The Problem

- Occupants do not turn the lights off when they leave the space

Economics – Office Space

- Energy Costs $1.50 to $2.50 ft2
- Salary Costs over $200 ft2
- Reducing energy costs by 50% saves $1.00 ft2
- Increasing productivity by 5% saves more than $10 ft2

- Spaces are over lighted by 10-20% designed for worst-case interiors and fabrics, adjustable systems can tune-out waste

Lighting Control Strategies

High-end trim/Tuning: Sets the target light level based on customer requirements in each space.

Occupancy or vacancy sensing: Automatically turn off lights when people vacate the space[7].

Daylight harvesting: Automatically adjusts the electric lighting levels based on the amount of daylight in the space.

Personal light control: Allows users in the space to select the correct light level for the desired task. Often that is much less light than full-on.

Controllable window shades: Allows quiet control of daylight for improved comfort and productivity using Sivoia® QS shades.

Scheduling: Lights turn off or are dimmed and shades are adjusted automatically at certain times of the day or in relation to sunrise and sunset[8].

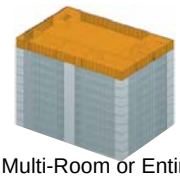
Demand response: Allows the facility manager to reduce lighting load at times of peak electricity pricing to avoid extra charges, black-outs, brown-outs, and create revenue opportunities.

Scalable Product Solutions

Total Light Management is WISE

Standalone/Single Space Solutions

Small Area Solutions



Multi-Room or Entire Floor Solutions

Whole Building Solutions

Wireless →
Interoperable →
Scalable →
Energy Saving →

Standalone and Single Space Solutions

Standalone and Single Space Solutions

NEW Maestro Occupancy Sensor

Vacancy Sensing = 15% Savings

Standalone and Single Space Solutions

Maestro® In-wall Sensors:

- Save Energy by automatically turning the lights off when the room or space is unoccupied
  - Aesthetics
  - Programmability
  - Upgraded Detection Capability
    - XCT Technology

Maestro Switch w/ Sensor

Vacancy Sensing = 15% Savings

LUTRON. Total Light Management Roadshow 2010

Standalone and Single Space Solutions

NEW Radio Powr Savr Occupancy

NEW Maestro Wireless Switch

Vacancy Sensing = 15% Savings

Standalone and Single Space Solutions

Wireless occupancy/vacancy sensor

- Innovative technology
  - XCT
  - Sensor placement
  - Sensor power
  - Control
  - Set up
- Interoperable with other Lutron Clear Connect™ devices

Vacancy Sensing = 15% Savings

Standalone and Single Space Solutions

Maestro Wireless® Product Overview:

- Dimmers
  - Fluorescent, Incandescent, MLV
- Electronic Switches
  - Control all lightings loads, including ELV and fans

RF Plug-in Modules:

- Communicates with Pico controllers as well as wireless occupancy / vacancy sensors to turn off table lamps or “Vampire Loads” such as:
  - Monitors
  - Printers
  - Televisions
  - Projectors

Vacancy Sensing = 15% Savings

Standalone and Single Space Solutions

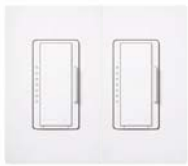
Pico™ wireless controls:

- Wireless controller that communicates via Clear Connect technology with Maestro Wireless dimmers, switches and lamp dimmers
- Adds second control to space

Vacancy Sensing + Personal Control = 25% Savings

Standalone and Single Space Solutions

NEW Radio Powr Savr Occupancy and Daylight Sensors



NEW Maestro Wireless Switch (Bi/Dual Level Switching displayed)

Vacancy Sensing + Daylight (switched) = 25% Savings

Standalone and Single Space Solutions

NEW Radio Powr Savr Occupancy and Daylight Sensors

NEW Maestro Wireless Dimmer (FL)

Vacancy Sensing + Daylight (continuous) = 30% Savings

Standalone and Single Space Solutions

Radio Powr Savr Wireless Daylight Sensor:

- Daylight sensor detects daylight
- Feeds that information back to a compatible Lutron (RF) lighting control
- Lighting control responds with the appropriate course of action (e.g. dim or turn lights off when daylight is high and brighten lights when available daylight is low)

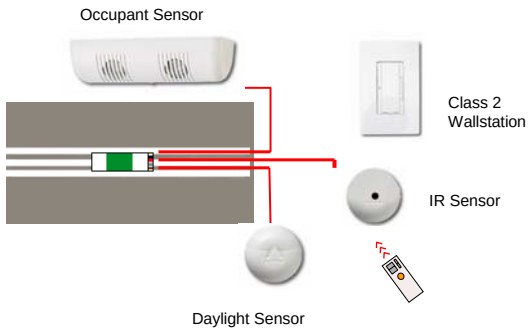
Daylight Sensing = 15%+ Savings

EcoSystem Overview

EcoSystem Overview

Example Single Fixture

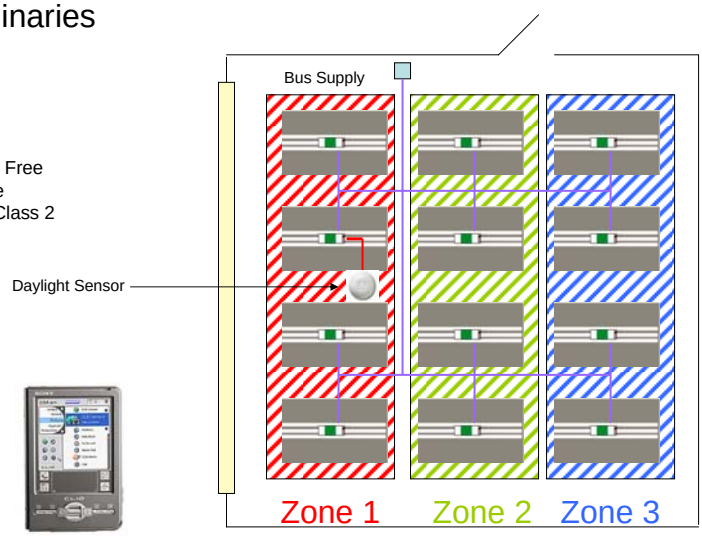
- No Interfaces, Power Packs, or Controllers



EcoSystem Overview

Multiple Luminaries

•Digital Ballast Bus
-Topology Free
-Polarity Free
-Class 1 or Class 2



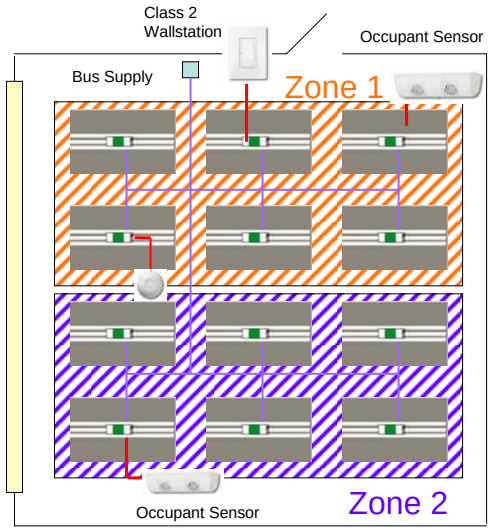
EcoSystem Programmer

EcoSystem Overview

Multiple Luminaries

- Digital Ballast Bus
  - -Topology Free
  - -Polarity Free
  - -Class 1 or Class 2

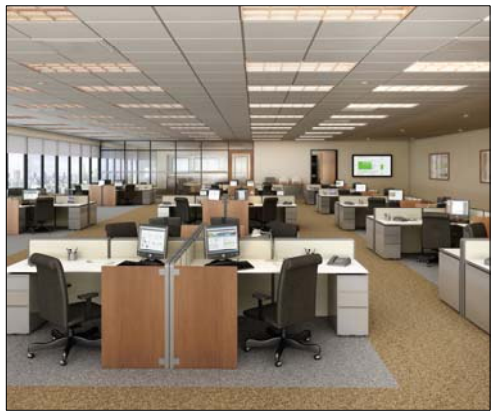
EcoSystem Programmer



Multi-Room and Entire Floor Systems

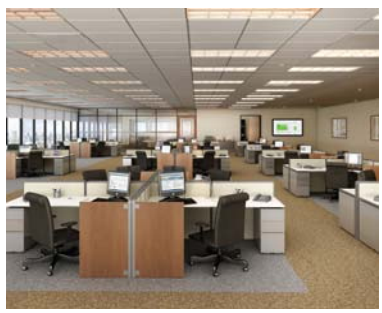
Problem

- Limited or zero distributed or local space control
- Difficult to retrofit
- Churn



Multi-Room and Entire Floor Solutions

- Control of multiple rooms to a single floor
- Integrate energy management strategies to save energy
- Applications
  - Open office and private offices
  - Classrooms
  - High-bay areas (warehouse, distribution facility)



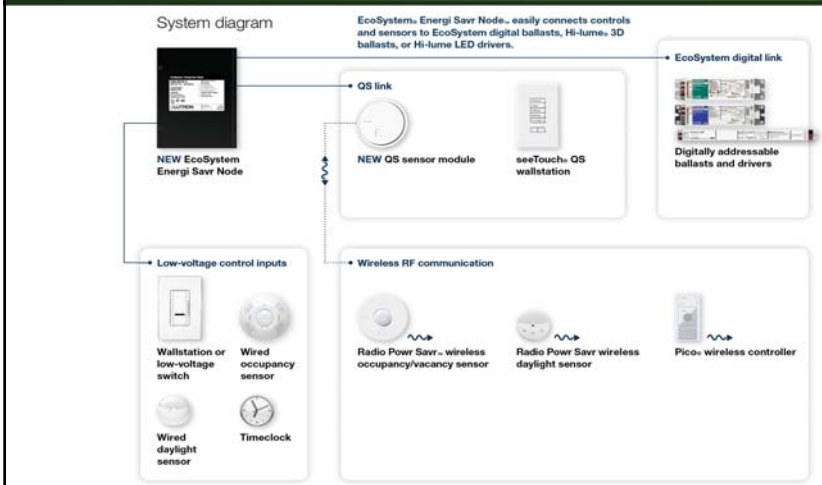
Multi-Room and Entire Floor Solutions

What is an Energi Savr Node™?

- Intelligent lighting control that integrates sensors and controls to adjust lights to maximize energy savings
- Easily combines daylighting, occupancy/vacancy sensing, personal control, and timeclock

Scheduling/Occupancy/Daylight/Control = 40%

Multi-Room and Entire Floor Solutions



Scheduling/Occupancy/Daylight/Control = 40+%

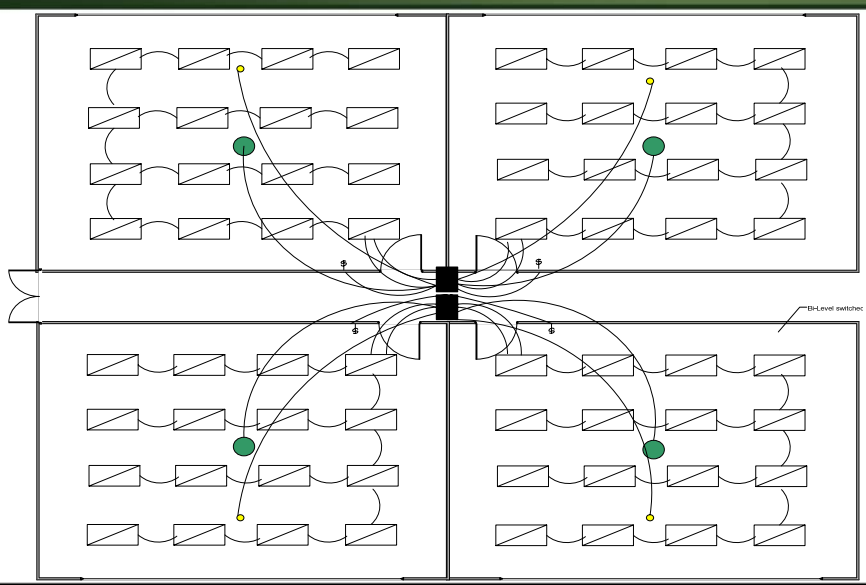
Multi-Room and Entire Floor Solutions

Which Energi Savr Node do I use?

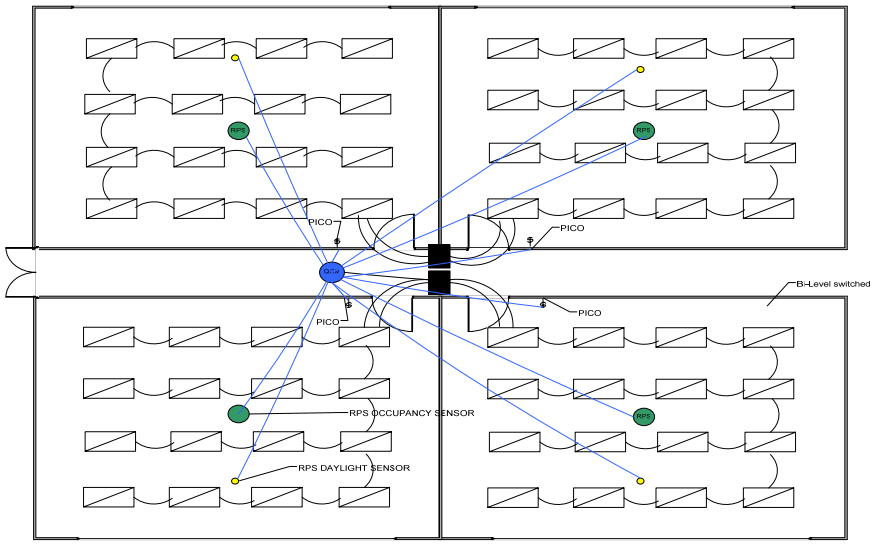
- EcoSystem® Energi Savr Node™
  - Adaptable: Re-zone digitally without touching a wire
  - Intelligent: Ballast can report failures and energy usage
- Energi Savr Node™ for 0-10V
  - Simple: Multi-zone dimming that works out-of-the-box
- SoftSwitch Energi Savr Node™
  - Low-cost: Integrates daylight harvesting and occupancy/vacancy sensing to provide basic energy savings

Scheduling/Occupancy/Daylight/Control = 40+%

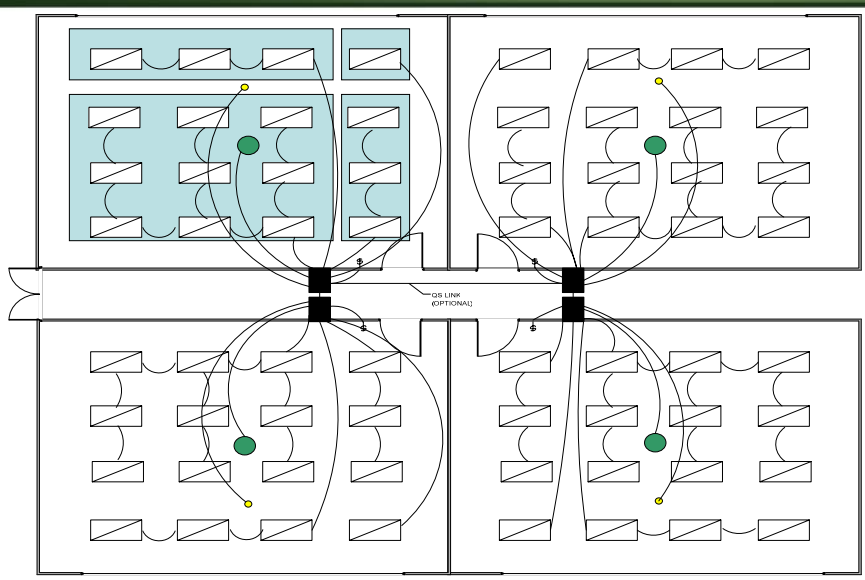
Energi Savr Node 2 Zone per room Wired



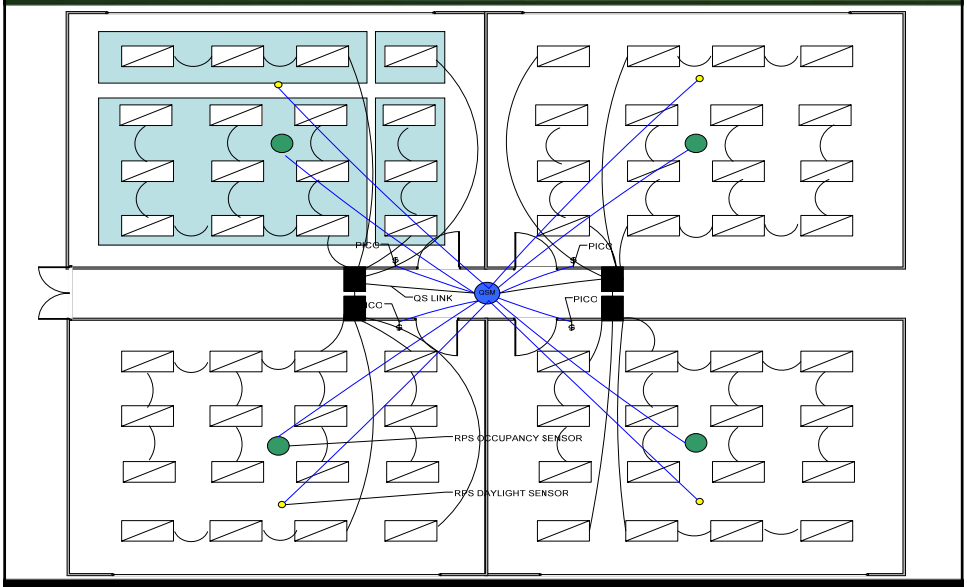
Energi Savr Node 2 Zone per room wireless



Energi Savr Node 4 Zone per room Wired



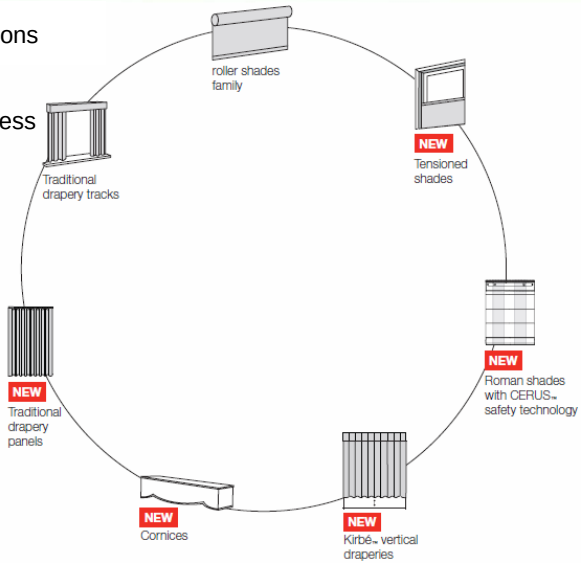
Energi Savr Node 4 Zone per room wireless



Shading Solutions

Small Area Solutions

Lutron® Shading Solutions
- Sivoia QED®
- Sivoia® QS
- Sivoia® QS Wireless



Small Area Solutions

Sivoia® QS Shading Solutions:

- Sivoia QS is part of Lutron's new technology platform
  - **Sivoia QS** shades use hardwired controls
  - **Sivoia QS Wireless** shades use Lutron's Clear Connect™ RF technology
    - Absence of communication wiring makes this system ideal for retrofit installations
- Sivoia QS and Sivoia QS Wireless both operate the entire family of Lutron shading solutions

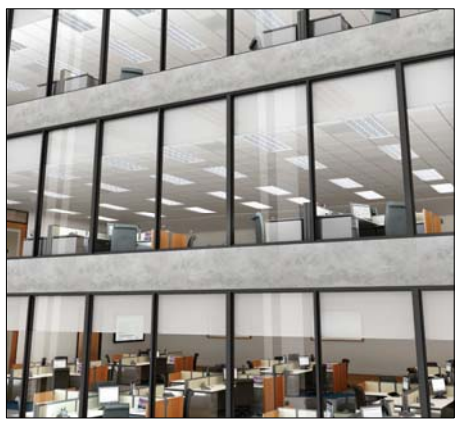
Whole-Building Solutions

LUTRON

save energy with Lutron

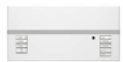
Problem

- No central control
- All or none mentality



What is Quantum?

- Ultimate level of interoperability and scalability for lighting control
- Manages both electric and natural daylight through automatic and manual control

Quantum Layer	 Quantum 				
Sub-System Layer	Sensors Wired or Wireless 	Digital Ballasts 	Grafik Eye QS 	Sivoia QS Shades 	Panels 

Configure/Control and Monitor

- By adding Quantum, systems can be easily scaled to control multiple floors, an entire building, or an entire campus
  - Configure, control, manage, monitor, and report on all the lighting in a building from a central location
  - Maximize the use of daylight and minimize waste

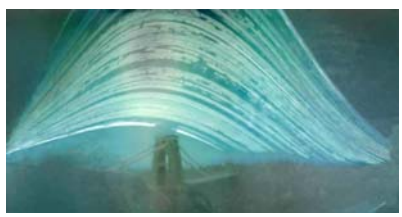
Display

Green Glance

Hyperion Solar-Adaptive Solutions

Calculates position of the sun at any instant in time

- Geographic location (latitude/longitude)
- Facade orientation (north, south, east, west)
- Shade travel limits
- Depth of solar penetration into workspace by area
- Time between shade movements

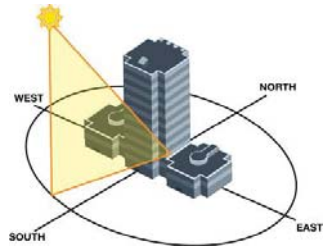


Solargraphy Pin-Hole Photography (6-month Elapse)

Photo ©Justin Quinnell, www.pinholephotography.org

Hyperion Solar-Adaptive Solutions

- Program automatically adjusts shades based on solar position
- Achieve comfort and productivity while saving energy with automated shading
- Transform and optimize available daylight for daylight harvesting while minimizing heat and glare



- Review Typical Office Floor Plan

Thank You – Questions?

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