COUNCIL OF THE DISTRICT OF COLUMBIA

COMMITTEE ON TRANSPORTATION & THE ENVIRONMENT

PUBLIC OVERSIGHT ROUNDTABLE
The District Department of Transportation's Streetlight Modernization Project
May 3, 2017

Testimony of Beth Purcell on behalf of the Capitol Hill Restoration Society

Good morning Councilmember Cheh. My name is Beth Purcell, and I am testifying as Chair of the Historic Preservation Committee of the Capitol Hill Restoration Society (CHRS), the largest civic organization on Capitol Hill. Since 1955 CHRS has advocated for the welfare of the Capitol Hill community. We urge that all the District's new street lights be warm-white LEDs at 2700 Kelvin or less, and that all streetlights be fully shielded to prevent light trespass into homes.

From the earliest days of street lighting in the city until very recently, street lights emitted a warm white light or yellow-white light, easy on the eye and the night sky. This is our streetlight heritage, now threatened. From 1801 through 1848 street lights used whale oil. Congress erected lamps on the Capitol grounds, sometimes lit only when Congress was in session. In 1842, Congress authorized lamps on Pennsylvania Avenue between the White House and the Capitol, and between 1847 and 1848 the Capitol and grounds were illuminated using "solar gas" "produc[ing] a light like the solar rays of the sun adapted to the human eye."

In 1848 Congress authorized Washington Gas Light Co to lay gas pipe from the Capitol to 15th Street, NW to light the area using gas made from coal oil. Just before the Civil War, there were 800 public gas lamps. By 1881 there were 4,826 gas lamps in the city, covering most of Capitol Hill west of Lincoln Park. All streetlights used gas between 1848 and 1881.

In 1881 electric arc lighting was used for the first time for President Garfield's inauguration. A newspaper article noted "the contrast of the whiteness of the electric lights ... and the yellowness of the thousands of gas burners elsewhere produced a fine effect." Arc lamps were energy inefficient, produced an unsteady light, and required lamp tenders to adjust them daily. As of 1893, there were 5,496 gas lamps, 700 kerosene lamps, and only 332 electric arc lamps.[1]

From a technical standpoint, correlated color temperature (CCT), expressed in Kelvins (K), measures the amount of short wavelength light that a streetlight emits. LEDs with lower Kelvin scores, such as warm-toned yellow-white gas lights, incandescent lights, sodium vapor lights, and LEDs at 2700 K or lower, produce much lower amounts of short wavelength light than blue-white light, at 4000 K or higher. Blue-white light with its short wavelengths scatters within the human eye, causing glare and also scatters in the atmosphere, increasing sky-glow.

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[1] See "High-Kelvin Streetlights," www.chrs.org. Robert R. Hershman, "Gas in Washington," *Records of the Columbia Historical Society*, Washington, D.C., Vol. 50, 137-157. Sarah Pressey Noreen, *Public Street Illumination in Washington, D.C.* (Washington, DC: George Washington Univ., 1975).

The American Medical Association has concluded that streetlights at 4000 K are potentially harmful to human health.[2] CHRS advocates streetlights at 2700 K or less.

The objection to warm-white LEDs has been their lower energy efficiency, and thus higher operating cost. While blue-white LEDs at 4000 Kelvin may have been "the industry standard" two or three years ago, the technology is rapidly advancing, and warm-white 2700 Kelvin LEDs are now only 3% to 15% less efficient than the blue-white LEDs that DDOT favors. Today, 3000 K LEDs are the standard choice for outdoor lighting and are in use by dozens of municipalities – representing millions of consumers – both in the United States and around the world: **Arizona:** Phoenix, Tucson, **California:** Los Angeles, Riverside, San Diego, San Francisco; **Colorado:** Denver; **Hawaii:** Honolulu.[3]

Streetlight type	**Color**	**CCT in Kelvins**
Whale oil/kerosene	?	1700-1850 (candle flame)
Gas (from coal oil)	Amber	1900-2200
Arc-light electric	Blue-white	Estimated @ 4000
Incandescent electric	Yellow-white	2400
Sodium vapor (high pressure)	Orange	2200
Mercury vapor	Blue-white	4200
LED amber	Warm white	2700
LED blue-white	Blue-white	4000 - 5000

All streetlights should be fully-shielded, i.e.., all the light is directed toward the ground and no light spills upward. DDOT's guidelines note that full-cut off's advantages include "perceived reduction in sky-glow, excellent light control at property line, limits spill light [light trespass], and reduces perceived glare."[4]

Thank you for considering our testimony.

[2] AMA Adopts Guidance to Reduce Harm from High Intensity Street Lights (June 14, 2016). https://www.ama-assn.org/ama-adopts-guidance-reduce-harm-high-intensity-street-lights.
[3] "LED 3000 K or less," www.dark-sky.org.
[4] DDOT, *District of Columbia Streetlight Policy and Design Guid*elines (2012), p. 20.