

# Save Money and Energy Engage A Lighting Professional!

**Stefan R Graf IALD**  
Lights in Alingsås 2011

ILLUMINART



Quote from Lisa Heschong....  
Heschong Mahone Group USA  
[www.h-m-g.com](http://www.h-m-g.com)



It is estimated that 70% of architects say good lighting is important....

.... but about 4% actually succeed in achieving best results....

Today, the economic consequences of lighting is too large to ignore.....

What 'process' do we need to achieve high performance lighting for our projects?

# Learning Objectives

- To reveal the 'process' required for better lighting
  - awareness
  - desire
  - action plan
- Discuss the *economic benefits* that smart lighting solutions provide
- Learn of risk management and loss prevention
- Communicate the holistic 'paradigm' required to achieve optimum lighting solutions
- To encourage a project owner or architect to take a leadership role to improve lighting for projects



ROI / return on investment

benefits

consequences



## Quotes I often hear

“Our engineer or sales rep will do the lighting design”

“I there is no fee available to contract a lighting designer for this project”

“I was not aware that there were ‘professional’ lighting designers!”

Lighting, successfully *implemented* translates into remarkable long term €osts saving\$ in energy, maintenance and human performance for the project owner.



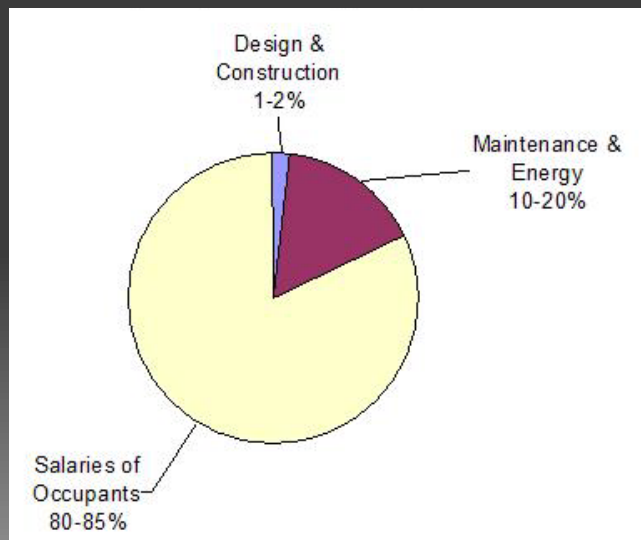
# Lighting costs considerations

- Equipment
- Labor to install equipment
- Aesthetics / visual impact
- Design methodology / current standards of care
- Energy use over time
- Maintenance
- Environmental / exterior lighting
- Relationship with manufacturers to meet timelines
- Value engineering or 'thriftig' of the lighting design
- Human factor / productivity / a happy work place
- Design and specification
  - by architect
  - by engineer
  - by owner
  - with a sales consultant
  - using a professional lighting designer



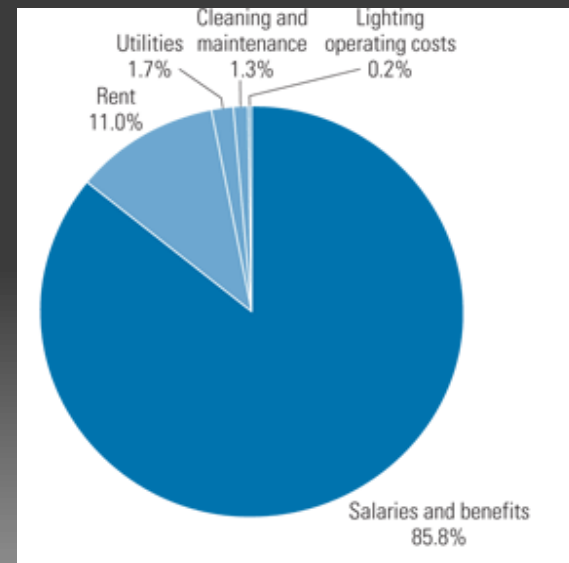
# Relative costs

These graphs illustrate the relative low cost of building construction compared to the long term cost considerations to the owner



**Construction costs relative to annual operations cost**

Lighting averages 3-4% of construction budgets



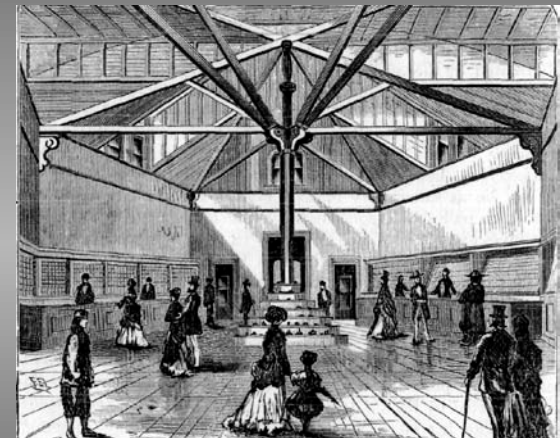
**Annual building operations cost**

People are the highest cost to company owners!

# Examples of published non-energy cost benefits of better lighting

## Benefits of Natural Light

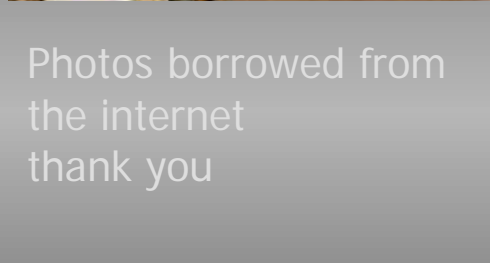
- Carnegie Mellon summarized findings from 11 studies documenting the impact of high performance lighting on productivity. Their analysis found that **productivity gains ranged between 0.7% and 26.1% with an average median value of 3.2%**
- High performance schools with multiple features including daylighting and better electric lighting cost 1.65% more to build (\$3.00 a square foot). These schools were projected to **save 33.4% on energy, and create a variety of health, learning and other benefits** (valued at \$74 / sq ft over the life of the building). Among twelve models considered in that study were identified a central tendency of a **21% improvement in student learning rates** from those in classrooms with the least amount of daylight compared to those with the most.
- 89 patients undergoing elective surgery were used in a **hospital study**. Patients were placed on either bright or the dim side of the hospital units. Intensity of light levels were measured daily. The patients on the bright side of the rooms received 46% higher intensity daylight than the dim side. Those patients perceived less perceived stress, marginally less pain, and **22% less analgesic medication per hour, and had 21% less pain medication costs**. (Jeffrey Walsh, University of Pittsburgh Medical Center. Published in the Psychosomatic Medicine Journal, 2005.)



# Daylight in retail sales



Reduced operations cost  
Under 5 year payback  
Increased sales



Photos borrowed from  
the internet  
thank you



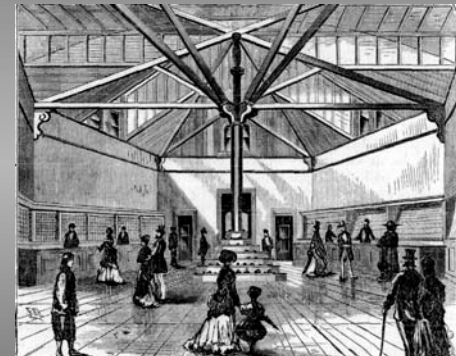
# Retail lighting evidence



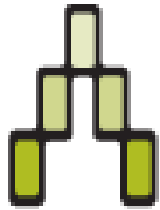
**HESCHONG MAHONE GROUP, Inc.**

[www.h-m-g.com](http://www.h-m-g.com)

'Skylights were found to be positively and significantly correlated to higher sales. All other things being equal, an average non-skylit store in the chain would be likely to have **40% higher sales** with the addition of skylights, with a probable range somewhere between 31% to 49%. This was found with **99% statistical certainty**. After the number of hours open per week, the presence of skylights was the best predictor of the sales per store of all the variables that we considered. Thus, if a typical non-skylit store were averaging sales of \$2/sf, then its sales might be expected to increase to somewhere between \$2.61 to \$2.98 with the addition of a sky lighting system'.



Websites in the USA with information that support the benefits of better lighting... 'evidenced based design'



BETTERBRICKS

Lighting  
Research Center



HESCHONG MAHONE GROUP, Inc.



l i g h t i n g   d e s i g n   l a b



National Research  
Council Canada

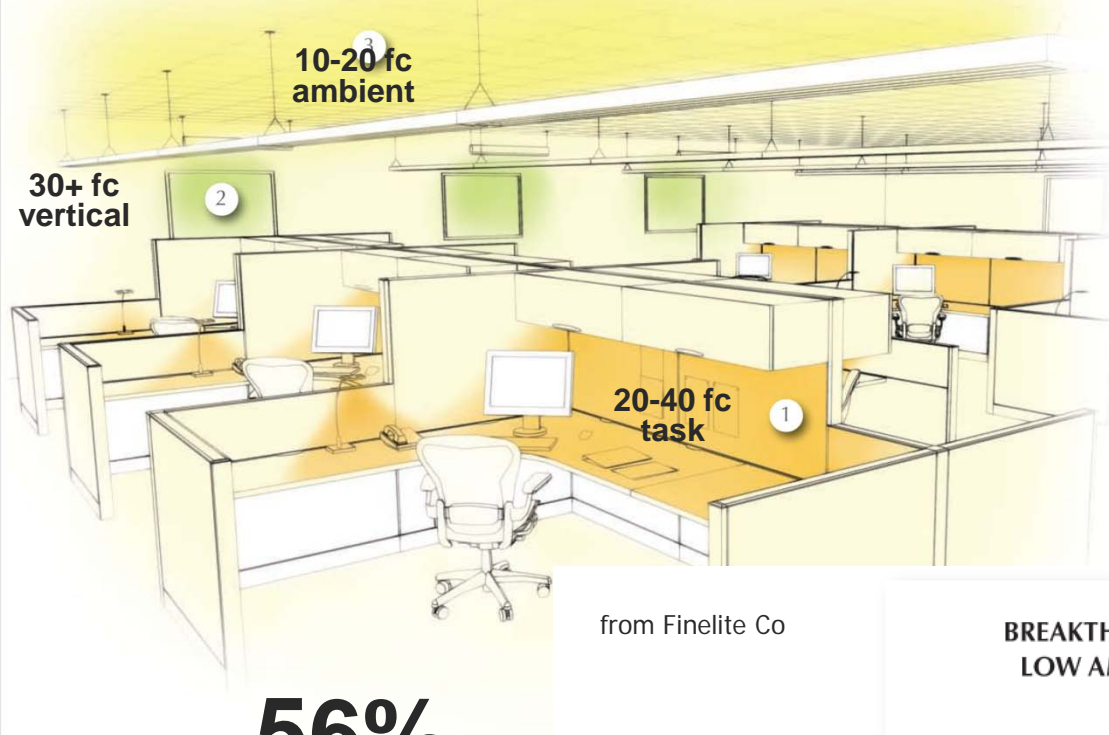
Conseil national  
de recherches Canada

**NRC-CNRC**   
Institute for  
Research in  
Construction

*Light Right* CONSORTIUM

All of the information found on these websites support the incredible economic benefits of lighting quality. There is no evidence to the contrary

# Smart office lighting design methods reduce long term costs

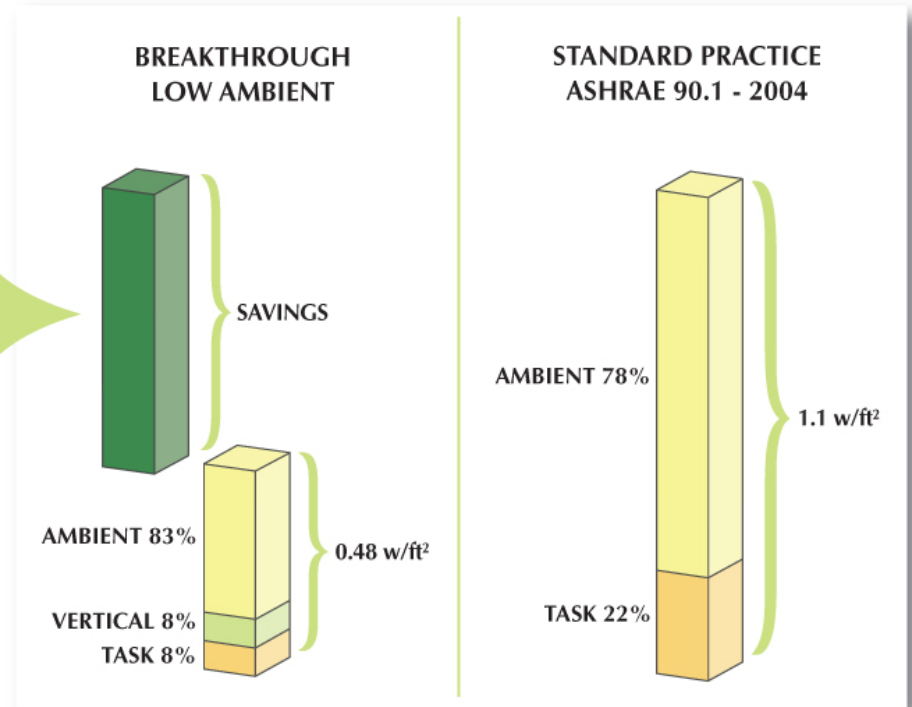


'Layers of light' method to Reduce energy and Improve worker satisfaction

1. Daylight integration
2. Lighting Controls
3. Task Lighting
4. Perimeter Wall Lighting
5. Ambient Lighting

from Finelite Co

**56%**  
**TOTAL ENERGY SAVINGS** below ASHRAE 90.1



Lighting quality and energy *must* be an equal part of the lighting program

# Visual comfort / glare control

Glare reduces visibility / reduced glare, improves visibility and reduces energy costs!!

interior



excessive contrast



direct glare



reflected glare

exterior



source glare  
light trespass  
light pollution



no glare / great visibility



bad design  
wasted energy

# Benefits of new design method in sales lots / parking lots

- Lower fc 50%-80% below current practice
- 50%-80% energy reduction
- High CRI lamps
- Better uniformity
- Reduced glare
- Provides greater attraction!
- Improved visibility of product details!
- Reduces sky glow and light trespass!

Kring Chevrolet Petoskey MI



Lower light with better lighting quality *improves* visibility



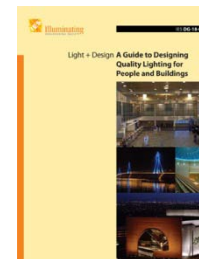
Gary Steffy IALD Lighting Design



McKeivt Volvo / San Leandro CA

## HOW TO USE THE IESNA LIGHTING DESIGN GUIDE

Previous editions of the *Illuminating Engineering Society of North America (IESNA) Lighting Handbook* have discussed important criteria for assessing and designing the visual environment, but a formal system for considering these criteria had never been developed by the IESNA. However, the IESNA has always recommended illuminances for specific applications or visual tasks. As a result, lighting specifiers often mistook the IESNA system of recommended illuminances as the primary or even sole criterion for lighting design. This edition of the *IESNA Lighting Handbook* introduces a new, formal system for considering a wide range of lighting design criteria. If followed, the recommended design criteria will increase the quality of the visual environment throughout North America. In engineering terms, the goal is to raise the “minimum standard of care” required of lighting designers.



The new IES DG 18

# Lighting and Professional Responsibility

Excerpt from 'lighting and risk management' / attorney Mark Eby

November 2006

'The Lighting Design Guide requires that lighting address new criteria that can have a substantial long term economic impact to the project owner.

Research has proven that properly designed lighting offers great economic benefits to the owner and building occupants. On the other hand, poorly designed lighting can have a detrimental effect; leaving the architect and electrical engineer liable to potential claims should the design fall short of the new standards of practice.

The long term economic impact to a project is the reason to address this professionally.'

# Project owners & the ROI conversation

Stefan's data based on experience and published information

- Lighting systems are about 4% of initial construction costs (new)
- Of that, a 2% adder would pay for better lighting / technical solutions
- An average 33% ROI is realized using energy efficient systems (daylight integration, controls, lamps, ballasts, reflectors, design techniques)
- An *additional* 20-30% energy savings is provided when natural light and electric light is integrated
- An average 20% ROI is realized in commercial buildings when skylights are used and electric lights are switched off
- Research has shown a 100% ROI in human cost benefits with *lighting quality* design programs
- A 4% gain in productivity from great lighting is more than the entire initial cost of the lighting system installed.
- A lighting designer (specialist) may cost about .10% of the initial lighting equipment budget for professional services



# Professional lighting designers

- Help to establish realistic budgets for electric and daylighting systems
- Introduce the best technologies
- Life cycle cost analysis
- Human cost benefits awareness
- Creative concepts
- Quick solutions based on experience
- Lighting plans
- Cost management
- Risk Management
- Fee flexibility

# Establish a lighting 'champion' for your project team / from the inside or out

A person that.....

- Is someone that is a 'career professional' lighting designer
- Is active and involved in continuing education
- Attends trade shows for product and technical knowledge
- Learns about the 'human factors' of light / continuing education
- Is involved in a 'design process' from concept through commissioning
- Is able to demonstrate creative and artistic use of light
- Is not involved in sales of equipment. Acts as the owners representative for lighting quality and cost issues
- May have membership in lighting design associations: IALD / PLDA. The American IES and LC credential does not indicate a 'lighting specialist'

What happened here?

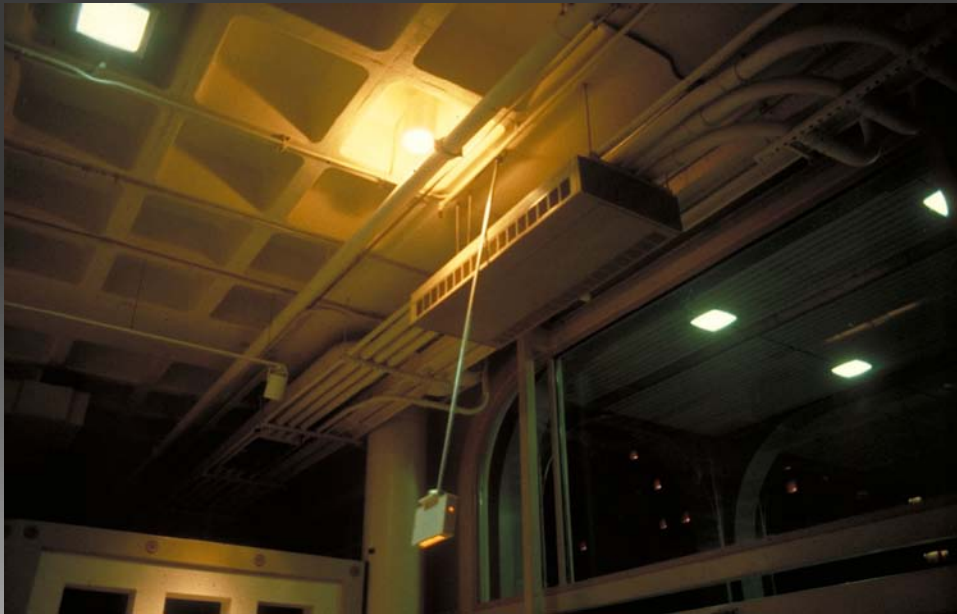


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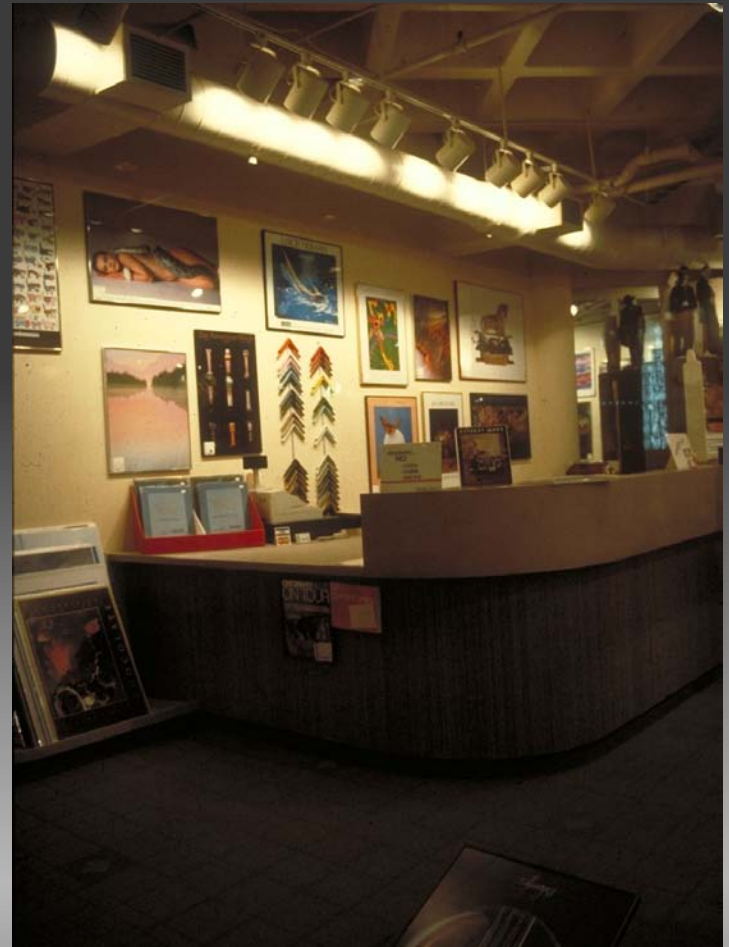


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What happened here?



c



d

Thank you  
tack själv  
danke  
gracias  
grazie  
takk skal du ha

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