



UNIVERSITY OF HAWAII SYSTEM

Legislative Testimony

Written Testimony Presented Before the
House Committees on Energy and Environmental Protection and
Economic Revitalization and Business
Tuesday, March 20, 2012 at 10:30 a.m.

by

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and

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SB 2402 SD1 Relating to Light Pollution

Chairs Coffman and McKelvey, and members of the Committees. My name is Richard Wainscoat and I am here today to submit this testimony on behalf of the University of Hawai'i. The University of Hawai'i strongly supports this bill that is an important first step in reducing light pollution in Hawaii.

Mauna Kea on the island of Hawai'i, and Haleakala on the island of Maui, are two of the best astronomy sites in the world. Dark night skies are essential for these observatories to continue to operate. However, increasing urban lighting is threatening the dark night skies over these observatories. Light pollution extends well beyond county boundaries; lights from O'ahu have a major and growing impact on Haleakala, and also affect Mauna Kea. Statewide legislation is needed to protect the observatories.

Astronomy in Hawai'i has a major economic impact. The present economic impact of astronomy is estimated to be \$150 to \$200 million per year.

The primary focus of this bill is proper shielding of outdoor lighting. Full shielding of lights is one of the most important techniques for protecting astronomical observatories from light pollution. Light emitted from poorly shielded fixtures at small angles above the horizontal travels enormous distances through the atmosphere, and is a major contributor to light pollution — it increases sky glow at remote locations, making it difficult or impossible to see faint objects. Fully shielded light fixtures emit no light above the horizontal, and therefore have much less impact on remote locations.

Full shielding also reduces glare, which is a very important safety factor, particularly for older drivers, and greatly reduces the impact of nighttime lighting on species that are affected by light at night, including endangered birds and turtles. Poorly designed and improperly shielded lights continue to be installed by government agencies, and a quick inventory of nighttime lighting shows that some of the most poorly shielded lighting is county and state lighting.

We note that SB 2402 SD1 affects only lighting by the state and state agencies. Careful use of all nighttime lighting in the state of Hawai'i — not just state lighting — including proper shielding, is required to protect the observatories.

We have provided suggested changes to the wording of the bill for clarification purposes. The suggested changes do not affect the intent of the bill.

A BILL FOR AN ACT

RELATING TO LIGHT POLLUTION.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF HAWAII:

SECTION 1. The legislature finds that the night sky is a tremendously valuable natural and cultural resource for the residents of Hawaii, and for visitors to Hawaii. The dark night sky has tremendous scientific value for astronomy, and is vitally important for wildlife in Hawaii including birds and turtles. Mauna Kea, on the island of Hawaii, is the best astronomical observatory site in the northern hemisphere, and arguably the best site on Earth. Haleakala on the island of Maui is also a world-class astronomical observatory site.

Unnecessary light pollution is threatening the dark night sky over the Hawaiian Islands. This light pollution includes sky glow, energy waste, glare, light trespass, visual confusion, and environmental harm. Light can travel enormous distances through the Earth's atmosphere, and therefore does not respect county boundaries. Light pollution spreads across the entire State and must be addressed using statewide

legislation. Furthermore, endangered species that are affected by light at night live on many of the Hawaiian Islands.

Many of the problems with light pollution that Hawaii faces are caused by improperly shielded lights. Poorly shielded lights direct energy straight into the atmosphere, where it is wasted. This light produces sky glow, which limits residents' ability to see stars. For example, in Honolulu only about the brightest twenty stars are visible, whereas about two thousand stars can be seen from a dark location. Poorly shielded lights also cause glare, which diminishes a person's ability to see at night. Poorly shielded lights also enter locations where the light is unwanted (light trespass), including bedrooms, making it difficult for residents to sleep. Excessive light in the sleeping environment has recently been linked to an increased incidence of breast cancer. Improperly shielded lights on the island of Kauai have led to many bird deaths, particularly of the endangered Newell's shearwater.

Act 161, Session Laws of Hawaii 2009, formed a temporary advisory committee to assist the department of business, economic development, and tourism to develop a statewide starlight reserve strategy to preserve the quality of the night sky and its associated cultural, scientific, astronomical, natural, and landscape-related values. The temporary advisory committee recommended the enactment of certain measures in the

2012 regular session to conserve energy and promote responsible use of light.

The purpose of this Act (hereinafter to also be known as the Hawaii Night Sky Protection Act) is to implement the recommended legislation of the temporary advisory committee established pursuant to Act 161. It is not the intent of this Act to require the realignment or relocation of any existing light poles.

SECTION 2. Chapter 201, Hawaii Revised Statutes, is amended by adding a new section to be appropriately designated and to read as follows:

"§201- Night sky protection strategy. (a) Beginning July 1, 2013, all state agencies shall comply with shielded lighting fixture requirements under this section, whereby, except as specified otherwise in sections (c) through (f), every new outdoor lamp light fixture emitting more than three thousand lumens shall be required to be fully shielded and to have a correlated color temperature of thirty-eight hundred Kelvin or less; provided that the impact of artificial light on shoreline and ocean waters shall be subject to compliance with section 205A-71. A lighting fixture is considered to be fully shielded when the lighting fixture is shielded in such a manner that all light rays emitted by the fixture, either directly from the lamp, or indirectly from the fixture, are projected below a

horizontal plane running through the lowest point of the fixture.

(b) No new mercury vapor lamps shall be sold or installed after July 1, 2013.

(c) As applicable, retrofit work or replacement of existing lighting fixtures shall:

(1) Limit the rated correlated color temperature of emitted light (lamp, fixture, and filter if used) to less than or equal to thirty-eight hundred Kelvin, ***except in the case of outdoor athletic facilities as described in section (d);***

(2) Not be ***subject to the shielding requirement*** for lamp-by-lamp replacement work; and

(3) Require one hundred per cent fully shielded lighting fixtures be installed if more than fifty per cent of existing nonconforming lighting fixtures need to be replaced.

(d) ***For outdoor athletic facilities, fully shielded lighting fixtures with correlated color temperatures less than or equal to 3,800 Kelvin are preferred, but not required.*** Where fully shielded lighting fixtures are not used, acceptable luminaries shall include light fixtures that are:

(1) Equipped with internal, external, or internal and external glare control louvers and are installed so as

to limit direct up-light to less than five per cent of the total lumens exiting from the installed fixtures and minimize offsite light trespass; and

- (2) Installed and maintained with minimum aiming angles of twenty-five degrees downward from the horizontal; provided that the aiming angle shall be measured from the axis of the luminaire maximum beam candlepower, as certified by an independent testing agency.

(e) Fully shielded replacement lighting fixtures for state managed roadways and highways shall be installed on a case-by-case basis, subject to the availability of capital improvement project funding and compliance with applicable federal, state, or county design standards or guidelines. Where fully shielded fixtures are not used, acceptable luminaires shall be partially shielded lights that emit no more than five per cent of their light above the horizontal plane, as certified by an independent testing agency.

(f) The use of existing nonconforming lighting fixtures shall be allowed, subject to compliance with subsection (c)(3), for:

- (1) Lighting fixtures that are extinguished between the hours of 11:00 p.m. and sunrise by an automatic shutoff device; or

(2) Outdoor amphitheaters, ballparks, playfields, play courts, or other similar recreational facilities, whether public or private, that are used for international, national, state, or county tournaments; or as needed to conclude any recreational event, sporting event, or other related clean up activity that is in progress prior to 11:00 p.m. at the amphitheater, ballpark, playfield, play court, or similar recreational facility.

(g) The following light sources shall be exempt from this section:

(1) Lighting sources emitting three thousand lumens or less, which is comparable to a lighting fixture with an incandescent lamp rated at one hundred fifty watts or less, and temporary ornamental holiday lights;

(2) Emergency lighting used by military, national guard, police, firefighters, correctional, medical, or hazardous material mitigation personnel or other emergency responders for the duration of the emergency;

(3) Temporary outdoor lighting used for construction or major renovation of buildings or for highway improvements or construction;

- (4) Temporary outdoor lighting used for night-time film production and other night-time permitted activities such as carnivals and concerts;
- (5) Temporary outdoor lighting used for night-time agricultural operations;
- (6) Navigational lights that are required for waterway, open ocean, and aircraft safety;
- (7) Existing outdoor lighting fixtures that were legally installed prior to July 1, 2013, **subject to compliance with subsection (c)(3);**
- (8) Outdoor lighting fixtures that are necessary for compliance with applicable federal, state, or county design standards or guidelines that are related to health and safety for the general public;
- (9) Upwards facing lighting fixtures used to illuminate buildings, monuments, statues, memorial structures, national or state flags, and other selected facilities or features that were legally installed prior to July 1, 2013, or that will result in the generation of three thousand lumens or less, as certified by an independent testing agency; and
- (10) Refurbishment, repair, or replacement-in-kind of lighting fixtures that are character-defining features of a historic property, as determined by the

department of land and natural resources historic
preservation division.

(h) This section shall be considered to be supplemental to
any adopted county lighting ordinances and shall not be
construed to supersede or modify county lighting ordinances or
rules; provided that the county ordinance is not less
restrictive than this section."

SECTION 3. This Act does not affect rights and duties that
matured, penalties that were incurred, and proceedings that were
begun before its effective date.

SECTION 4. New statutory material is underscored.

SECTION 5. This Act shall take effect on July 1, 2012.

Report Title:

Outdoor Lighting; Starlight Reserve

Description:

Requires every new and replacement outdoor light fixture to be fully shielded beginning 7/1/13, with certain exemptions. (SD1)

The summary description of legislation appearing on this page is for informational purposes only and is not legislation or evidence of legislative intent.