

Next Frontiers for Lighting

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Trends Influencing the Frontier

- Supply Side Challenges



- Sustainability

- Incandescent “Ban”

- Flattening World

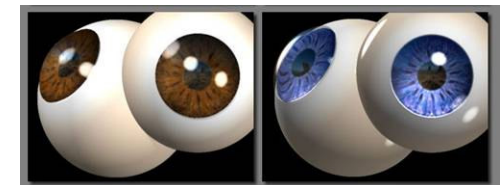
- Technological advances



What was that bump?

from adbusters.org

- Urbanization
- Increased focus on security & safety
- Longer work days
- Aging US Population
- Understanding how eyes see...



Systems & Applications

- The Right LightSM
 - Light levels
 - Glare
 - Color
 - Uniformity
 - Energy Efficiency
- Lots of Choices
 - Light Sources
 - Fixtures & Components
 - Controls
- Best Practices
 - Application Specific
 - Energy versus Power

Residential Best Practices

- Promotion of Lighting through the Right Lightsm
 - NYSERDA is working towards a long-term strategy that promotes the philosophy of efficient lighting in a home rather than promoting specific products.
 - Consumers need to understand that eventually they will have several choices for efficient lighting (e.g. a combination of CFLs, ENERGY STAR[®] fixtures, and SSL products), instead of being forced to use one technology over another.

ENERGY STAR Fixtures

- Advanced Lighting Package (ALP)
 - New Homes & Remodeling Markets
 - Buy downs for ENERGY STAR Fixture Families
 - Increased Training to Builders & Contractors



ENERGY STAR Fixtures

- Retail Promotions
 - Impacting consumers at the retail level
 - Comparisons between non-ENERGY STAR & ENERGY STAR lighting fixtures
 - The comparisons, coupled with a reasonable fixture buy down and educational materials, help provide consumers with the information needed to make an informed purchase.



Commercial Best Practices

- Partnerships are Crucial
 - Advanced Lighting Guidelines
 - DOE Commercial Lighting Solutions
 - Office of the Future
 - Lighting Research Center
 - NEMA Premium and CEE

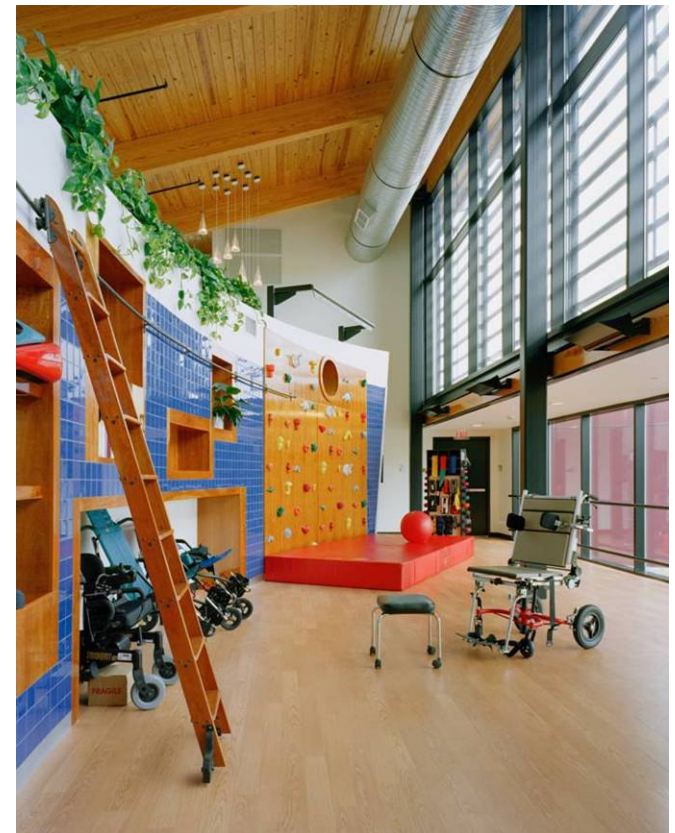


Photo by David Allee, courtesy of Guenther5 Architects, PLLC

DOE Commercial Lighting Solutions

Commercial Lighting Tool

Logged in as **Geoffrey Elliott** [Log Out](#) | [Settings](#) [? Help](#)

Untitled Project...

Design Vignettes

Select the spaces your store will include, then enter the floor space and select a lighting vignette.

Freezer Cases

Specialty

Deli

General Sales

Produce

Pharmacy

Bakery

Point-of-Sale

▶ PROJECT DESCRIPTION

Retail: Grocery Store

▶ DESIGN VIGNETTES

- Vignette 1
- Vignette 2
- T5HO Strips (V1)
- Vignette 1
- Vignette 1
- Vignette 2
- Vignette 2
- Vignette 2
- Vignette 3

▶ CONTROL STRATEGIES

Daylight harvesting 4% SFR
Daylight harvesting 3% SFR
Dimming - Night operation
50% reduction (stocking)
Occ. Sensor (cleaning)
Unoccupied - 10% night light
Demand Reduction

90.1-2004
Baseline: 297,840 kWh
Proposed: 247,207 kWh

25%

Integrated Lighting Systems



Public Interest Energy Research Program

Technical Brief



PIER Buildings Program

Integrated Office Lighting Systems: Making It Personal

Research Powers the Future

www.energy.ca.gov/pier

Simply Intelligent

The advantages of Distributed Intelligence

Current systems are difficult to work with because they address energy management simply from a control standpoint. The ability to ensure a more integrated and flexible design.

SMPL's lighting intelligence becomes a whole system, being designed to tightly address lighting, heating and cooling components. The result is a complete solution that is easy for everyone.

Light Energy Manager

- 1. Controls all lighting systems
- 2. Controls all heating and cooling systems
- 3. Controls all building equipment
- 4. Controls all building systems
- 5. Controls all building systems

Smart Connector

- 1. Controls all lighting systems
- 2. Controls all heating and cooling systems
- 3. Controls all building equipment
- 4. Controls all building systems
- 5. Controls all building systems

Efficient Lighting Returns

- 1. Controls all lighting systems
- 2. Controls all heating and cooling systems
- 3. Controls all building equipment
- 4. Controls all building systems
- 5. Controls all building systems

Intelligent Control Box

- 1. Controls all lighting systems
- 2. Controls all heating and cooling systems
- 3. Controls all building equipment
- 4. Controls all building systems
- 5. Controls all building systems

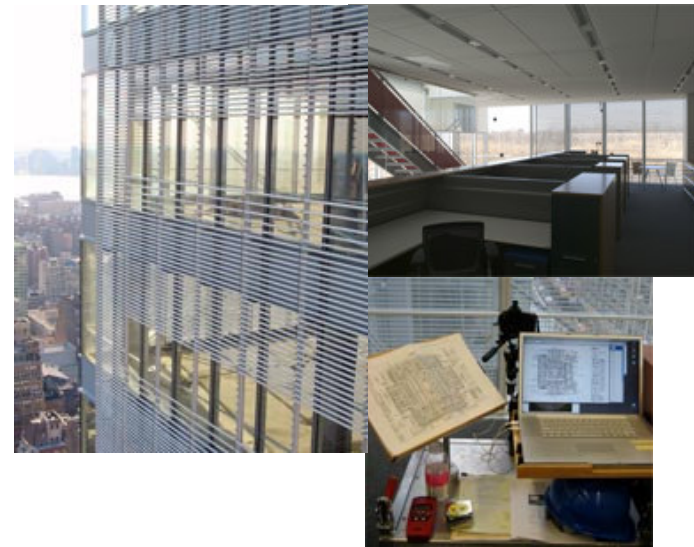
Simple Wall Controls

- 1. Controls all lighting systems
- 2. Controls all heating and cooling systems
- 3. Controls all building equipment
- 4. Controls all building systems
- 5. Controls all building systems

Double-Window Walling

- 1. Controls all lighting systems
- 2. Controls all heating and cooling systems
- 3. Controls all building equipment
- 4. Controls all building systems
- 5. Controls all building systems

SIMPLY
CONTROL INTELLIGENCE



Industrial & Outdoor Lighting Best Practices

- Integration of Controls
- Promising Advances in Lighting Technologies
- Mesopic Vision

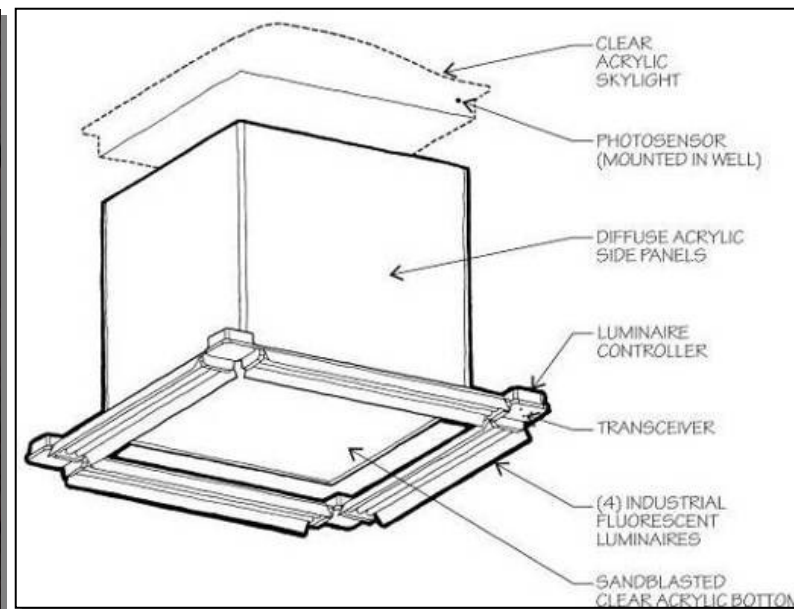


Image courtesy of the Lihtina Research Center

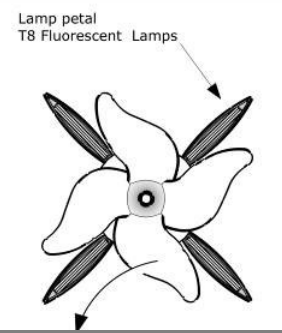
Integrated Skylight Luminaire



Photo courtesy of the Lighting Research Center



Images courtesy of the Lighting Research Center



Mesopic Lighting

100 W HPS @ 2100K CCT



Photo courtesy of the Lighting Research Center

55 W Induction @ 6500K CCT



Photo courtesy of the Lighting Research Center

Lighting Research Center demonstration project in Groton CT

The Promise of Controls: Can They Deliver?

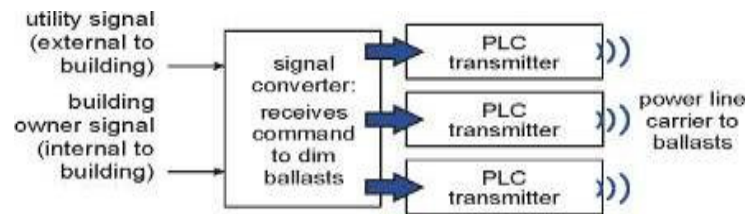
- Occupancy, Dimming, Load Shedding ...
- Localized control
- Offsetting electric lighting with daylight
- Controlling night lighting
- New Products/features
 - Easier commissioning
 - Modular networks
 - Load shed ballast
- Workforce training
- Widespread use
 - New Construction & Existing Buildings



Controls

- Home automation
 - NYSERDA continues to investigate the opportunities for connected systems and home automation.
 - This is the next big frontier for the residential program as all aspects of a home will be combined and a home's performance will really transform into a systems approach.

Load-Shed Ballast



Sponsors: NYSERDA, CEC

DaySwitch®

- Daylight cut-off switch
- New & existing fixtures
- Design priorities
 - Inexpensive
 - Minimal visual impact
 - Fixture compatibility
 - Low power requirement
 - Simple automatic commissioning



Sponsors:
NYSERDA, CEC, CL&P, NEEA, Iowa Energy Ctr.,
North Carolina Daylighting Consortium, LRC, US DOE

Lighting Controls Workforce Training

- Architects
- Engineers
- Contractors

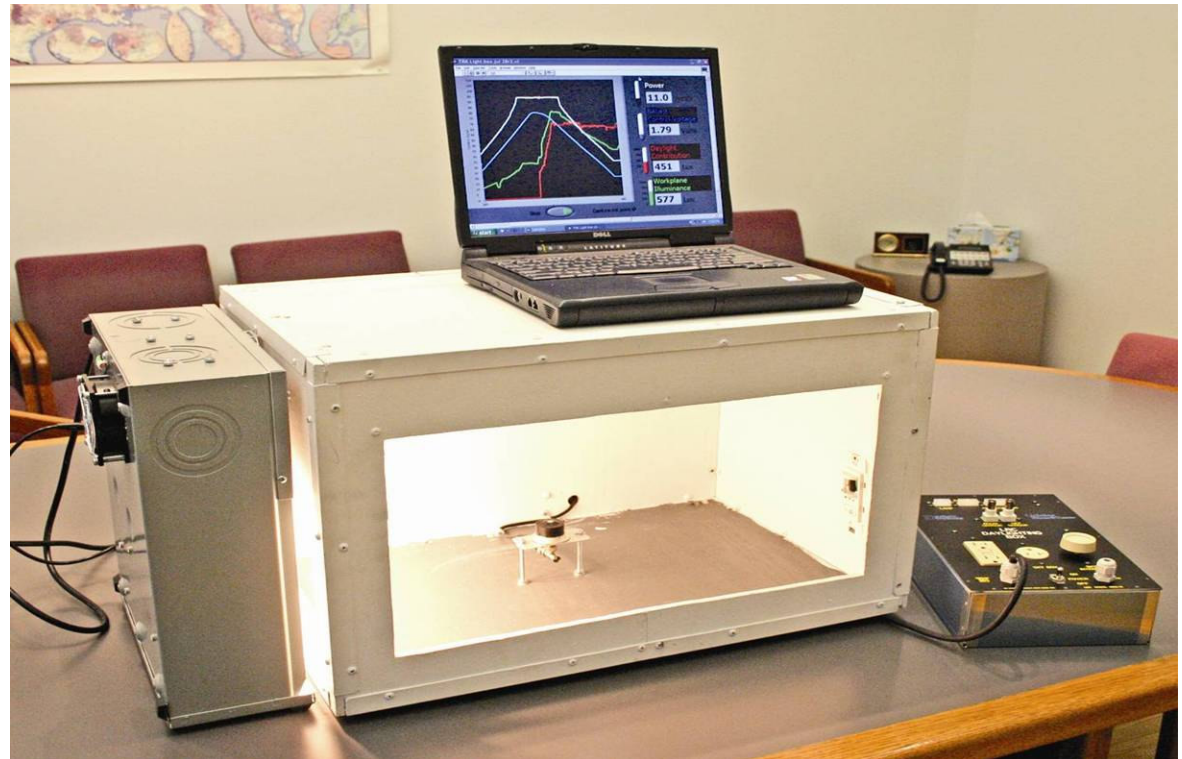


Photo courtesy of the Lighting Research Center



We Love the Light Bulb



- Incandescent Standards- source of confusion
- Consumer Education
- Quality Assurance & Testing
- CFL Recycling- mercury management
- Packaging
- Bridging to SSL



Solid State Lighting

- Applications
 - Decorative strings
 - Refrigerator case lighting
 - Undercabinet
 - Downlights
 - Task lights
 - Street lights
- Testing standards
- Testing
- Energy Star
- Built for life
- Price

PAR 20 Size LED Lamp
Driver
LED Specialists



Testing Standards & Testing

- Testing Standards
 - IESNA/ANSI LM-79 & LM-80
 - ASSIST Recommends
- Testing
 - CALiPER
 - NLPIP

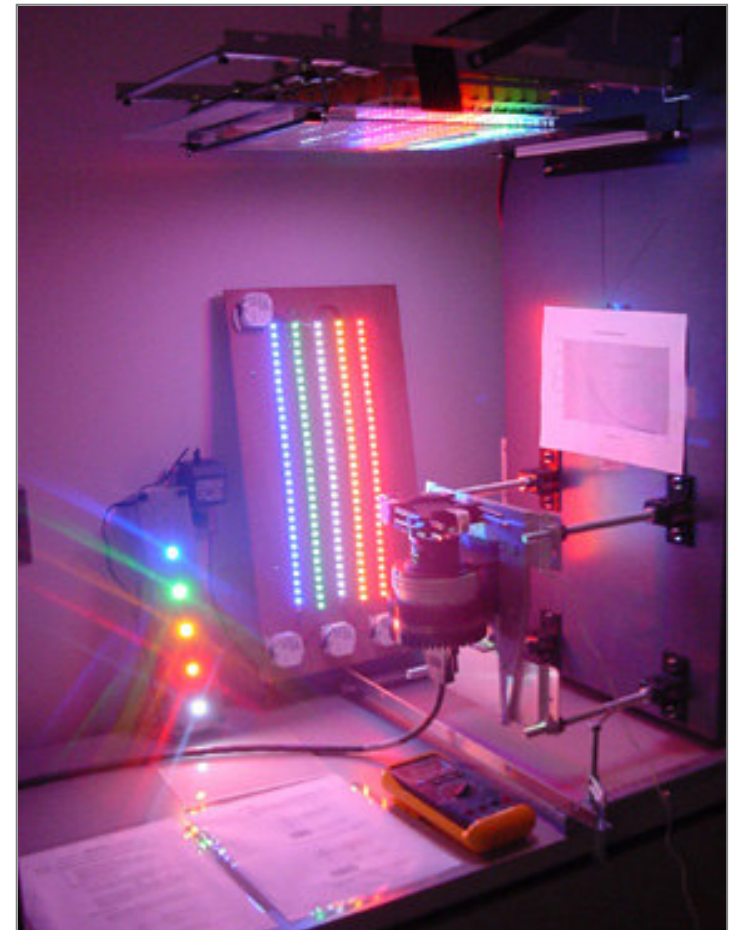


Photo courtesy of the Lighting Research Center

What will Lighting Programs look like?

- **Systems & Applications Focused**
 - Integrating Electric Light and Daylight
 - Matched components
 - Controls
- Incorporating partnership products & resources