

Let's Get Greedy The L-Prize invites innovators to 'have it all'

LEDs have arrived. They're long-lasting, energy-efficient and priced competitively with the products they're replacing. Case closed and let's move on, right? And yet...transformative lighting has the capacity to do more, with excellent energy and application efficiency, data-driven functionality, material sustainability, and the ability to make buildings better places to work, live, learn and heal—for people in all communities.

Consider the commercial sector, which accounts for 37% of national lighting energy use and 18% of the total U.S. energy consumed. Commercial buildings that have made the switch to LED now save a combined \$5.1 billion in energy costs every year, just one small indicator of the potential of smart lighting technologies as part of integrated whole-building energy solutions.

The U.S. Department of Energy has signaled its understanding of this deeper story with the May announcement by Energy Secretary Jennifer Granholm of a new Lighting Prize or L-Prize, “designed to spur groundbreaking innovation, domestic manufacturing, and the benefits of an inclusive clean-energy economy for next-generation lighting solutions in commercial buildings.”

In the known lighting world, we've been stuck with familiar LED trade-offs and cost reali-

ties and a paradigm that “we can't have it all.” The L-Prize stands this idea on its head and asks, “Why *can't* we have it all?”—lighting systems that are fully connected, with exceptional efficacy and quality of light? Lighting that minimizes the impact on the environment, during production, operation and at the end-of-life? Quality lighting that's accessible to all?

TO HELP THE NATION GET THERE, the L-Prize provides \$12.2 million in cash awards to leading innovators presenting lighting that demonstrates exceptional achievement in five areas: efficacy, quality of light, connectivity, product life cycle, and innovation and inclusion. Not two or three of these five, but all five. We're asking for a lot at the

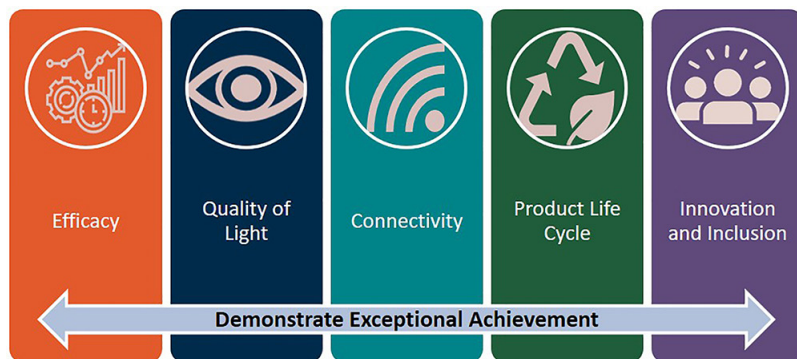


The DOE again asks the U.S. lighting industry to reach for what's possible

outset and counting on game-changing results.

Basically, DOE considers all that the lighting industry continues to achieve with LEDs—including innovations happening every day—to be a first step to inspire the transformative designs, products and impacts of tomorrow. We have only scratched the surface of what's possible with LED lighting.

To see why, it helps to step back to 2008 when the original L-Prize sought a high-quality, high-efficiency LED replacement for the incandescent bulb, with performance targets that represented a huge stretch. In 2011 DOE announced the winner, the Philips Lighting North America A-19 60-W replacement lamp that drew less than 10 watts (a savings of 83%) to replace



The L-Prize requires that a winning system demonstrate exceptional achievement in five key areas. Currently available LED products may excel in one performance area, but often at the expense of others (e.g., some excel at efficacy but at the expense of color rendition, flicker, or glare that can have negative impacts on worker safety, productivity, or well-being). The L-Prize also invites innovation for diversity, equity and inclusion in how systems are designed, produced, deployed or installed.

the 60-W incandescent, with excellent color quality (CRI=93, CCT=2727K), light distribution, and light output (940 lumens), and almost no color shift over 25,000 hours of testing.

Just three years of research, innovation and testing spurred by the L-Prize helped push the entire lighting industry forward and established a new bar for

customer expectations and confidence even as retail prices for LED products shot downward. Today, LED is the go-to solution for reliable, high-quality, long-life lighting in the U.S.

In announcing a new L-Prize aimed at the commercial building sector, DOE again asks the U.S. lighting industry to reach for what's possible. This time the

opportunity is greater: to revolutionize lighting systems for commercial and institutional buildings, contribute to our nation's climate goals, improve quality of life, enable smart buildings, and spur LED manufacturing with significant domestic materials and workforce involvement.

THE ENVIRONMENTAL IMPACTS of lighting are paramount in the thinking behind the L-Prize, which includes a section supporting a circular economy that minimizes waste and maintains the value of products, materials and resources as long as possible. L-Prize requirements cover the entire product life cycle, from the design phase through production, to a long and energy-efficient useful life, then end of life and disassembly. A winning system will address all these phases.

This technical innovation is exciting, but how do we draw upon our strengths in diversity and make L-Prize innovation accessible for everyone? The L-Prize competition also includes incentives for innovation that addresses diversity, equity and inclusion (DEI) in how lighting systems are designed, produced, deployed or installed. For example, L-Prize teams could include minority-owned businesses, teams from minority-serving institutions (MSIs) including historically Black colleges, universities (HBCUs), and other minority institutions (OMIs) as well as teams from "Opportunity Zones" as defined by the Internal Revenue Code of 2017. These are just some examples. The L-Prize invites new thinking and innovation in this area. Where lighting is con-

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cerned, let's harness our diversity and leave no one behind.

Finally, the L-Prize will incentivize U.S. content, production and installations. As noted in DOE's 2020 Manufacturing Supply Chain report,¹ though many components such as LED die and packages are manufactured overseas, a multi-billion-dollar domestic luminaire manufacturing market still exists in the U.S. The L-Prize will showcase the role of U.S.-based design and innovation, encourage manufacturers to highlight the U.S. economic impact of their products, and provide further support to the domestic manufacturing and assembly of luminaires that already exists in the U.S.

THE L-PRIZE INCLUDES THREE complementary phases and we're inviting all innovators to participate in any or all phases. The Concept Phase, from May 2021 to January 2022, enables competitors with innovative ideas in lighting to receive feedback on their designs, with the possibility of \$20,000 in prize money to 10 winners. The Prototype Phase from February 2022 to February 2023 invites product prototypes that emphasize technical innovation, with \$2 million in prize money split by up to three winners. The Manufacturing and Installation Phase, tentatively set for March 2023 to December 2024, encourages innovation at scale as awards are given for actual lighting systems manufactured and installed in the U.S. Competitors may participate in only the Concept, only the Prototype, or only the Manufacturing and Installation phase, or any combination thereof. Whether you are a manufac-

turer, a lighting designer or specifier, a student at a university, a researcher, or someone with a great idea, we're inviting and welcoming your participation.

Pacific Northwest National Laboratory (PNNL) serves as technical lead for the L-Prize competition, responsible for developing requirements and facilitating the technical review of entries. PNNL will coordinate an Expert Review Panel consisting of independent lighting industry experts for the technical review of entries. The National Renewable Energy Laboratory (NREL) serves as the Prize Administrator, developing and managing the web interface for the prize and bringing expertise on the American Made Prize competitions to the new L-Prize.

DOE has committed these resources to a new L-Prize because of the importance of lighting to the future of our economy and society. That's why we're calling all innovators to accept this challenge. Enter the L-Prize competition. Break the paradigm, have it all and help create a better world.

Gabe Arnold is a senior engineer at Pacific Northwest National Laboratory where he focuses on development and deployment of emerging lighting technologies. He's a principal investigator on the advanced lighting team supporting the U.S. Department of Energy's Lighting R&D and Commercial Buildings Integration programs.

Reference

1. 2020 LED Supply Chain. March 2021. <https://www.energy.gov/sites/default/files/2021-05/ssl-2020-led-mfg-supply-chain-mar21.pdf>