Department of Planning and Budget
2017 Fiscal Impact Statement

1. **Bill Number:** HB1988-H1

House of Origin	☐ Introduced	☒ Substitute	☐ Engrossed
Second House	☐ In Committee	☐ Substitute	☐ Enrolled

2. **Patron:** Bell, John J.

3. **Committee:** Appropriations

4. **Title:** Light-emitting diode (LED) use on outdoor lighting fixtures.

5. **Summary:** Requires any authority, department, agency, or institution of the Commonwealth that installs, replaces, or maintains an outdoor lighting fixture to use LEDs instead of traditional incandescent light bulbs when installing new outdoor lighting fixtures or replacing nonfunctioning bulbs on existing outdoor lighting fixtures. The bill also provides for the Department of General Services to include the requirement for the use of LEDs in the agency's purchasing regulations. The bill creates an exception to these requirements for the installation or replacement of light bulbs on state-owned property that is listed individually on the Virginia Landmarks Register or is certified by the Director of the Virginia Department of Historic Resources as contributing to the historic significance of a historic district that is listed on the Virginia Landmarks Register.

   The substitute bill provides an exception in instances where a determination is made by the chief administrative officer of an agency or the Chief Engineer for the Department of Transportation that the use of LEDs is not cost efficient.

6. **Budget Amendment Necessary**: No.

7. **Fiscal Impact Estimates:** Indeterminate; See Item 8 below.

   8. **Fiscal Implications:** The fiscal impact is indeterminate due to the many factors affecting lighting costs such as: lighting application, purchase price of the bulb, and the cost of energy. The bill requires nonfunctioning light bulbs on existing outdoor lighting fixtures to be replaced with light-emitting diodes (LEDs) unless a determination is made by the chief administrative officer of an agency of the Chief Engineer of the Department of Transportation that LED use is not cost efficient or the lighting is on property listed individually on the Virginia Landmarks Register or is certified as contributing to the historic significance of a historic district by the Director of the Virginia Department of Historic Resources.

   Although LED bulbs are often more expensive than incandescent bulbs upfront, they also have a longer life expectancy and are more energy efficient. Comparisons of the life expectancy and energy costs of incandescent and LED bulbs suggest that LEDs can be more cost effective in many lighting applications over the long term. According to Energy Saver

(the U.S. Department of Energy's consumer resource on saving energy and using renewable energy technologies), LED bulbs typically use about 25 to 80 percent less energy than traditional incandescent bulbs and can last 3 to 25 times longer. As an illustration, Energy Saver compared bulbs having similar light levels. The bulbs used were a 60-watt incandescent bulb and a 12-watt LED bulb. The findings indicated that the incandescent bulb's life expectancy averaged about 1,000 hours whereas the LED bulb averaged about 25,000 hours (or about 25 times longer) and the LED's annual energy cost was about 80 percent less than the incandescent.

In some cases, lighting fixtures are not capable of handling an LED bulb and would need to be replaced in order to accept an LED, which would be an additional upfront cost.

Virginia Department of Transportation Impact:
The Virginia Department of Transportation (VDOT) uses high pressure sodium (HPS) fixtures for almost all of its roadway lighting. When replacing a HPS fixture with LED technology, the entire fixture must usually be replaced because HPS "bulbs" cannot be simply replaced with an LED "bulb." For conventional light poles, a LED luminaire fixture is expected to cost approximately $200 more than an equivalent HPS luminaire. VDOT currently owns approximately 30,000 conventional roadway luminaires, 1,300 high mast lighting luminaires, and 18,500 sign lighting luminaires. Assuming 15,000 replacements per year, initial upfront fixture replacement costs may be as much as $3.0 million per year during initial implementation if LEDs are used for all replacements, according to VDOT estimates. However, LED replacement would not be required in cases where the Chief Engineer determines LED use is not cost efficient; however, the number of lights that may be affected by such determinations is currently unknown. A

Any additional upfront costs associated with LED replacement would need to be reallocated from VDOT's existing nongeneral fund resources or may potentially be financed through an energy performance-based contract to be repaid with savings over time. The agency typically budgets less than $10 million per year for all highway lighting maintenance and operational expenses and would likely have to move funding from other budgetary areas to meet the requirements of this legislation.

VDOT is currently developing a program to replace most existing roadway lighting with LED technology. However, the highest rate of return to convert roadway lighting to LED is expected when the fixtures are replaced in a systematic and orderly fashion over approximately a 5-year period. This is expected to be most efficient for the procurement of replacement fixtures, mobilization of work crews, and safety of the traveling public. Mixing LED and other types of lighting could also potentially have an adverse effect on safety because of the contrasting amounts of color saturation, contrast, and glare. Fixture replacement should be customized for each section of highway to take into account a variety of factors that impact the optimal fixture size, location, and light intensity for driver safety.

A study conducted by the Virginia Tech Traffic Institute and the Virginia Transportation Research Council (Report No. VTRC 16-R6; Report Date: October 2015) estimated systematic implementation of LED roadway lighting could be expected to produce between a

3.25 and 5.76 return on investment over a 25-year period due to savings in maintenance and energy consumption. This was based on analysis of three LED implementation scenarios: replacing all HPS luminaires at once, in even increments over 5 years, and in even increments over 10 years. The results suggested that the investment would be returned in 7 to 8 years for all scenarios, with conversion over a 5-year period yielding the shortest investment return time.

According to VDOT, there are situations where LEDs might not be the best technology for roadway lighting due to physical or safety factors unique to the particular setting. Use of LEDs for some existing under-bridge and tunnel lighting, for example, may not provide the expected cost-benefit return, especially when reduced maintenance or longer life-cycle is not equivalent to other emerging or existing technologies.

9. **Specific Agency or Political Subdivisions Affected:** Virginia Department of Transportation, Department of General services, and all other state public bodies, including authorities, departments, agencies, and institutions of the Commonwealth.

10. **Technical Amendment Necessary:** No.

11. **Other Comments:** None.

Date: 2/1/2017
File: HB1988-H1.doc