Improving Hotel Aesthetics and the Bottom Line with Window Shades and Lighting Controls
Ver-Tex Experience Center
Agenda

• Who is Lutron?

• Review current code required lighting control strategies

• Discuss Natural light – positives and negatives, along with ways to control it

• Review ways that lighting and shade control work together as a team

• Review Guestroom solutions

• Review Public space solutions
Who is Lutron?

The global leader in lighting and shade control for commercial and residential applications.

- Privately owned global company
- Company owner, Mr. Joel Spira, invented the first solid-state dimmer in 1961
- Designs and manufactures all components
- Over 25 years of experience in the hospitality industry
- Offers 24/7 technical assistance, 365 days/year
- Single Provider – Guestrooms, public areas, and back of house
Control strategies
Control Strategies

Improvements in Stringency from Standard 90-75 to 90.1-2010

- Standard 90-75
- Standard 90A-1980
- Standard 90.1-1989
- Standard 90.1-1999
- Standard 90.1-2004
- Standard 90.1-2007
- Standard 90.1-2010

- 14% Savings
- 4% Savings
- 12% Savings
- 5% Savings
- DOE Focus – 30% Savings
Control Strategies

**Scheduling:** Lights automatically turn off or are dimmed at certain times of the day or based on sunrise or sunset.

**Occupancy/Vacancy Sensing:** Automatically turning lights off when people vacate the space.

**Multi-level Lighting/Dimming:** Providing users one or more light levels than full-on and full-off.

**Daylight Harvesting:** Automatically adjust light levels based on the amount of daylight in the space.
Control Strategies

**High end trim/Tuning:** Set target light level based on occupant requirements in the space.

**Personal Light Control:** Allow users in the space to select the correct light levels for the desired task.

**Controllable Window Shades:** Allows users to control daylight for reduced solar heat gain and glare.

**Demand Response:** Reducing lighting load at times of peak electricity pricing.

**Plug-load Control:** Automatically turning task lighting and other plug loads off when they are not needed.
Natural Light Control
Positives of Natural Light

- Lower or no dependency on electrical lighting
- Increases productivity
  - Glare reduction
  - Maintain alertness, reduce errors
  - Improve moods, lower absenteeism
- Improves patient health and student performance
- Increases retail spending
Negatives of Natural Light

• Glare and Solar heat gain – Visual discomfort

• Washed out display screens

• Bright interior environment

• Disrupted view to outside

  – Physical discomfort, move/relocate to relieve discomfort

• Direct sunlight brings heat

• Fluctuations in availability

• Damaging UV rays
Automation of Natural Light Control

- More than 90% of manual shades are moved less than once per day*
- Can effectively double the area with adequate daylight**
- Maximize time occupants receive un-obstructed views
- Automation provides confidence in glare and solar heat control

Sources:
** Daysim daylighting simulations comparing closed shades to automated shades showed the area with a Useful Daylight Illuminance (UDI)\textsubscript{20,200} of 80% was twice as deep for automated shades.

= Useful Daylight Zone
• **Siting** - Neighboring homes, tall structures, and reflective surfaces

• **Window size** - Daylight can penetrate the space up to 1.5x the height of the window

• **Window composition** - Tinted or reflective glass can reduce solar heat gain, but also limit visible light
How it works:

\[ h = f(x, y, \theta) \]

- \( h \): Bottom bar height
- \( x \): Target depth of light penetration onto the work surface
- \( y \): Height of target work surface
- \( \theta \): Sun angle inclination
• Commonly seen as VLT or Tv
• An important measurement to understand glare and visual comfort
• Lower Tv recommended (high Tv value can indicate high glare)

8000 fc x 0.7(Tv_{glass}) = 5600 fc x 0.15(Tv_{fabric}) = 840 fc

8000 fc x 0.7(Tv_{glass}) = 5600 fc x 0.04(Tv_{fabric}) = 224 fc
Fabric Metrics

**Solar Transmittance (Ts)**
percentage of solar radiation that passes through the fabric

**Solar Absorptance (As)**
percentage of solar radiation absorbed by the fabric

**Solar Reflectance (Rs)**
percentage of solar radiation reflected back out by the fabric

**Visual Transmittance (Tv)**
Percentage of visible light that passes through the fabric
Results:

- Fabric selection affects lighting energy.
- Location has a smaller effect on lighting energy savings due to automation.

A higher $T_v$ fabric provides greater lighting energy savings.
Results:

- Little to no effect on heating energy
- A higher Rs fabric has a greater reduction on cooling energy consumption

Cooling energy savings range from 3% to 22% based on fabric thermal reflectance (Rs) and building properties
Energy Savings
**Energy Savings**

**Lighting Annual Energy Usage**

AVG Savings = $0.34/ft²/yr [83%]

**Closed (Manual)**

**Automated**

**South**

**North**

**West**

**Lutron Electronics, Inc. worked with Purdue University to analyze the benefits and savings potential of automated shading systems. The results showed the impact of how automated shades significantly reduce annual lighting energy usage.**
Energy Savings

**Lighting Annual Energy Usage**

**AVG Savings = 1.6 kWh/ft²/yr [83%]**

**Closed (Manual)**

**Automated**

**South**

**North**

**West**

**Lutron Electronics, Inc. worked with Purdue University to analyze the benefits and savings potential of automated shading systems. The results showed the impact of how automated shades significantly reduce annual lighting energy usage.**
Energy Savings

<table>
<thead>
<tr>
<th>Cost of Electricity</th>
<th>Payback</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0.18 - $0.21 per kWh</td>
<td>4-5 years</td>
</tr>
<tr>
<td>$0.14 - $0.17 per kWh</td>
<td>6-7 years</td>
</tr>
<tr>
<td>$0.10 - $0.13 per kWh</td>
<td>7-10 years</td>
</tr>
</tbody>
</table>

Expected Return Based on Cost of Electricity
myRoom™
Guestroom Systems
What is myRoom™?

- A family of guestroom systems, easily tailored to performance and budget requirements

- myRoom offers beautiful, energy-efficient control options for lights, temperature, and shades

- Global guestroom solution from Lutron that leverages existing residential and commercial technologies

- Design is scalable – combine light, temperature, and shade control to meet your needs and functionality

- Wired and wireless controls and occupancy sensor options
  - Low installation cost
  - 10 year battery life, interference free
myRoom™ plus - Example
## Sequence of Operations

<table>
<thead>
<tr>
<th></th>
<th>Unsold Check-out</th>
<th>Sold Check-in</th>
<th>Sold Occupied Day</th>
<th>Sold Occupied Night</th>
<th>Sold Unoccupied</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lights</strong></td>
<td>Off</td>
<td>Off</td>
<td>First entry</td>
<td>Other entry</td>
<td>First entry</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Day grand-welcome scene</td>
<td>Day welcome scene</td>
<td>Night grand-welcome scene</td>
</tr>
<tr>
<td><strong>Receptacles (optional)</strong></td>
<td>Off</td>
<td>Off</td>
<td>Powered</td>
<td>Powered</td>
<td>Off</td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
<td>Deep Setback: hotel setpoint, large drift</td>
<td>Comfort Mode: hotel setpoint, small drift</td>
<td>Comfort Mode: guest controlled, small drift</td>
<td>Comfort Mode: guest controlled, small drift</td>
<td>Setback Mode: guest controlled, medium drift</td>
</tr>
<tr>
<td><strong>Shades/Draperies</strong></td>
<td>Closed</td>
<td>Closed</td>
<td>First entry</td>
<td>Other entry</td>
<td>First entry</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Open</td>
<td>Unaffected</td>
<td>Closed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unaffected</td>
</tr>
</tbody>
</table>
myRoom™ plus vs prime

<table>
<thead>
<tr>
<th></th>
<th>myRoom prime</th>
<th>myRoom plus</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy saving statuses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupied/Unoccupied</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Sold/Unsold</td>
<td>-</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Welcome scene options</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Default guest welcome scene</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Doorlock integrated programmable welcome scenes</td>
<td>-</td>
<td>✓</td>
</tr>
<tr>
<td>Privacy and corridor</td>
<td>-</td>
<td>✓</td>
</tr>
<tr>
<td>Pico controls</td>
<td>-</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Privacy/service</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Third-party corridor plate</td>
<td>-</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Integration</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PMS integration for guest check-in and privacy/service information</td>
<td>-</td>
<td>✓</td>
</tr>
<tr>
<td>BMS BACnet/IP integration for lights, shades and temperature control</td>
<td>-</td>
<td>✓</td>
</tr>
</tbody>
</table>

5 Allows for multiple welcome scenes (guest first entry, guest subsequent entry, staff entry) that respond to programmed doorlock integration. Available for use with qualified partners.
myRoom™ plus - Summary

• Integrated guestroom management system that connects to other hotel systems

• Requires a Room Controller – GCU-HOSP

• Large variety of control options and finishes

• Energy savings from HVAC, lighting, and shading control

• Advanced energy savings from Check-in/Check-out information

• Adds Privacy/Service functionality

• Adds door lock integration capabilities
Shading Solutions
Shade Styles

Drapery/Curtain Tracks
Suggested uses: guest rooms, restaurants, lobbies
- Pull-to-start functionality available
- Offer daylight control in pinch pleat or ripplefold styles
- Pinch pleat and ripplefold fabric styles
- Straight, curved, and long-track systems available

Roller Shades
Suggested uses: guest rooms, hotel lobbies, conference rooms, restaurants, ballrooms
- Lutron's most versatile shade style
- Available in different sizes – ideal for multi-story windows and curtain walls
- Precise alignment of multiple shades
- Sheer, translucent, and blackout opacities available

Roman Shades
Suggested uses: guest rooms, spas
- Feature CERUS® safety technology, which eliminates exposed cords
- Soft fabrics and woven woods are available in Lutron's fabric collections; customer's own material can also be used
**Shade Styles**

**Venetian Blinds**
*Suggested uses: guest rooms*
- Control the tilt of the slats and lift of the blinds independent of each other

**Kirbé® Vertical Drapery System**
*Suggested uses: guest rooms, conference rooms*
- Eliminates stackback with its one-of-a-kind drapery roller system

**Tensioned Shades**
*Suggested uses: guest rooms, lobbies*
- Maximize the view and privacy
- Available in meet-in-the-middle, skylight, and bottom-up shades
- Can be installed at any angle
Public Space Solutions
Public Space Solution

**Quantum®**

- A lighting and shade control and energy management system

- Ties the most complete line of lighting controls, motorized window shades, digital ballasts and LED drivers, and sensors together under one software umbrella.

- Create the right light in public areas –
  - Control of electric light and daylight
  - Control of shades/blinds and draperies
  - Use in Lobbies, Ballrooms, meeting rooms
  - Create beautiful and functional lighting environments
  - Save considerable amounts of money and energy

- Easily scales from a single area to a building, or to a campus with many buildings
Public Space Solution

Automated shades

Wireless Keypad

Dimming Ballast

Wireless Occupancy sensor

Wireless Daylight sensor
Public Space Solution

BMS Integration via BACnet
• BTL Certified
• Open protocol

Facilities Management
• Energy reports
• Operational control and maintenance

Quantum Vue™
• Access from any PC or mobile device
• Provides actionable information that improves the performance of your building
Service Areas Solution

Energi TriPak®

• Build an energy-saving solution for any budget
  • Meet energy codes and standards

• Simple retrofit—installs 70% faster than wired systems
  • Minimizes disruption to people in space
  • Easy set up and adjustment—no knobs or dials

• No callbacks—sensors use XCT™ Technology
  • 2–3 times more sensitive to fine motion than other sensors
  • Recognizes the difference between fine human motion and background noise

• Superior Clear Connect® wireless communication
  • Proven, patented technology that works
Lutron products and solutions are used in these and many more hotels all over the world.

Africa
Conrad Hotel, Cairo, Egypt
InterContinental Citystars, Cairo, Egypt
Kempinski, Gold Coast, Ghana
Maia Beach Resort, Morocco
Meridian Oran, Algeria
Royal Mansour, Marrakech, Morocco
Sofitel, O Hlic En Flac, Mauritius

Asia / Middle East
Chawal Blanu Ranch, Republic of Maldives
The Claridges Hotels and Resorts, New Delhi, India
Four Seasons Resort Dubai at Jumeirah Beach, Dubai, UAE
Four Seasons, Hangzhou, Hong Kong & Macau, China
Grand Copthorne Waterfront Hotel, Singapore
Grand Hyatt, Beijing, Shanghai & Hong Kong, China
Grand Hyatt, Goa, India
Hyatt Regency, Makkah, Kingdom of Saudi Arabia
InterContinental Jordan, Amman, Jordan
JW Marriott, Abu Dhabi, UAE
JW Marriott, Shanghai, China
JW Marriott Hotel Kuala Lumpur, Kuala Lumpur, Malaysia
The Langham, Palm Jumeirah, Dubai, UAE
Le Meridien Grand Pacific, Tokyo, Japan
Mandarin Oriental, Singapore
Kempinski Hotel, Istina, Jordan
Nagoya Marriott, Nagoya, Japan
Park Hyatt, Beijing, Tianjin & Shanghai, China
Park Hyatt, Seoul, Korea
Park Hyatt Tokyo, Tokyo, Japan
The Peninsula, Beijing, Shanghai & Hong Kong, China
The Peninsula, Tokyo, Japan
Ritz Carlton, Bangalore, India
Ritz Carlton, Beijing, Hong Kong & Shenzhen, China
Royal Mirage Dubai, UAE
Sands Hotel & Casino, Singapore and Macau, China
Sheraton Hotel, Huzhou, China
Sofitel, Beijing, Qingdao & Xiamen, China
St. Regis, Beijing, Tianjin & Sanya, China
The Westin, Hyderabad, India.
Lutron Hospitality Projects

Europe
Fairmont, Baku, Azerbaijan
Four Seasons, Beloe, Azerbaijan
Four Seasons George V, Paris, France
Four Seasons, Moscow, Russia
Grand Hyatt Berlin, Berlin, Germany
Hilton Barcelona, Barcelona, Spain
Hotel Kudamm, Berlin, Germany
Marriott Hotel, Frankfurt, Germany
Park Hyatt Paris-Vendôme, Paris, France
Peninsula, Paris, France
Prestige Hotel, Barcelona, Spain
The Ritz Carlton, Wolfsburg, Germany
Rosewood Hotel, London, England
Shangri-La, Paris, France
St. Regis Grand Hotel, Rome, Italy
W Hotel, Paris, France
The Westin Excelsior, Rome, Italy

Latin America
Andaz, Papagayo, Costa Rica
The Fairmont Acapulco Princess, Acapulco, Mexico
Fasano Ipanema, Rio de Janeiro, Brazil
Hyatt Regency, Mexico City, Mexico
JW Marriott, Bogotá, Colombia
Ritz Carlton, San Juan, Puerto Rico
Tamarindo Intercontinental, Coracás, Venezuela
The Westin Pico Ki Beach & Golf Resort, La Alta Gracia, Dominican Republic

North America
Andaz Wailea, Maui, HI, USA
Bellagio Hotel and Casino, Las Vegas, NV, USA
Four Seasons, Hawaii, USA
Four Seasons, Orlando, FL, USA
Hilton Washington Dulles Airport, Washington, DC, USA
InterContinental Buckhead Hotel, Atlanta, GA, USA
JW Marriott Desert Ridge Resort & Spa, Phoenix, AZ, USA
JW Marriott Desert Springs Resort & Spa, Palm Desert, CA, USA
JW Marriott Grande Lakes, Orlando, FL, USA
Langham Hotel, Chicago, IL, USA
Mandarin Oriental, New York, NY, USA
Mandarin Oriental, Washington, DC, USA
Park Hyatt Chicago, Chicago, IL, USA
Renaissance Hollywood Hotel, Hollywood, CA, USA
Ritz Carlton Grande Lakes, Orlando, FL, USA
St. Regis Hotel, San Francisco, CA, USA
Virgin Hotel, Chicago, IL, USA

For a list of case studies, visit www.lutron.com/casestudies
What’s Next?

How can you reduce energy in your property?
• Implement lighting control strategies – guest rooms, lobbies, function spaces, restaurants, etc.
• Automate window treatments to adjust to solar conditions
• Use these strategies to leverage your property to your guests
Questions?

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