

Using Airfield LED Lighting to Save Energy and Costs

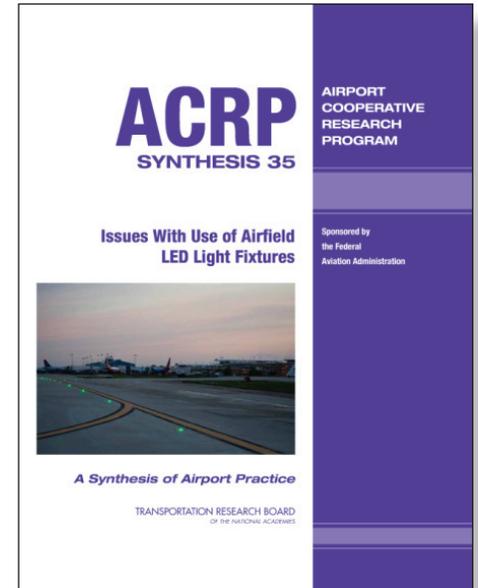
Light-emitting diode (LED) bulbs and fixtures are used increasingly in residential and commercial settings, including airfields. Longevity, energy savings, and potential for cost savings have made LED lighting a practical option to conventional incandescent lighting systems. These considerations, together with public energy policies that incentivize alternatives to using incandescent lights, are reasons why airport operators are considering the use of LED lighting in a variety of applications.

ACRP Synthesis 35: Issues with Use of Airfield LED Light Fixtures documents the cost, performance, and operational issues associated with LED lighting systems in an airfield setting. The synthesis was compiled from a literature review and a survey of 22 airport representatives and aviation agencies describing their experiences with airfield LED lighting. *ACRP Synthesis 35* concluded that, although the up-front costs of LED lights are presently higher in

comparison to incandescent lights, their reduced maintenance and energy use requirements can result in significant long-term cost savings.

The synthesis found that feedback from airport professionals regarding the performance and visibility of LED airfield lighting was largely positive. It also noted that even though the majority of airfield electrical systems are designed for incandescent bulbs, LED lights are not necessarily incompatible with existing electrical infrastructure. While compatibility issues were reported early on, the situation has improved over time. In some cases, replacing portions of the existing electrical infrastructure may result in greater energy savings than only replacing the light bulbs.

New Hampshire's Manchester-Boston Regional Airport (MHT) utilized *ACRP Synthesis 35* to guide the decision to replace its airfield taxiway incandescent lighting



with an LED lighting system. Carlton Braley, assistant airport director at MHT for operations and facilities, noted the LED lighting has been a “huge success” so far. According to Braley, cost savings, less down time, and fewer repairs with LED fixtures were the most influential factors in the airport’s decision. *ACRP Synthesis 35* also provided MHT with useful information on the increased operating life of LED bulbs and on the amount of energy savings that can be achieved following the transition to LED lighting.

When the staff at MHT deliberated on whether to make the transition to LED lighting, there were no concerns about the LED light bulbs themselves since they were FAA approved. However, Braley noted, “there was a slight concern—because we’re an airport that receives winter weather—that there would be unknown issues with snow removal activities around LED lights, especially around in-pavement lights. We found that we had no extraordinary issues.” MHT also learned from *ACRP Synthesis 35* that upgrading to LED lights would



Above: LED taxiway light at King County International Airport (BFI). The airport followed practices from other agencies, as reported in *ACRP Synthesis 35*, in its decision to install LED light fixtures along the taxiway, runway, and in airport buildings. Photo courtesy of BFI.

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have minimal effect on its airfield lighting system's constant current regulators. Regarding maintenance, Braley added, "We've basically eliminated all but one repair in the circuits that contain the LED lighting. We've had far less maintenance on these lights."

Braley also described how governmental policies have facilitated MHT's transition from incandescent to LED lighting. "We are a small hub airport," said Braley, "and our grant allows us 90% participation by the federal government, and 5% state match, so we are only paying 5 cents per dollar [spent] for installing LED lights. Our return on investment is under one year."

From these positive experiences, MHT is planning further replacement with LED lighting on its airfields as well as in the parking garage. "Eighty-five percent of the airfields are still incandescent," Braley noted, "but as we upgrade or perform construction on the airfields we are upgrading to the LED lights."

King County International Airport (BFI) in Seattle, Washington, also has been guided by information from *ACRP Synthesis 35* to update its lighting with LED fixtures. According to Gary Molyneaux, planning

and program development manager at BFI, outdated bulbs in airport buildings, on taxiways and runways have been replaced, and the decades-old lighting system has been re-cabled for compatibility with LED light fixtures. "The report helped us in making those decisions," said Molyneaux.

BFI, like other airports, was motivated to update its lighting system with LED fixtures to save costs, as well as to meet King County's aggressive energy reduction goals. Molyneaux noted there were concerns that arose during their decision to switch from incandescent to LED lighting, including technical and wattage requirements of the bulbs; whether snow buildup on the cooler LED lights would be an issue; and the consistency in color of the LEDs. *ACRP Synthesis 35* helped BFI to address some of these issues by providing useful background information and experience from other airports.

"Specifically," said Molyneaux, "*ACRP Synthesis 35* addressed the issue of legacy electrical infrastructure and assisted in the decision to develop a replacement plan for our older system. The report reduced our concerns regarding installation and system compatibility." Molyneaux added that

The lower operating costs of LED airfield lighting have been confirmed through reduced maintenance costs and reductions in energy use. Together, these can offset the present higher costs of installing LED airfield lighting fixtures within a few years. It is likely that the majority of economic savings comes from reduced maintenance costs.

— *ACRP Synthesis 35: Issues with Use of Airfield LED Light Fixtures*



Above: Taxiway sign at King County International Airport (BFI) illuminated by LED bulbs. BFI has seen a reduction in its energy use over the previous year due, in part, to replacing incandescent with LED lighting. The airport utilized *ACRP Synthesis 35* to guide its decision to install airfield LED light fixtures. Photo courtesy of BFI.

BFI's most recent energy report showed a reduction in energy use by 7% over the previous year due in part to the new LED lighting as well as to the installation of motion detection switches in all buildings.

In addition to *ACRP Synthesis 35*, Molyneaux has referenced ACRP publications on rail terminal interfaces and industrial development, among other topics, to inform decision-making at BFI by both airport and county officials. "The ACRP program is incredibly valuable. It answers so many questions," said Molyneaux. "You're able to skim the reports and get basic information, and then dig deeper for specific help. They're an amazing resource to pull from on an infinite number of subjects."

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