent warning by the American Medical Association (AMA), are giving pause to some local officials, spurring them to consider less-intense LED alternatives. Honolulu, Phoenix and smaller cities in Arizona, California, Florida and Massachusetts are among those who are taking the health warnings seriously.

In June, the AMA warned that high-intensity LEDs (which stands for light-emitting diodes) emit unseen blue light that can disturb sleep rhythms. The full report from the AMA found that LEDs possibly increase the risk of serious health conditions, including cancer and cardiovascular disease. The AMA also cautioned that high-intensity LEDs can impair nighttime driving vision.

Honolulu, which was poised to install high-intensity LEDs, decided to hold off and consider other options. Phoenix is still deciding between a bright white LED model and one with a softer hue. It might opt for intense lights for major intersections and ballpark areas and a softer light for residential areas.

Lake Worth, Florida, spent 18 months debating and sampling different options before settling on lower-intensity LEDs with an amber glow.

“We found a color that made sense for the health of our city, and we’re proud of the choice we’ve made,” said Michael Bornstein, city manager of Lake Worth, which is in Palm Beach County.

City officials in Davis, California; Gloucester, Massachusetts; and Sahuarita, Arizona, made the same choice.

But other cities say the health concerns are not convincing enough to override the benefits of the first-generation LEDs, which many of them installed within the past decade.

New York is one of them, although for residents who complain that lights on their block are too bright, the city has been “toning those lights down.”

Scott Thomsen, a spokesman for Seattle City Light, which is responsible for that city’s outside lights, dismissed the health concerns about the bright white LEDs, noting that they emit less of the problematic blue light than most computers and televisions.

“We have been able to reduce by half the light spread so it doesn’t go into people’s homes while increasing driver’s acuity and visibility,” Thomsen said.

A Harsh and Lurid Light?

Almost as soon as outside LEDs were made available, the federal government encouraged states and municipalities to use them, calling LEDs highly efficient for applications such as traffic lights and exit signs. But critics say the federal government was too quick to endorse LEDs.

The Department of Energy and the Environmental Protection Agency “put a lot of push into them,” said Michael Siminovitch, director of the California Lighting Technology Center at the University of California, Davis. “I call it a rush.”

Siminovitch said the light from early-generation LEDs “really negatively impacts people’s physiological well-being.”

But until last year, cities eager to make the switch to LED streetlights had limited options.

LEDs are measured by their color temperatures, which are expressed in “Kelvins” or “K.” The original LED streetlights were made with at least 4000K, which produces a bright white light with a high content of unseen blue light.

Cities that installed LED streetlights before the end of last year used 4000K lights or higher because those with lower Kelvin ratings either weren’t yet manufactured or hadn’t achieved the same energy-efficiency.

Now, however, LEDs with lower Kelvin ratings have roughly the same energy-efficiency as those with higher ratings. They don’t emit as much potentially harmful blue light and they produce a softer, amber hue.

When 4000K and 5000K LEDs were initially installed, they drew mixed responses. Police and traffic safety officials and many motorists liked them because they created a bright light that sharply illuminated the ground they covered.

But in many places, including New York City and Seattle, residents complained that the bright white light they emitted was harsh, even lurid. People described them as invasive, cold and unflattering.

Even before the AMA warning, some researchers raised health concerns. Some noted that exposure to the blue-rich LED outside lights might decrease the secretion of the hormone melatonin in humans. Melatonin, which is secreted at night, helps balance the reproductive, thyroid and adrenal hormones and regulates the body’s circadian rhythm of sleeping and waking.

“As a species, we weren’t designed to see light at night,” said UC Davis’ Siminovitch.

Meanwhile, the “dark sky” movement, which aims to reduce the level of “light pollution” humans cast into the night sky, criticizes LEDs as a major contributor to the problem.

Effect on Sleep Cycles

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In its warning, the AMA, which conducted a review of the scientific literature on LEDs, cited the melatonin issue, noting that studies have linked bright LEDs to reduced sleep time, poor sleep quality and impaired daytime functioning.

It referred to evidence that exposure to high-intensity light at night might increase the risk of cancer, diabetes, cardiovascular disease and obesity. And it cautioned that intense LEDs have been associated with “discomfort and disability glare” in motorists, meaning that they impair nighttime driving vision.

Finally, the AMA cautioned about the harmful effects of bright LEDs on wildlife, particularly nocturnal animals, birds and insects.

“These lights aren’t just bad for us,” said Mario Motta, one of the authors of the AMA report, “they’re bad for the environment, too.”

The AMA did commend LEDs for their energy-efficiency and effectiveness, but it urged cities to minimize blue-rich outside lighting and recommended the use of LEDs no higher than 3000K.

Tony Dorsey, a spokesman with the American Association of State Highway and Transportation Officials, said that the organization’s environmental committee is studying the AMA’s report, but that association members haven’t seemed concerned about the use of 4000K LEDs on their state roadways.

The Department of Energy said LEDs should be used with “prudence” but praised their overall performance. It said the AMA had added “another influential voice” to the issue.

Others, including the Lighting Research Center at Rensselaer Polytechnic Institute, said the lights pose less risk than the AMA suggests. The research center pointed out that the AMA report is based on extended exposure to high-intensity LEDs, and said the blue-light hazard of LEDs “is probably not a concern to the majority of the

population in most lighting applications.”

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Motta, co-author of the AMA report, stood by the group’s concerns about the health and environmental impact of LEDs that are 4000K and above, and said there is no downside — either in cost or efficiency — to choosing a lower-intensity light.

Sleeping in Seattle

Some cities are satisfied with their higher-intensity LED streetlights.

In Seattle, which has installed about 41,000 new 4100K lights since 2010, Thomsen, the spokesman for Seattle Light, attributed the early complaints to residents’ surprise at the sharp difference in brightness between the old sodium lights and the new LEDs.

The new lights are comparable to moonlight and provide excellent visual acuity for drivers, Thomsen said. Police especially like them, he said, because unlike the old sodium lights, they enable people to distinguish colors at night. “The police say they get much better witness descriptions,” Thomsen said.

Thomsen also noted that even though the Seattle LEDs are 4100K, that is significantly less than most computer screens, laptops and televisions.

But Pete Strasser, technical director at the International Dark-Sky Association, said moonlight contains far less blue light than higher-Kelvin LED lights. As for other computers and television screens, he said, “Everyone knows it’s a bad thing for your sleep cycle to watch TV or work on your computer before going to bed.”

A little more than a year ago, Gloucester was on its way to replacing its old sodium streetlights with 2,800 new 4000K LEDs. But then city planner Matt Coogan began reading about health and environmental warnings. He also had residents sample the 4000K lights against 3000K models.

Next month, the city is expected to finish installing its LEDs, but they will be 3000K rather than 4000K.

Coogan knows the debate over the health risks of LEDs rages on. But he doesn't want Gloucester, and its city planner, to risk being on the wrong side of history.

"I didn't want to get 10 or 15 years down the road and find out we had exposed our people to a health risk," Coogan said.

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LED Streetlights Are Giving Neighborhoods the Blues

Early adopters of LED street lighting are struggling with glare and light pollution

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By **JEFF HECHT** Posted 22 Sep 2016 | 19:00 GMT

You may have noticed them going up in your town's streets and parking lots: a new generation of pole-mounted lights that pour down a cool torrent of lumens from an array of light-emitting diodes. Like me, you might have welcomed this development. LEDs are, after all, the most energy-efficient lighting option on the market. They can last twice as long as ordinary sodium-vapor streetlights



Photo: Bob O'Connor

(<http://www.ledsmagazine.com/articles/print/volume-7/issue-12/features/choosing-between-led-and-hps-street-lights.html>), and their prices have dropped to within range of the competition.

If the switch to LEDs had needed any more support, it came from growing evidence about climate change. In the United States, street lighting accounts for a whopping 30 percent (http://energy.gov/sites/prod/files/2015/07/f24/led-adoption-report_2015.pdf) [PDF] of all the energy used to generate electricity for outdoor lighting. Another 60 percent goes toward lighting parking lots and garages, and much of that energy is still produced by fossil-fired power plants. Consultants at the firm Navigant, in Chicago, have estimated (http://energy.gov/sites/prod/files/2015/07/f24/led-adoption-report_2015.pdf) [PDF] that the United States could save 662 trillion British thermal units—the energy needed to power 5.8 million typical U.S. homes for one year—by converting all remaining non-LED outdoor lighting to LEDs.

Armed with statistics like these, and a mandate to cut energy use wherever they can, municipalities across the United States have installed more than 5.7 million outdoor LED street and area lights. Other towns and cities in Canada, Europe, and Asia have added millions more over the past decade. Amid this rush to adopt outdoor LEDs, the U.S. Department of Energy (DOE) stressed energy efficiency as the biggest advantage of the new technology while cautioning cities to also consider light output and color quality. But now that ordinary folks have got an eyeful of those new lights, some municipalities are coming down with a case of the early-adopter blues.

For some, those first LED lights have been a fiasco. The harsh glare of certain blue-rich designs is now thought to disrupt people's sleep patterns and harm nocturnal animals. And these concerns have been heaped on the complaints of astronomers, who as far back as 2009 have criticized the new lights. That's

the year the [International Dark-Sky Association \(http://darksky.org/\)](http://darksky.org/), a coalition that opposes light pollution, started worrying that blue-rich LEDs could be “a disaster for dark skies and the environment,” says Chris Monrad, a director of IDA and a lighting consultant in Tucson.

When my city of Newton, Mass., announced plans to install LED streetlights in 2014, I was optimistic. I'm all for energy conservation, and I was happy with the LED bulbs in my home office. But months later, returning from a week's vacation in rural Maine, I was shocked to find my neighborhood lit by a stark bluish blaze that washed out almost all of the stars in the night sky.

Lately, lighting companies have introduced LED streetlights with a warmer-hued output, and municipalities have begun to adopt them. Some communities, too, are using smart lighting controls to minimize light pollution. They are welcome changes, but they're happening none too soon: An estimated [10 percent of all outdoor lighting \(http://energy.gov/sites/prod/files/2015/07/f24/led-adoption-report_2015.pdf\)](http://energy.gov/sites/prod/files/2015/07/f24/led-adoption-report_2015.pdf) [PDF] in the United States was switched over to an earlier generation of LEDs, which included those problematic blue-rich varieties, at a potential cost of billions of dollars.

The episode invites a few questions: How did an energy-saving technology that looked so promising wind up irritating so many people? Why has it taken so long for the impacts of blue-rich lighting to become widely known? And why did blue-rich LEDs so captivate municipal lighting engineers long before better options reached the market?

Early innovations in street lighting were largely driven by brightness and convenience. The ancient Greeks and Romans lit terra-cotta [oil lamps \(http://classics.richmond.edu/gallery/research-papers/RomanLamps.pdf\)](http://classics.richmond.edu/gallery/research-papers/RomanLamps.pdf) [PDF] to illuminate their streets. Candles and oil lanterns brightened preindustrial cities, with some 3,000 streetlamps said to be used in Paris in 1669. In the early 1800s, whale-oil lamps and lanterns began to give way to relatively inexpensive gas streetlights, which were first installed throughout London, Paris, and St. Petersburg, Russia.

Not until the 20th century did engineers start worrying about efficiency. Brilliant arc lamps were the original electric streetlights in the late 1800s, but it took more practical incandescent bulbs to persuade most cities to replace gas streetlights with electric ones. These were gradually phased out for even higher-efficiency successors: mercury-vapor lamps starting in 1948, and then high-pressure sodium in 1970.

The bluish LEDs were a stark counterpart to the orangish high-pressure sodium lights that came before them. Switching from the warm sodium lights to those LEDs was like going from a subtropical sunset to high noon at the equator.

The difference in color comes from the inner workings of a white LED. Individual LEDs are nearly monochromatic, which means they emit light of only one particular color, and in a very narrow band of wavelengths. The cheapest and most efficient way to make [white light \(http://www.energy.gov/eere/ssl/led-basics\)](http://www.energy.gov/eere/ssl/led-basics) from an LED is to shine light from one or more powerful blue LEDs onto compounds called phosphors that absorb blue light and emit yellow light. This light combines with the remaining blue light from the LED to appear white to the eye.

The resulting shade of white depends on the blend of blue from the LED and yellow from the phosphor. It's measured on the color-temperature scale, which corresponds to the temperature (in kelvins) of a “black body,” which is an object that absorbs all the electromagnetic radiation it encounters and emits a similar mixture of colors. [Early “white” LEDs \(http://proceedings.spiedigitallibrary.org/proceeding.aspx?articleid=918575\)](http://proceedings.spiedigitallibrary.org/proceeding.aspx?articleid=918575) developed in 1997 at [Nichia Chemical Industries \(http://www.nichia.co.jp/en/about_nichia/history.html\)](http://www.nichia.co.jp/en/about_nichia/history.html), in Japan, (now known as Nichia Corp.) were quite blue: They emitted more than 45 percent blue light, corresponding to 8,000 K. That's even bluer than the color temperature of summer daylight, and it looks harsh to the eye.

Adding more and redder phosphors to a white LED makes its light look warmer and more agreeable to the eye—but at the cost of reduced efficiency. That's because energy is lost in converting high-energy blue photons to lower-energy yellow and red photons. At home, though, people are sensitive to the color of lighting, so for indoor use [many people choose LEDs \(http://energy.gov/eere/femp/purchasing-energy-efficient-light-bulbs\)](http://energy.gov/eere/femp/purchasing-energy-efficient-light-bulbs) of 2,700 to 3,000 K, close to the hue of ordinary incandescent bulbs.

Indoor [LEDs reign supreme \(http://earthesy.com/live_energysave_lighting.htm\)](http://earthesy.com/live_energysave_lighting.htm) among light sources based on the savings they deliver: They are about five times as efficient as incandescents and up to 10 percent more efficient than compact fluorescents. They are rated to last anywhere from 2 to 50 times as long as competing bulbs. Though they've been screwed into only about 3 percent of indoor sockets in the United States, their rate of adoption is growing.

Outdoor lighting is a different matter, though, because it's bought by municipal engineers charged with providing functional lighting at minimum cost. The cost-saving potential of LEDs appealed greatly to them, so they looked for the highest-efficiency bulbs. In June 2008, the DOE correctly noted that the [most efficient white LEDs \(http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/outdoor_area_lighting.pdf\)](http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/outdoor_area_lighting.pdf) [PDF] of the time were those with a color temperature of 4,500 to 6,500 K. The agency also recommended matching color temperature to the bulb's intended application.

Whatever their faults were, those blue-rich LED lights do save energy and money. My city of Newton, Mass., which has about 80,000 residents, expects to save US \$3 million over 20 years

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Photos: Bob O'Connor

A Glaring Mistake? Jeff Hecht stands on his stoop in the city of Newton, Mass., which installed 4,000-K LED streetlights in 2014 [top]. One of the new lights shines through Hecht's kitchen window [middle]. Another casts ghostly shadows onto a second-floor wall from across the street [bottom].

<http://newton.wickedlocal.com/article/20140718/NEWS/140716658>) after swapping its 8,406 sodium streetlights for 4,000-K LEDs, and avoid 1,240 metric tons of carbon dioxide emissions (<http://newton.wickedlocal.com/article/20140824/NEWS/140828170>) annually. Los Angeles anticipates saving \$8 million a year after installing more than 150,000 LED streetlights (http://energy.gov/sites/prod/files/2015/07/f24/led-adoption-report_2015.pdf), [PDF] while New York City (<http://www.nyc.gov/html/dot/html/infrastructure/streetlights.shtml>) hopes to recover \$14 million a year by replacing the city's 250,000 streetlights with LEDs.

Outdoor LEDs also illuminate streets more efficiently than sodium not so much because of their superior lumens per watt but because they are highly directional, meaning that they focus light mostly in one direction. Sodium lamps are gas-filled bulbs that emit in all directions. More than half of that light must be redirected downward by reflectors or lenses, reducing the lamps' illumination efficiency.

A much trickier factor to quantify for street lighting is how the difference in color temperature between LEDs and high-pressure sodium affects the way we see at night. Our ability to see in a range of environments comes from two sets of sensors: a group of receptors known as cones that show us color in daylight, and night-time sensors called rods (http://www.newworldencyclopedia.org/entry/Rod_cell) that are very sensitive to bluish light but are less sensitive to red.

Our visual sensitivity shifts as light grows dim because rods and cones respond most strongly to waves of different lengths. The collective response of cones makes the human eye most sensitive (<http://www.nightsea.com/articles/lumens-fluorescence-1/>) in daytime to wavelengths of green-yellow light in the middle of the visible spectrum. Rods have a peak response (<http://hyperphysics.phy-astr.gsu.edu/hbase/vision/bright.html>) to shorter blue-green wavelengths. Blue-sensitive cones, which are greatly outnumbered by other types of cones but are thought to play a role in sensing brightness at night, peak at wavelengths that produce indigo light.

The result is that at night the blue-rich light from an LED streetlamp looks brighter to the eye than the orangish light from a high-pressure sodium lamp—even if the two emit the same number of lumens, which are measured on a scale based on the eyes' daytime response.

Given these facts, some experts touted bluer light for LEDs, noting that the relatively high color temperatures could enhance visibility (<http://kbelectricpa.com/high-pressure-sodium-vs-led-parking-lot-lighting/>) at night. Some suggested that the use of bluish LEDs would let us see so much better at night that we could turn down the intensity of the lighting.

Yet Ron Gibbins, director of the Center for Infrastructure-based Safety Systems (<http://www.vtti.vt.edu/>) at the Virginia Tech Transportation Institute, says his experiments don't support that idea. He has found that drivers' eyes do not fully adapt to the dark, and thus would benefit little from the higher sensitivity of rods to blue light.

Other peer-reviewed studies have found that portions of the retina can adapt to different light levels at the same time. This suggests that rods focused on a road's periphery may be better adapted to lower light levels, and therefore stand to benefit more from blue-rich lighting than those focused on the center line.

Meanwhile, evidence has been mounting that increasing the blue content of outdoor lighting can worsen its biological impact on both humans and wildlife, leading some to question the wisdom of putting LED streetlights in their neighborhoods.

We have long been adding light to the outdoor environment. But only in the past decade or two have experts become aware of the consequences for wildlife, human health, and residents' view of the night sky, says Chris Luginbuhl, a retired astronomer active in the Flagstaff Dark Skies Coalition, in Arizona. (<http://www.flagstaffdarksities.org/>)

In 2014, Luginbuhl and his colleagues showed that because the human eye is more sensitive to blue and green light than yellow and orange, some white streetlights can contribute up to four times as much nighttime sky glow as the amber-hued sodium lamps of the same luminous output. Worse, John Bullough, (<http://homepages.rpi.edu/~bulloj/>) director of the transportation and safety lighting programs at Rensselaer Polytechnic Institute, in Troy, N.Y., found that the impact of "discomfort glare"—which may make it hard for the eye to focus on objects—peaks in the blue part of the spectrum that was abundant in early LEDs.

It's more than an inconvenience. Research over the past 15 years has shown that humans and other animals have nonvisual receptors in their eyes containing a pigment called melanopsin that senses blue light. Our bodies use that response to control our diurnal cycles, waking in the morning as light

increases, peaking in activity at midday when it is most intense, and winding down for sleep at dusk. Though the overall amount of light in a person's environment has the greatest impact on circadian rhythms, this blue light response is an important factor.

Blue light at the wrong time can disrupt sleep by suppressing production of the sleep-inducing hormone melatonin. You might have noticed, a couple of years ago, the news that looking at your smartphone or other LED-lit screen before bedtime was a bad idea. Much the same is true of blue-rich outdoor LEDs: Their impact on the circadian rhythms associated with sleep is estimated to be five times greater (<http://www.ama-assn.org/ama/pub/news/news/2016/2016-06-14-community-guidance-street-lighting.page>) than that from conventional streetlamps.

Ecologists have also long known that the color and intensity of nighttime illumination can affect such wildly diverse creatures as bugs, bats, and birds. Robin Somers-Yeates at the University of Exeter, in England, found in 2013 that blue lighting attracts nocturnal moths, which creates a fluttering buffet for bats. And an important group of slow-flying bats, named *Myotis* and known as mouse-eared bats, instinctively avoids the light because other, faster-moving bats prey on them, says Gareth Jones of the University of Bristol, in England.

One of the best-understood, and most serious, impacts of bluish lighting is on endangered sea turtles. They evolved to scurry toward the moonlit sea when they hatch, but bluish lights at coastal resorts draw them inland, to be stranded or caught by waiting predators. Electric lights can even lure them back to land once they reach the water. To protect the turtles, the Florida Fish and Wildlife Conservation Commission now limits outdoor lighting visible from sea turtle nesting zones (<http://myfwc.com/wildlifehabitats/managed/sea-turtles/lighting/>) to amber, orange, and red wavelengths longer than 560 nanometers. LEDs are fine, but only if they follow this wavelength restriction.

A European Union-funded consortium called the Loss of the Night Network (<http://www.cost-lonne.eu/>) is supporting research on the biological impact of LEDs and other outdoor lighting. But well-controlled ecological studies can take years of painstaking observations, and at the moment there is precious little research on the impact of different color spectra on wildlife.

In the meantime, human beings are making their own displeasure known based on health, environmental, and quality-of-life concerns. Some residents of Brooklyn (http://www.nytimes.com/2016/07/12/nyregion/new-yorks-led-streetlights-recv-a-lukewarm-reception.html?_r=0) Seattle, and Houston have joined the International Dark-Sky Association (IDA) in fighting installations of blue-rich LED street lighting. And in Canada, public outcry over the city of Montreal's \$84 million plan to replace existing streetlights with LEDs (<http://montrealgazette.com/news/local-news/opposition-calls-for-suspension-of-montreals-led-streetlights-project>) centered on light pollution and health impacts.

In response to questions that I posed to the DOE about the early rollout of blue-rich LEDs, the agency says it does not recommend specific color temperatures for LED street lighting and that it provides information about energy efficiency ratings and color temperatures only to allow buyers to make informed choices. Unfortunately, the right choice is not always clear—just months after the city of Davis, Calif., installed 4,000-K LED streetlights in 2014, a high volume of complaints prompted officials to spend \$350,000 to replace 650 of those new lights with less-efficient 2,700-K LEDs.

LED lighting manufacturers have taken notice of the public rumblings about blue-rich LEDs. This year Cree, one of the top U.S. makers of LED lighting, began offering 3,000-K LEDs that could generate the same number of lumens per watt as 4,000-K LEDs (modern sodium lights have a color temperature of 2,100 to 2,300 K). Cree's breakthrough involved adding a new high-efficiency red-emitting LED to the standard blue LED with yellow phosphors. As it turns out, producing red light directly from the new LEDs generates more lumens per watt than adding red-emitting phosphors to the standard yellow-emitting ones in a white-light LED.

Erik Milz, Cree's vice president of product marketing for outdoor lighting, says the reddish LEDs give the warm appearance of high-pressure sodium lamps, but with the long lifetime and high efficiency of LEDs. This technique does not eliminate the blue but reduces it; the DOE calculates that the output of 3,000-K LED lamps is about 20 percent blue, compared with 30 percent for 4,000-K LEDs and 10 percent for high-pressure sodium bulbs.

"Communities like the warmer light," says Patrick Roche, energy coordinator for the Boston-based Metropolitan Area Planning Council (<http://www.mapc.org/>). And 3,000 K is good news for the IDA (<http://darksky.org/lighting/lighting-basics/>), which, along with the Loss of the Night Network in Europe and the American Medical Association, recommends that color temperature as the maximum.

The city of Tucson, with about a billion dollars' worth of research telescopes within 75 miles, is now installing 3,000-K LEDs. And for Southern California, Monrad's consulting firm is working on a regional street-lighting plan for a dozen communities near the Palomar Observatory. The upper limit for that project is 3,000 K, but he is pushing for LEDs with a color temperature of 2,700 K, a typical color for an incandescent bulb.



Photo: Bob O'Connor

Bright Night: The city of Boston installed LED streetlights to replace mercury-vapor lamps and high-pressure sodium bulbs in the South End neighborhood. Older high-pressure sodium lights along I-93, in the upper right, are still maintained by the Massachusetts Department of Transportation.

Monrad has another design trick: mixing LEDs of different colors in the same fixture. He combined amber LEDs with 3,000-K LEDs for a school in southern Arizona. The white LEDs switch off after workers go home, and the amber lights switch on to provide security with minimal impact on astronomers and wildlife.

Similarly, Cambridge, Mass., has installed a wireless control system to dim its new LED streetlights after most traffic stops. In addition to reducing lighting during the wee hours, the controls let city workers dim lights when residents complain.

Adaptive headlights, used on some European cars but not legal in the United States, could further reduce the need for street lighting by letting drivers use high beams more often to see farther at night. These systems detect oncoming cars and dim the part of the high beam aimed in their direction while leaving the rest of the road fully illuminated. "It could change how we determine what we need in road lighting," says Rensselaer's [Bullough](http://homepages.rpi.edu/~bulloj/) (<http://homepages.rpi.edu/~bulloj/>).

Another promising approach is developing optical systems that reduce the intensity of light from the LED device before directing it toward the street. A Cree offering called WaveMax uses transparent waveguides to collect light from LEDs and deliver it to ports that diffuse the emitted light. The effect is similar to that of a frosted incandescent bulb, which spreads light from the bright filament across the bulb's surface.

The challenge with LEDs, as with so much other energy-saving technology, is to improve energy efficiency without creating more problems for humans and the nonhuman environment. Fortunately, LED technology is extraordinarily flexible. Its wide range of colors, and the ease of using adaptive techniques, will let us develop street lighting that illuminates a neighborhood with minimal impact on wildlife and residents.

In retrospect, government agencies such as the U.S. Department of Energy and many municipalities pushed a wholesale shift to the first generation of outdoor LEDs more aggressively than they should have. But they were hardly alone. Most of us who grew up with streetlights tended to think of them as uninteresting utilitarian objects, when we thought of them at all. The turbulent early years of LED lighting have forced us to take another look at what nighttime lighting could—and should—be. Because of that, the future looks brighter, and it will also be much easier on the eye.

This article appears in the October 2016 print issue as "The Early-Adopter Blues."

This story was corrected on 27 September 2016 to better characterize the work of Luginbuhl and colleagues.

After complaints, Phoenix to install dimmer LED streetlights

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Dustin Gardiner, The Republic | azcentral.com 12:31 p.m. MT Dec. 8, 2016



(Photo: Michael Chow/The Republic)

And Phoenix said "Let there be new lights!" — but the people complained, as they once could have been blinded.

After four years of installing LED streetlights, Phoenix responded recently to concerns that the lights could negatively affect human health, blind older drivers or block astronomers' views [\(story/news/local/phoenix/2016/04/09/phoenix-led-streetlights-spark-light-pollution-debate\)](#), drawbacks have often overshadowed the environmental benefits as LEDs are expected to last half.

On Nov. 30, the City Council approved a contract with Ameresco, an energy-efficiency company, to install lower-intensity LED streetlights that shine a yellow or amber-looking light, rather than a jarring white or blueish stream. Health officials say the negative effects of LEDs, or light-emitting diodes, are minimized by using a more subdued lighting level.

Ameresco will convert all of the city's roughly 100,000 streetlights over the next few years and the switch could save the city about \$20 million by 2030 by reducing energy and maintenance costs.

'That intersection was almost blinding'

The decision was a relief to residents like Craig Weaver who consider the sharp, white glare of high-intensity LEDs a public-health and safety hazard.

Weaver said his concerns about new streetlights started about a year ago after the city installed several LEDs in his Sunnyslope neighborhood. At the intersection, the lights are so bright at one intersection, Dunlap and 19th avenues, that he worries about hitting pedestrians because he can't see them.

"That intersection was almost blinding for us," Weaver said.

Public-health professionals also have raised concerns about the affect of whiter LEDs like the ones Phoenix had installed. In June, the American Academy of Ophthalmology issued a report advising cities that high-intensity LED streetlights can "create worse nighttime glare" and harm human sleep.

City Council members said they had those concerns in mind when they voted unanimously Nov. 30 to switch to lower-intensity LED streetlights.

"At the end of the day, we got the decision right," Mayor Greg Stanton said. "So we get the sustainability benefits, we get the cost-savings, and we get the right lighting level. It balanced out all the interests."

City officials have said the high-intensity LEDs are the "industry standard" for cities converting their streetlights, but recent improvements in LED technology has created fixtures that are both energy efficient and shine a lower-intensity light.

The color characteristics or temperature of light is measured in Kelvins. Lights higher on the spectrum appear white and blueish, seen with the naked eye and can have detrimental effects on human health and some species of animals, according to the AMA.

Lights lower on the Kelvin scale appear more yellow or orange and pose fewer concerns.

Change could benefit city by \$52M by 2030

Phoenix had installed 4,000-Kelvin LED lights. But the city's new contract with Ameresco requires the company to install more subdue lights.

The city began replacing burnt-out streetlights with LEDs in 2013, and about 1,500 LEDs of the whiter variety were installed. A city sp those lights will all be replaced with 2,700-Kelvin fixtures.

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Installing LEDs isn't cheap. The city plans to borrow about \$30 million to pay for the new lights. But Deputy City Manager Mario Pania will "more than pay for itself" because the city will save more money through reduced energy and maintenance costs.

LEDs last longer than high-pressure sodium bulbs, the amber-looking streetlights still in use throughout most of the city. The city also e will reduce energy costs by more than \$2.8 million per year.

Those savings combined — along with money from energy rebates and recycling — could benefit the city by an estimated \$52 million Council report states. That's a net savings of \$22 million when accounting for the cost of installing the lights.

"There's nothing more annoying than when you're driving down the street and a streetlight is burnt out," Vice Mayor Kate Gallego said statement. "Having heard complaints about burnt-out streetlights, we looked into longer-lasting LED lights as a more cost-effective, gr alternative."

Monica Hernandez, a spokeswoman for the Street Transportation Department, said the city hasn't determined when it will begin install streetlights, but the project will take about two years to complete.

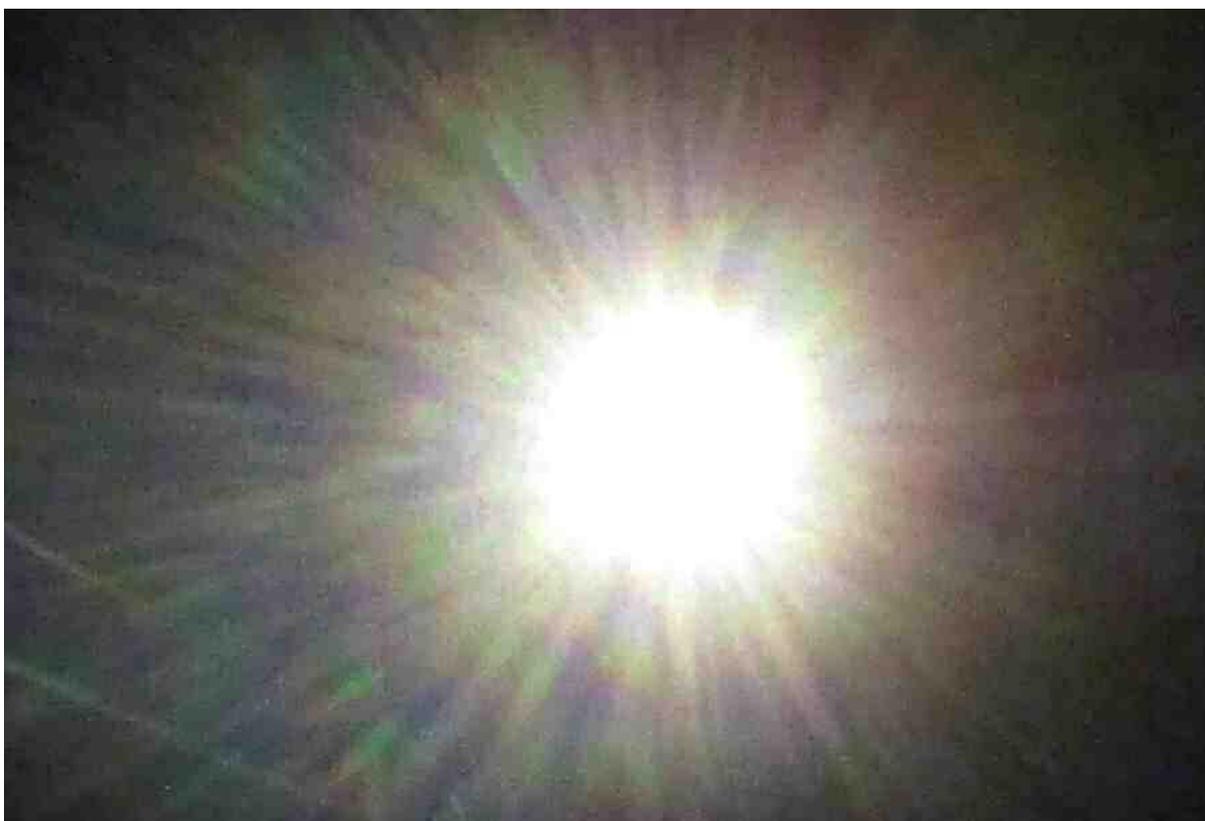
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EMF Safety Network

Reduce EMF and RF (wireless) to protect children, communities, and nature

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The perils of LED streetlights



Close up of a PG&E LED streetlight in Santa Rosa California

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There is a major push all over the country to install LED streetlights based on assumptions of saving energy and money. In places where the LEDs have been installed there are so many complaints. On February 16 Sebastopol will consider whether or not to allow PG&E

to install the LED streetlights. PG&E owns the streetlights and requires cities to opt-in to the changeout.

PG&E is currently installing LED streetlights in Santa Rosa, and we took a team to investigate, measure and photograph there. What we found is, unlike the warm yellow streetlights, the LED's are very white, with cold blue tones, and painfully bright.

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Mary Carvalho who lives in Santa Rosa writes, “Has anyone noticed lately that the night sky is lit up like a full moon every night?”

Paul Marantz, a lighting designer said about the yellow streetlights, “there was a warmth about them that’s missing from the new lights. And because of the way the LEDs are designed, it’s a much more directed light, with more glare.”

When the environment is saturated with blue rich light it causes melatonin reduction which can affect sleep. Harvard Medical School reported blue light has a dark side. “*Light at night is bad for your health, and exposure to blue light emitted by electronics and energy-efficient lightbulbs may be especially so.*”



PG&E LED streetlight

Bob Parks, executive director of the International Dark-Sky Association states, “Now, people can certainly close their blinds and block-out that rich blue-white light. The problem is that every other species on the planet can’t do that, so you have an impact on everything else. And not just animals — we are talking plants, trees, right down to one-cell organisms.”- Earth Island Journal

The Department of Energy (DOE) and IEEE reported there are serious health risks from LEDs if inexpensive drivers are used. DOE writes, “Why is flicker bad? For one thing, in addition to being annoying and distracting, it can cause eyestrain, blurred vision, and impairment of performance on sight-related tasks. And in those who are flicker-sensitive, it can cause debilitating headaches and migraines — 10% of the population is estimated to suffer from migraines, and that’s only one of the groups prone to flicker sensitivity. According to the IEEE recommended practice, flicker has been reported to contribute to autistic behaviors, and can be a trigger for epileptic seizures.... Some of these problems might occur even when the flicker isn’t detectable by the eye.”

The EMF Safety Network sent a list of questions to PG&E about their LED streetlights. We await their answers. We can trust PG&E will cut costs and we can’t be certain they will tell the public the truth. We don’t know whether or not PG&E will be using the streetlights for wireless transmissions, as has been done in Los Angeles and Florida. The California Public

Utilities Commission (CPUC) had a [presentation](#) on their website that touted the benefits of “intelligent” wireless streetlights.

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Intelligent LED Street Lights Wireless Monitoring & Management System

Savings:

- Lower Maintenance cost through longer life LED
- Lower operation cost through higher energy efficient LED

Features:

- Non-Start Detection
- Light Power Monitoring
- Error Reporting Tracks Burn-In Hours
- Dimming when activity is not present
- Wi-Fi Capabilities and Cellular Revenue Capabilities
- Motion /Infrared Sensor Adapter that increases lighting when motion is sensed
- Increased illumination for Emergencies
- Smart battery system that keeps lights on during an emergency or Demand Response load shedding events



Before LED Streetlights



After LED Streetlights

We don't know if PG&E is installing these, but we do know the rapid increase of microwave technologies deployed on our homes and in our neighborhoods, largely without informed consent, threatens privacy, public health, children, wildlife and nature.

The other risk is whether or not the LED streetlights add unintentional radiation to the power lines, creating “dirty electricity” like PG&E smart meters do. Samuel Milham, MD and David Stetzer, Electrical Engineer wrote a [peer reviewed published paper](#) in 2013. They wrote, “Dirty electricity, also called electrical pollution, is high-frequency voltage transients riding along the 50 or 60 Hz electricity provided by the electric utilities... has been associated with cancer, diabetes and attention deficit hyperactivity disorder in humans.

Some people claim brighter streetlights will help reduce crime. However, Earth Island Journal reported “Public safety was a big motivator behind the Oakland conversion project, and it may seem intuitive that brighter lights improve safety. However, some [studies](#) suggest that though brighter streets make people feel safer, they have no impact on actual crime levels.”

In 2015, PG&E's claims of LED cost and energy savings were merely assumptions. In the CPUC 2015 [Uncertain List](#) they stated, “market move to LED technology requires verifica-

tion.” As yet PG&E has offered no proof. In addition the city claimed the streetlight conversion would be free, however PG&E intends to recover streetlight costs through customers rate increases. So we all pay for the LED streetlights.

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Why should perfectly good streetlights be scrapped for a risky technology whose benefits are questionable? A study published in late 2010 in the journal Environmental Science and Technology found that LEDs contain lead, arsenic and a dozen other potentially dangerous substances. While it is possible that the LED's save energy, it's not worth the cost to public and environmental health.

In September 2015, the Sebastopol city council had the PG&E streetlight conversion on their consent calendar. Due to complaints, they took the issue off consent and put it on the regular agenda. At that meeting, Rich Emig, Public Works superintendent, gave a report acknowledging the LED health risks. Public comments included one woman who said when she was a child she had seizures from light flicker. See the Sebastopol City Council's video which starts at 1:40:00

Considering the city acknowledged the serious public health risks, why are they bringing it back to the council, and why have they not notified the public of this issue that will affect each and everyone of us?

More information:

What LED light pollution looks like from space

<http://www.techinsider.io/astonauts-photos-from-space-leds-light-pollution-2016-1>

Ecological Light Pollution <http://www.urbanwildlands.org/Resources/Long-coreRich2004.pdf>

A Silent Cry for Dark Skies <http://astrosociety.org/edu/publications/tnl/74/74.html#3>

Residents sue Monterrey over new LED streetlights (2012)

<http://www.montereyherald.com/article/ZZ/20120717/news/120718012>

Ann Arbor Michigan has been a leader in converting city streetlights to energy-efficient LEDs, but despite a large reduction in energy usage, DTE Energy is proposing rate increases for LED lights, while decreasing rates for conventional high-pressure sodium lights. http://www.mlive.com/news/ann-arbor/index.ssf/2015/02/ann_arbor_reponds_to_streetli.html

Darkness is a requisite part of life.

“Half of your life, half of the lives of all nature, half of all human history has occurred between sunset and sunrise. We and all of the natural kingdom have evolved in a landscape that segues from a bright blessed day to a dark sacred night. A dark night is really that—sacred. Ev-

ery cell in the human body has time-related functions, part of the bigger circadian system. I'm referring to science, not some woo-woo feel-good incense-laden chanting mysticism. Healthy life depends on critical functions for which the absence of light is essential.”

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1. All outdoor lighting shall be full cutoff, or fully shielded.
2. If LED lights are used, they shall have a correlated color temperature (CCT) less than 3000K.
3. All lights shall minimize glare, sky glow, and light trespass. —Excerpt and recommendations from www.Nightwise.org

Video of New York news story on LED street lighting and resident reaction.

<http://pix11.com/2015/04/27/new-bright-leds-that-replaced-street-lamps-angering-local-residents/>

The city of Davis received so many complaints about the LED lights they put the project on hold for a year, then spent \$350,000 more money on the project. <http://sacramento.cbslocal.com/2014/10/21/davis-will-spend-350000-to-replace-led-lights-after-neighbor-complaints/>

Berkeley complaints: <http://www.berkeleyinsider.com/2014/08/06/berkeley-residents-weigh-in-on-new-led-streetlights/>

Houston, we've got a problem with LEDS. <http://www.houstonpublicmedia.org/articles/news/2016/02/08/136878/city-waiting-for-more-information-on-alternative-led-street-lights-as-some-call-for-change/>

Grassroots website about LED streetlight complaints <http://lightsickness.com/actions-you-can-take/>

📅 February 9, 2016 👤 admin 📁 children, Commentary, CPUC, dirty electricity, Doctors, Environment, Government, PG&E, Public Health, Resources, Take Action!, wireless 🔗 LEDs, public health, science, smart grid failure

7 thoughts on “The perils of LED streetlights”

**Responses to Comments
PG&E LED Streetlight Upgrade Project**

Comment	Response
<p>1. The two proposed mitigations are inadequate; they are indefinite, are not quantified, and improperly defer the metrics to a later unknown date by unknown persons using unknown and possibly inconsistent or arbitrary standards.</p> <p>The proposed mitigations are not reliable and do not have adequate performance standards. The mitigation #1 proposal is “LED replacement street lighting fixtures shall be selected and adjusted to provide appropriate lighting levels based upon public safety considerations while also minimizing aesthetic impacts and glare. Where feasible, lower CCT bulbs and reduced lighting levels such as 3000 Kelvin bulbs shall be used in residential areas and near sensitive wildlife habitat.” The words “appropriate,” “feasible” and “selected” and “adjusted” are not defined and no metrics or standards are provided.</p>	<p>This comment expresses the author’s opinion and does not cite substantial evidence supporting a fair argument that the proposed project will cause a significant impact.</p> <p>The proposed project and mitigation measures have been designed to strike a reasonable balance between the City’s duty to construct and operate public facilities in a manner that protects public safety and its duty to minimize environmental impacts from those facilities. The aesthetics of light and glare are subjective and there is no established quantified threshold of significance for lighting intensity or color. In addition, CEQA (and common sense) indicate that such impacts are dependent on context. For example, a particular street light intensity level that may be judged by some persons to have significant impact in a rural area may be considered less than significant in an urban area where ambient light levels are higher. (see CEQA Guidelines Sec. 15064(b) <i>“The determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data. An ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting. For example, an activity which may not be significant in an urban area may be significant in a rural area.”</i>)</p> <p>Different bulb and fixture specifications (e.g., wattage, CCT, orientation, shielding) are appropriate in different locations due to a range of parameters such as height of pole and light fixture, the street configuration (e.g., straight vs. curved, right-of-way width), vehicular and pedestrian volumes, traffic speeds, sight distance, adjacent uses (e.g., residential, commercial, open space), etc. Based on these factors it is the City’s responsibility to determine the appropriate bulbs to be used in each location based on the professional judgment of City staff, including the Public Works Director or designee and the Police Department. The current bulbs will be replaced with an LED of comparable wattage. CEQA does not require the detailed specifications of each and every light fixture and bulb to be described at the time the project is approved. The project proposes 3000-Kelvin CCT light bulbs all throughout the city, with the exception of one predominantly-commercial area where 4000-Kelvin light bulbs are proposed. The only predominantly-commercial area where the 4000-Kelvin lights are proposed is a portion of the Highway 68 corridor from Sunset Drive to the northwest through Presidio Boulevard to the southeast.</p> <p>In addition, after installation of the replacement LED fixtures, affected persons may request modifications to fixture wattage and/or shields by contacting the City. The City will then consult with PG&E, and if the City determines that the requested change would not adversely affect public safety,</p>

Comment	Response
	<p>modifications to fixture specifications or shielding will be made.</p> <p>The Mitigation Monitoring and Reporting Program will describe the responsible persons and timing for implementation of mitigation measures; however, the Initial Study and Mitigation Measures have been revised to clarify these issues.</p>
<p>2. Mitigation #2 fails to address the visibility of light emitting diodes and the glare that causes to drivers and pedestrians and occupants of hotels and businesses. The mitigation also claims to protect only “adjacent residential properties” and not nonadjacent residential properties.</p>	<p>As discussed above, “glare” is subjective and not readily quantifiable. Different persons will have varying opinions regarding whether glare in a particular situation is a significant impact based on existing background light levels, the nature of the surrounding area (rural, suburban, urban), etc. Mitigation Measure #2 has been revised to clarify that the selection and orientation of fixtures and bulbs will consider residential properties in the vicinity of each streetlight.</p>
<p>3. <u>Impacts to historic resources</u>. The harsh glare, the cold blue light, and the visible exposed diodes can dramatically change the setting and context of historic districts and individual historic resources such as buildings, homes, and parks. The initial study fails to address this important issue for “the Last Home Town,” Historic buildings in Pacific Grove will be seen under a very different, cold, piercing and glaring light, which Monterey residents described as “prison yard” and “used car lot.”</p>	<p>Claims of “harsh glare, cold blue light, visible diodes, piercing and glaring light, prison yard and used car lot” are examples of argument and unsubstantiated opinion as referenced in CEQA Guidelines Sec. 15384 (the definition of “substantial evidence”). As noted above, the City has a broad mandate to protect public safety and use taxpayer funds efficiently, while also protecting environmental quality. The brightness, color and orientation of the replacement LED bulbs and fixtures will be selected and installed using the least intrusive option that provides adequate public safety and reduces impacts to a level that is less than significant as determined by the Public Works Director or designee, in consultation with the Police Chief.</p>
<p>4. The initial study’s suggestion that views are not affected because there are no views at night is nonsense. Visitors and locals alike see Pacific Grove and its historic harsh blue glaring lights and such lights compromise and reduce the significance of the historic resources. Views of historic structures are protected at all times, including at night. The new proposed LED lights will cause significant impacts on PG’s historic resources. The initial study fails to adequately address and mitigate these impacts.</p>	<p>The aesthetic quality of nighttime views of historic structures is a subjective issue that must be balanced with the City’s obligation to protect public safety. As noted above, context is a major consideration is CEQA. Many historic structures in Pacific Grove exist in an urban context where nighttime lighting levels are higher than may typically exist in a rural area. Within this context, the proposed streetlights would not result in a significant aesthetic impact on historic resources.</p>
<p>5. Glare impacts on drivers and pedestrians. LED glare can cause temporary blindness in drivers, which presents major public health and safety issues. Glare is caused by seeing the light source: the light emitting diodes. Glare should be eliminated from all viewing angles with the exception of looking straight up when standing directly beneath the streetlight. This requires recessing the diodes in the luminaire, shielding them with side shields, or other steps. Side shields on the side of private property do not prevent glare impacts on drivers and pedestrians on public streets and sidewalks. Many residents and businesses are not comfortable contacting city hall, even if their homes is (sic)</p>	<p>As noted in #1 above, the evaluation of “glare” is subjective. The IS/MND notes that the Public Works Director or designee, will determine the appropriate specifications and directional orientation of the replacement street lights in consultation with the Police Chief based on public safety and other considerations including aesthetics. The suggestion that the City intends to install street lighting that would be so intense as to “cause temporarily blindness in drivers” constitutes “argument and unsubstantiated opinion” and not substantial evidence pursuant to CEQA Guidelines Sec. 15384. Nonetheless, as noted in response to comment #1 above, after installation of the replacement LED fixtures,</p>

Comment	Response
<p>being trespassed upon by bright lights, or if glare is compromising their ability to drive and walk. The initial study fails to adequately address this issue.</p>	<p>affected persons may request modifications to fixture wattage and/or shields by contacting the City. The City will then consult with PG&E, and if the City determines that the requested change would not adversely affect public safety, modifications to fixture specifications or shielding will be made.</p>
<p>6. <u>Light trespass on private property.</u> LED streetlights have a more piercing light that easily gets through curtains and even around blackout shades. The photometrics also cause light trespass in ways not seen in other streetlights. Some options such as LED shields must be installed by the manufacturer or the warranty may be voided. The initial study does not adequately investigate the available mitigations and fails to adequately address this issue.</p>	<p>As noted above, the City has an obligation to balance public safety and environmental protection. Mitigation Measure #1 notes that street lighting fixtures and lighting levels will be determined by the Public Works Director or designee, in consultation with the Police Chief in a manner that addresses public safety considerations while also minimizing aesthetic impacts and glare. In addition, Mitigation Measure #2 notes that light fixtures shall be fitted with cutoff shields to block light rays from shining directly onto residential properties in the vicinity of each streetlight. These mitigation measures would substantially reduce impacts to a level that is less than significant. Furthermore, as noted in response to comment #1 and #5 above, after installation of the replacement LED fixtures, affected persons may request modifications to fixture wattage and/or shields by contacting the City. The City will then consult with PG&E, and if the City determines that the requested change would not adversely affect public safety, modifications to fixture specifications or shielding will be made.</p>
<p>7. <u>Color temperature.</u> The bluer the light, the worse the impacts. Common complaints are that new LED streetlights emit bright and cold light that makes residential streets look like a prison yard or a used car lot. The initial study does not adequately investigate the available mitigations and fails to adequately address this issue.</p>	<p>The City agrees that lighting with higher color temperatures (bluer light) may be perceived by some as more harsh light. For this reason, the IS/MND includes mitigation measures requiring lower CCT bulbs and reduced lighting levels where feasible in consideration of public safety concerns. These mitigation measures would substantially reduce impacts to a level that is less than significant.</p>
<p>8. <u>Health impacts.</u> Bright LED light affects melatonin, sleep and health in ways not seen with other streetlights. The initial study does not adequately investigate the available mitigations and fails to adequately address this issue.</p>	<p>The City acknowledges that some studies suggest bright light can interfere with sleep patterns for some persons. For this reason, the IS/MND includes mitigation measures requiring lower CCT bulbs and reduced lighting levels where feasible based on public safety concerns, as well as fitting light fixtures with cutoff shields to block light rays from shining directly onto residential properties. These mitigation measures would substantially reduce impacts to a level that is less than significant.</p>
<p>9. <u>Community participation in decision making.</u> The city should require test installations of at least a full block's worth of each LED streetlight under consideration for a week. I urge the City to redo its past tests, and to involve residents, businesses, and historic preservation organizations in any consideration of LED streetlights. Publicize the installations so the public can view them and provide feedback.</p>	<p>This comment does not raise a CEQA issue. No response is necessary.</p>
<p>10. <u>Evaluate Environmental Impacts.</u> Consider all environmental impacts in a thoughtful written document. Hold</p>	<p>As noted above, the IS/MND adequately addresses all potential environmental impacts as required by CEQA. The</p>

Comment	Response
public forums for information, questions, and demonstrations. While LED streetlights save energy, they can have many harmful impacts that decision makers should evaluate carefully before any decision is made.	recommended mitigation measures would reduce potential impacts to a level that is less than significant.
11. These are important matters. The technology is changing rapidly, and the city can consider the decision in the future with more information and better technology. The current initial study and proposed CEQA determination falls short.	The City concurs that these are important matters and technology is changing rapidly. However, the City must balance multiple factors in the provision of street lighting including energy usage and related air quality and greenhouse gas emissions, public safety, and cost to taxpayers. For these and other reasons described above, the City finds that the IS/MND fully complies with the requirements of CEQA.

Revised mitigation measures (changes shown with underline and ~~strikeout~~).

1. The selection and directional orientation of LED replacement street lighting fixtures and bulbs shall be selected approved by the Public Works Director or designee, in consultation with the Police Chief and adjusted to provide appropriate lighting levels based upon public safety considerations while also minimizing aesthetic impacts and glare. The current bulbs will be replaced with LED bulbs of comparable wattage. The project proposes 3000-Kelvin CCT light bulbs all throughout the city, with the exception of one predominantly-commercial area where 4000-Kelvin light bulbs are proposed. The only predominantly-commercial area where the 4000-Kelvin light bulbs are proposed is a portion of the Highway 68 corridor from Sunset Drive to the northwest through Presidio Boulevard to the southeast. In addition, where feasible, lower CCT bulbs and reduced lighting levels such as 3000-Kelvin bulbs shall ~~will be used in residential areas and near sensitive wildlife habitat.~~
2. Light fixtures shall be installed in a manner approved by the Public Works Director or designee, in consultation with the Police Chief to aim light onto the public right-of-way, and fixtures in residential areas or adjacent to sensitive wildlife habitat shall be fitted with cutoff shields to block light rays from shining directly onto ~~adjacent~~ residential properties or wildlife habitat areas in the vicinity of each streetlight.

MITIGATION MONITORING & REPORTING PROGRAM

for:

PG&E LED STREETLIGHTS UPGRADE

Project Proponent(s):

PACIFIC GAS & ELECTRIC COMPANY (PG&E)

Lead Agency:



CITY OF PACIFIC GROVE

Mitigation Monitoring and Reporting Program PG&E LED Streetlights Upgrade Project

MITIGATION MEASURE	IMPLEMENTATION RESPONSIBILITY	MONITORING RESPONSIBILITY	TIMING
<p>1. The selection and directional orientation of LED replacement street lighting fixtures and bulbs shall be approved by the Public Works Director or designee, in consultation with the Police Chief to provide appropriate lighting levels based upon public safety considerations while also minimizing aesthetic impacts and glare. The current bulbs will be replaced with LED bulbs of comparable wattage. The project proposes 3000-Kelvin CCT light bulbs all throughout the city, with the exception of one predominantly-commercial area where 4000-Kelvin light bulbs are proposed. The only predominantly-commercial area where the 4000-Kelvin light bulbs are proposed is a portion of the Highway 68 corridor from Sunset Drive to the northwest through Presidio Boulevard to the southeast. In addition, where feasible, lower CCT bulbs and reduced lighting levels will be used near sensitive wildlife habitat.</p>	PG&E	<p>City of Pacific Grove Public Works Director or designee, in consultation with the Police Chief</p>	<p>Prior to installation, and ongoing during the operational life of any PG&E LED light bulb.</p>
<p>2. Light fixtures shall be installed in a manner approved by the Public Works Director or designee, in consultation with the Police Chief to aim light onto the public right-of-way, and fixtures in residential areas or adjacent to sensitive wildlife habitat shall be fitted with cutoff shields to block light rays from shining directly onto residential properties or wildlife habitat areas in the vicinity of each streetlight.</p>	PG&E	<p>City of Pacific Grove Public Works Director or designee, in consultation with the Police Chief</p>	<p>Prior to installation, and ongoing during the operational life of any PG&E LED light bulb.</p>