ANSI/IES LP-9-20

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LIGHTING PRACTICE:
UPGRADING LIGHTING SYSTEMS IN COMMERCIAL AND INSTITUTIONAL SPACES

AN AMERICAN NATIONAL STANDARD

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Prepared by the
IES Energy Management Committee

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CONTENTS

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1.0 Introduction and Scope

1.1 Introduction

Increasing lighting efficiency is often the most cost effective energy efficiency improvement that can be made to an existing building. There are three basic approaches for improving the energy efficiency of an existing lighting system: retrofit, redesign or a combination of both. Retrofitting the existing luminaires is the more common approach. However, depending on a variety of factors, redesign may be the better choice. A thorough assessment is necessary to determine which of these methods is advantageous.

When upgrading lighting in any space, it is important to know the recommended practice and illumination levels for the occupant and task. The IES publishes many standards on lighting applications, and a competent lighting practitioner or designer should be able to help with specifying accepted illumination levels in the building. There may be a nominal cost, but it is a sound investment to get the lighting upgrade project right. When working on a lighting upgrade project, one should always be aware of the delicate balance between quality lighting and energy savings. If too much focus is placed on energy savings, quality may suffer, and vice-versa.

1.1.1 Audience, This document is intended for commercial and institutional building owners, lighting practitioners, facility managers and engineers, energy service companies, retrofitters, and utility representatives considering a lighting upgrade.

This document is written in general terms; every lighting project is different because of a wide variety of factors (e.g., architectural and luminaire styles, age of the building and its lighting systems, tasks performed, age of occupants).

According to the U.S. Department of Energy Buildings Energy Databook, 2010, Chapter 3, Table 3.1.4,[1] lighting systems often consume up to 26% of the electrical energy used by the building, depending on the type of building, location, age and other factors. A lighting upgrade generally offers one of the most cost-effective and easiest means to reduce operating costs, with a return on investment that is acceptable to the financial managers of the facility. However, appropriate illumination levels and light quality also need to be achieved along with the energy savings. **Figure 1-1** illustrates the large portion of office costs that are due to employees. If those employees are less productive, the company is not getting "its money's worth." This is why it is imperative to not lose employee productivity in the name of energy savings. According to *Lighting Europe*, April 2015, Quantified Benefits of Human Centric Lighting, if completed properly, a lighting upgrade can actually increase occupant productivity![2]

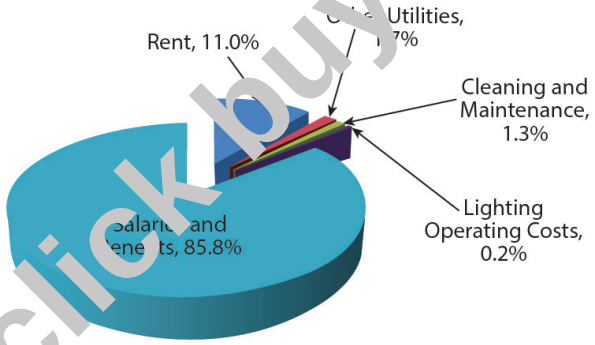

Figure 1-1. Average office costs show the importance of maintaining employee productivity.[1] (Graphic redrawn based on original by Elizabeth Gillmor)

1.2 Scope

This document addresses the general methods of performing a successful lighting upgrade. The designer should consult the latest product information obtained directly from lighting manufacturers for the most current data.

2.0 Lighting Upgrades: The Fundamentals

2.1 Lighting Upgrade: Retrofit, Redesign, or Both?

As mentioned above, the basic ways to improve energy efficiency for an existing lighting system are retrofit, redesign, or a combination of both. A retrofit, largely due to financial considerations, is the most common type of upgrade. Sometimes, however, it may make

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