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TECHNOLOGY

Gabe Arnold

L-Prize Final Phase: $10 million for lighting industry innovation

The U.S. Department of Energy (DOE) has opened the final stage of the L-Prize competition—the Manufacturing and Installation (M&I) phase. This is where we move beyond prototypes to real systems that must be fully commercially available. Competitors are required to install their solutions in real buildings to be evaluated. Manufacturers can compete in one or both of two tracks: a Luminaire Track and Connected Systems Track. Much is at stake in this phase; up to four competitors earning the most points in innovation, U.S. content and installation will share an award of $10 million.

Although funded by the DOE, the innovations targeted by the L-Prize go beyond energy efficiency. In the Luminaire Track, the winning entries must also deliver exceptional quality of light, environmental sustainability, digital interoperability and accessibility for a wide range of users and buyers. We want these innovations to be accessible and applicable not just to the highest end of the commercial lighting market but also for everyday buildings where people learn, work, heal and gather. High-quality, energy-efficient lighting is a clean energy technology that can transform private and public buildings.

In the Connected Systems Track, the L-Prize requirements are designed to address key barriers to adoption: complexity and value proposition. Standards-based minimum requirements are intended to ensure interoperability and data compatibility, helping to ease system complexity. Minimum requirements for lighting control strategies, system resilience, automated fault detection and grid services capability add value to buildings by saving energy and maintenance costs, keeping the lights on during and following emergencies and even earning money back on utility bills. We are inviting innovations that can break through complexity and value proposition barriers so that more buildings can benefit from advanced lighting control systems.

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![Image of a blue digital cityscape]

We saw amazing innovations from winners of the prior L-Prize Prototype phase. In the Luminaire Track, Signify Innovation introduced a ground-breaking prototype troffer luminaire that achieved an astounding 196 lumens per watt while providing exceptional color quality and light distribution. Another prototype Luminaire Track winner, Lightly, ditched traditional materials, such as aluminum and steel, to build a sustainable, low-carbon prototype pendant luminaire made from locally harvested wood, hemp and wool. Even with these sustainable features, Lightly's luminaire delivered 175 lumens per watt with exceptional color quality. A third prototype luminaire winner, the Grid-interactive Efficient Building Alliance (GiEBA), developed a new troffer with open-source digital interoperability that is fully designed for modularity, disassembly and recyclability at 160 lumens per watt.

The Connected Systems Prototype phase winners were equally impressive. Autani, with partner Leviton, focused on interoperability innovations. Interoperability is essential to realizing the value and potential that lighting can provide to people and buildings, and Autani's system was compatible with many open protocols and open-source databases. This prototype particularly stood out

to the judges with an extremely capable and user-friendly API that enabled the system to exchange just about any type of data with other systems.

Another Prototype Connected Systems Track winner, Signify Innovation, brought a new all-in-one sensor that measures not only daylight and occupancy but also humidity, temperature and sound in new ways that can be used to optimize employee comfort and productivity. Finally, Connected Systems Track winner MWConnect (formerly McWong International) developed a fully open-standard system using the Bluetooth Mesh protocol. Unlike some other connected lighting systems on the market that have built proprietary implementations of Bluetooth, the MWConnect system was qualified Bluetooth Mesh, meaning it has been tested to be fully interoperable with other devices and systems, even from other manufacturers, that are also qualified Bluetooth Mesh. The MWConnect gateway submitted with its prototype system was an off-the-shelf Bluetooth Mesh gateway. This fully open-standard interoperability approach will provide future-proofing benefits, along with more flexibility and choice for specifiers, buyers and users.

These individual innovations don't tell the whole story, as the DOE set a very high bar with technical requirements. All three of the winning connected systems were required to bring new innovations in aspects including

fault detection and diagnostics as well as grid integration. Having the ability to dynamically respond to electric grid signals while ensuring continued occupant satisfaction with lighting will be an increasingly important capability that is needed to support building and grid decarbonization. This is an opportunity for lighting to serve an important role in a massive area of investment.

THE M&I PHASE IS an opportunity for manufacturers to bring these lighting innovations to life. L-Prize entries will be commercially available and operational in real buildings. Luminaires and systems will have all the information that specifiers and buyers need to design and install them, including all the usual testing, datasheets and product specification information. Luminaire entries are required to have Life Cycle Assessments and Environmental Product Declarations (EPDs), such that specifiers and buyers can understand the full environmental impact and embodied carbon of the products. Many other building product industries are already providing EPDs with their products, and L-Prize winners will provide leadership in the lighting industry to make that same data available for their winning luminaires.

The L-Prize also requires that winning luminaires and connected systems incorporate labeling or markings into the luminaire housing and/or components, such as QR codes. These labels

direct contractors and users to information about servicing, replacement, disassembly and recycling of each component. These measures help to take the mystery and difficulty out of maintaining, recycling or reusing lighting to support a more circular economy.

Fostering U.S. innovation and jobs is a major goal, and U.S. assembly of the luminaire is required. Competitors earn additional points for demonstrating U.S. content beyond the requirement, such as designing, sourcing, assembling and/or manufacturing housing, lenses and other components. Although most electronic components continue to be manufactured in other countries, there is a multi-billion-dollar luminaire manufacturing business in the U.S. that we aim to support and grow.

The innovation opportunities of this L-Prize are broad. We are pushing for innovation in energy efficiency, quality of light, connectivity, health and well-being, environmental sustainability and accessibility and affordability, among others. Ultimately, it will be about the tradeoffs. We have seen tremendous lighting industry innovation in each of these areas but often at the expense of another. Can we make progress to overcome the historical tradeoffs that have existed in lighting technology to develop lighting that has it all, that is more accessible and affordable to more people, right here in the U.S.? There's a lot at stake, and anyone can enter, even if you

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Key focus areas for the L-Prize.

did not participate in the previous phases. We can't wait to see, reward and celebrate the innovations the lighting industry can deliver.

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