

DOE GATEWAY Demonstration Program - Highlights Results of Three Projects to Date

DOE's SSL Technology Demonstration GATEWAY program brings Solid-State Lighting (SSL) product and component manufacturers together with residential, commercial or industrial host sites and energy efficiency organization or utility partners to demonstrate SSL products in real world applications. The GATEWAY Demonstration projects feature high-performance SSL products for general illumination of exterior and interior sites where their performance can be evaluated. The novelty of the GATEWAY Demonstration program is that, the projects provide real world evidence of overall SSL project performance that cannot be replicated in a lab. Unlike other SSL programs through DOE efforts or otherwise, the GATEWAY Demonstration tests the capacities of SSL products, product specifier trades, city planners, engineers in real world setting. Project performance measures gathered in the GATEWAY Demonstrations include energy consumption, light output/distribution, and installation/interface/control issues. In addition to quantitative analysis of the project's lighting performance, financial metrics are calculated and qualitative performance is investigated via feedback surveys of relevant end users.

Individual GATEWAY partners can apply for Demonstrations even if a full project team has not been established. Pacific Northwest National Laboratory (PNNL) will match partners together to create full project teams. Demonstration results are publicly shared and provide real-world experience and data on product performance and cost-effectiveness. For more information on the GATEWAY Demonstration Program please visit [GATEWAY FAQs](#).

To date, the nine completed GATEWAY Demonstration projects have focused mainly on Outdoor applications including Parking Lot, Street, Walkway, Roadway, and Parking Garage Lighting. Other Demonstrations have included Freezer Case and Residential Indoor Downlight and Undercabinet Lighting applications. Each project evaluation is compiled into a single report paper and is housed on the DOE SSL website for public consumption: [GATEWAY Demonstration Results](#).

The most recent GATEWAY Demonstration project to be published included a project team in Portland, Oregon, comprised of the Energy Trust of Oregon, Inc. (ETO), Leotek Inc., the Bonneville Power Administration (BPA) and Pacificorp, and the City of Portland, in addition to PNNL/DOE. The project replaced on a one-to-one basis 8 100W High Pressure Sodium (HPS) cobra head fixtures with 36.7W LED street light luminaires with efficacies around 70lm/W. The project was calculated to yield a 20 year payback for the replacement project, however, using the LED product for a new project would result in a 7.6 year payback. The energy savings, and resulting payback period, was in large part a result of reducing the horizontal illuminance by 53 percent using the LED fixtures while maintaining Portland's minimum light requirements. The installation was thus slightly undersized in terms of overall light output compared to other street lighting installations throughout the city. The resident survey was overall very positive with 10 out of 11 respondents reporting they noticed either improved or no change in lighting quality of the project compared to the HPS. The full report for this project can be found through the DOE website, here: [Lija-Loop, Portland, OR](#).

As part of the 2008 [Tour of Homes](#) in Eugene, Oregon, two homes were built by the Lane County Home Builders Association (HBA) and Future B Homes with lighting products from Philips, the LED Lighting Fixtures Corporation (LLF), and Cree LED Lighting Solutions, and with project participation by the Energy Trust of Oregon (ETO) in addition to PNNL/DOE. This GATEWAY Demonstration project featured two interior residential LED applications, an LED Downlight replacement lamp for recessed can fixtures and an Undercabinet fixture used for countertop illumination in the kitchens. The Downlight replacement product drew 12W saving 82 percent and 84 percent compared to typically specified

incandescent and halogen products respectively. Meanwhile, the Undercabinet fixture drew 10W saving 83 to 90 percent compared to baseline halogen products depending on power settings of the incumbent technology. The builders who toured the homes gave the Downlights high marks for brightness and most reported that the LED Downlights were the same or better than halogen and incandescent for shadows, glare, and overall visibility. One nuance of SSL was exhibited through this project however was the incompatibility of dimmer switches for the LED fixtures and lamps. For more information on this Demonstration project, the full report can be found on the DOE website, [Eugene](#). Payback periods for the applications were 7.6 years and 4.4 years for the Downlights and Undercabinet fixtures respectively. Payback periods did not include labor costs for bulb replacement of incumbent technologies and assumed an 11c/kWh electricity rate which is just below the national average.

Also in Eugene, a recent GATEWAY Demonstration project, including Albertsons Grocery, LED Power, Inc., Aztec Energy Partners, PECL, Inc., Eugene Water and Electric Board in addition to PNNL and DOE as participants, featured LED Refrigerator Case Lights. In addition to highly efficient LED lighting products, this project reduced overall refrigerator energy consumption through reduced refrigerator compressor run times by installing motion sensors that inform step dimming in addition to less heat production by the lower wattage LED lighting products. Simple payback for this project was 5.4 years and included maintenance cost considerations and an 8.27c/kWh electric rate. However, when including utility rebate and tax incentives, the payback is reduced to 1.6 years. Public opinion of the retrofit reported that the uniformity of the light distribution was no different than the incumbent fluorescent product. For a more information on this Demonstration project, the full report can be found on the DOE website, [Freezer Case](#).

DOE is accepting applications for more GATEWAY demonstration projects. To form or become part of a GATEWAY demonstration project team showcasing a Solid-state Lighting retrofit, download an application from the [DOE GATEWAY Demonstration website](#).

For questions or comments on this article or Northeast Energy Efficiency Partnerships TINSSL Initiative, please contact tinssl@neep.org.