

ANSI/IES RP-31-20



**Illuminating**  
ENGINEERING SOCIETY

**RECOMMENDED PRACTICE:**  
**ECONOMIC ANALYSIS OF LIGHTING**  
AN AMERICAN NATIONAL STANDARD



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AN AMERICAN NATIONAL STANDARD**

Publication of this Recommended Practice  
has been approved by the IES.  
Suggestions for revisions  
should be directed to IES.

**Prepared by the  
IES Economics Committee**



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## 1.0 Introduction and Scope

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### 1.1 Introduction:

Good lighting should be responsive to the needs of the user. Among those needs are the aesthetic and the visual, as admitted in the oft-quoted “lighting is both a science and an art.” But the user also has economic needs. In fact, it is the economic needs that often drive the decision-making process when lighting systems are designed and purchased. Unfortunately, because they frequently control the final decision, economic concerns are often thought of as the antagonists of aesthetic and visual concerns. The lighting professional will tend to draw up a list of system desiderata, then heave a large sigh of resignation and say “but the budget won’t allow it..”

This Recommended Practice is written from the point of view that “economic analysis” is not the same as “how to beat the budget.” Rather than considering economic analysis as the antithesis of engineering or artistic analysis, it should be thought of as subsuming these other needs. A couple of generic examples illustrate this. When a worker’s vision is impaired by reflected glare, reduced productivity is an economic consequence. A decision to improve the lighting would be based on the economic needs of the owner. When the lighting of an office building atrium fails to complement the architecture of the space, the rental value would fail to achieve its potential. Again, all decision to improve the lighting is an economic decision. Thus, when a competent lighting professional takes care of economic needs in conjunction with artistic, engineering, and other needs, it increases the likelihood a project will have success and longevity. Financial considerations as demonstrated through an accurate lighting financial analysis is important, but other elements such as aesthetics, human visual performance resulting from a lighting system appropriate to a given task, and other considerations involved in lighting for the human and natural environment are of equal importance.

*Note:* Parts of this document are adapted from chapter 14 of *Lighting for Energy Efficient Luminous Environments*, by Helms and Belcher.<sup>1</sup> Used by permission.

### 1.2 Scope

This Recommended Practice (RP) will help answer many types of lighting economic questions. It provides a framework for selecting from a group of competing lighting designs. It gives insight into the question of when a system under consideration will “pay off.” It can help the lighting professional make energy conservation decisions. Most importantly, it provides methods for gauging the profitability of a capital investment in a lighting system, which can be objectively compared to other competing capital investments.

This RP begins with a discussion of the second-level methods, concentrating on LCCBA. This is followed by sections on sensitivity analysis and benefit analysis. Finally, because the lighting practitioner is likely to encounter the first-level methods in practice, these are also covered. In discussing the first-level methods, emphasis is placed on their shortcomings so that the lighting professional can understand why their use is not encouraged.

## 2.0 The Role of Economic Analysis in Lighting Design

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### 2.1 The Importance of Making Wise Economic Decisions in Selecting Lighting Systems

Lighting economics may not be the most exciting subject for the lighting professional to master, but it is one of the most important. Reducing energy use is a noble pursuit for many reasons. Preserving natural resources through conserving fossil fuels is good for the future. Limiting air pollution and reducing carbon dioxide and other greenhouse