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Street Lighting as a Controllable Load for EPIC 5

Additional submitted attachment is included below.

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To:
California Energy Commission
Docket Unit, Docket No. 25-EPIC-01
1516 Ninth Street
Sacramento, CA 95814
Submitted via the CEC e-comment portal

Date: June 19, 2026

June 19, 2026

Re: Comments on the Draft CEC EPIC 5 Initiatives and Research Topics (Docket 25-EPIC-01)

To the Commission and EPIC 5 staff:

Photometrics AI, a San Diego company and a product of EvariLABS LLC, respectfully submits these comments in response to the June 11, 2026 EPIC 5 public workshop on draft initiatives and research topics. These comments identify a significant load class that is absent from the draft and recommend its inclusion in the Distributed Energy Resources Integration agenda.

Municipal and utility-scale street and roadway lighting does not appear in any of the draft initiatives or research topics. This is a meaningful gap. Public street and area lighting account for up to 40 percent of electricity consumed by municipalities, and for about 1-3 percent of total electricity demand worldwide.[1] In California, the scale is concrete: the three investor-owned-utility territories contain an estimated 1.7 million streetlights, with roughly 2.2 million statewide, and Southern California Edison alone owns and operates approximately 450,000. This is a large, predictable, already-networked load. It is exactly the kind of controllable, dispatchable resource the DER Integration initiatives are designed to capture, yet grid planning does not treat it as one.

The grid value of this load is not incidental, and it does not depend on its size alone. It depends on when the load occurs. Street lighting switches on at the end of civil dusk, as solar generation falls and the evening ramp drives the grid into its most stressed and most expensive hours. Using the California Public Utilities Commission's 2024 Avoided Cost Calculator (Electric Model v1b, Climate Zone 10, Total Resource Cost test, 20-year levelization), Photometrics AI calculates that optimized dimming produces approximately $10.18 per light per year in utility system cost avoidance, or $203,699 for a representative fleet of 20,000 luminaires. Across the 1.7 million streetlights in California's IOU territories, that is on the order of $17.5 million per year in avoided generation, transmission, distribution, greenhouse-gas-compliance, and ancillary-

[1] https://www.cleanenergyministerial.org/content/uploads/2022/05/sead-street-lighting-factsheet-final.pdf

service costs that otherwise flow to ratepayers. Street lighting is the rare load whose entire operating profile coincides with the hours the ACC values most. Reducing midday demand does little for the grid because of the duck curve, but streetlights are off then; their load sits squarely in the high-value evening window.

Because the value concentrates at the edges of darkness, timing precision is itself a research-worthy variable. The $10.18 figure assumes every light operates on the correct dusk-to-dawn window. If the average light switches on just 15 minutes early, that adds approximately $0.91 per light per year, about $1.6 million across California's IOUs, precisely because those minutes fall on the highest ACC rates of the day. Field observation confirms widespread early activation. The per-light dollar figures above are modeled using the CPUC's own avoided-cost methodology and published tariff rates; they are not claims of demonstrated field results. That distinction is the point: these estimates motivate the demonstration and validation work that EPIC funds.

This maps directly onto research topics the draft already names. Under the initiative "Leveraging DERs and Load Flexibility for Affordability and Grid Reliability," the topic "Scaling DERs and Demand Flexibility as Grid Resources" calls for streamlining measurement and verification for participant settlement and establishing DER valuation methodologies. Street lighting is a textbook candidate that the draft omits. Strategic Objective 11, "Providing Data Input into a Value of DER Framework," is the natural home for the avoided-cost and timing analysis described above. The central barrier to monetizing this flexibility today is that unmetered municipal street lighting lacks an accepted metering and M&V pathway for settlement. That is the same gap the draft identifies, applied to a load class it has not yet recognized. Photometrics AI therefore recommends that EPIC 5 support demonstrations of networked-lighting-control-based metering and M&V for street lighting, so that the data and methods needed for a flexible-load valuation pathway exist for later regulatory consideration.

The demand-response potential is concrete and California-specific. Through the Capacity Bidding Program and the Emergency Load Reduction Program, which can be enrolled simultaneously, street lighting can generate roughly $2.02 per light per year, built on the verified CBP capacity rate of about $79 per kW-year and the verified ELRP rate of $2.00 per kWh. ELRP operates May through October, 4 to 9 PM, and is authorized through 2027, the same evening grid-stress window in which street lighting load is rising. Modeled peak-reduction capability is on the order of 14 to 28 kW per 1,000 luminaires; validating that figure under real conditions is exactly the kind of work an EPIC demonstration should perform.

This flexibility does not come at the expense of public safety, and the comment should not be read to suggest dimming streetlights into darkness. Precision optimization designs each segment to its applicable roadway standard and reduces only the over-illumination above it.

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Human vision cannot perceive nighttime brightness changes below about 20 percent, so meaningful flexibility exists within an imperceptible, standards-compliant band. A correctly designed system holds transportation safety above grid response in its control priority, so a grid signal can never override an active safety need. Because optimization is software-driven and requires no new customer hardware or field activity, it is also non-disruptive, and the ratepayer savings it produces benefit all customers, including disadvantaged and vulnerable communities.

Photometrics AI offers these comments from direct experience. Through EvariLUX, the company's GIS-native photometric calculation platform, and its consulting channel, roughly 290,000 streetlights have been analyzed across 22 municipal projects in California and nationally. The underlying methods are protected by two issued United States patents (9,894,736 and 12,579,336). The author serves as an Advisory Member of the Illuminating Engineering Society Roadway Lighting Committee.

In summary, Photometrics AI recommends that EPIC 5 recognize municipal and utility-scale street and roadway lighting as a distinct, addressable, controllable load class within the DER demand-flexibility and Value-of-DER research agenda, and that it support networked-lighting-control-based metering and M&V demonstrations to establish the settlement and valuation methods this resource currently lacks. Street lighting is large, predictable, already networked, and aligned with the grid's highest-value hours. It merits a place in California's clean energy research portfolio.

Thank you for the opportunity to comment and for the staff's work on the draft.

Respectfully submitted,

Ari Isaak, GISP, CFLC
Founder, Photometrics AI / EvariLABS LLC
San Diego, California
ari@photometrics.ai