

ASCEM Conference

Lighting Controls Roundtable Discussion



PRIORITY
SOLUTIONS
GROUP

Why do we want lighting controls?

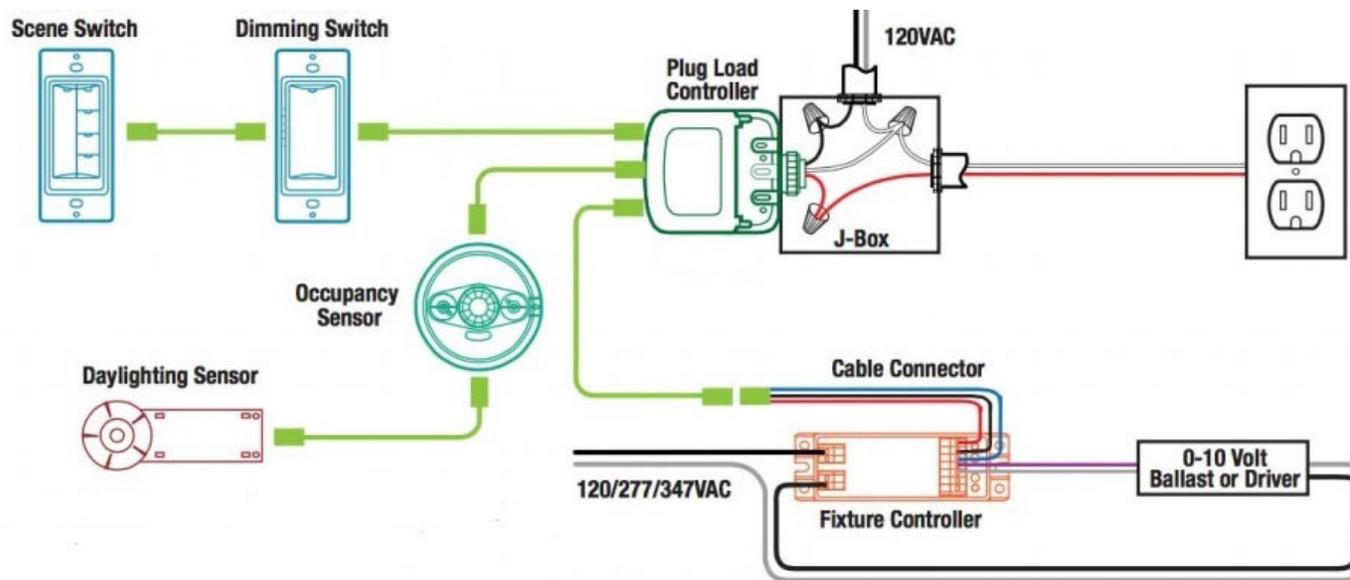
- ▶ Behavior Modification versus lighting controls
 - ▶ Implementation and outcomes
- ▶ Typical Controls
 - ▶ Keyed Switches
 - ▶ Dual switching
 - ▶ Standalone occupancy sensors



Additional lighting control strategies

- ▶ Dimming
- ▶ Daylight harvesting
- ▶ High End Trim
- ▶ Scheduling
- ▶ Demand Response
- ▶ Grouping
- ▶ IoT and system networking
- ▶ Energy reporting
- ▶ Diagnostics reporting

Wired Solutions



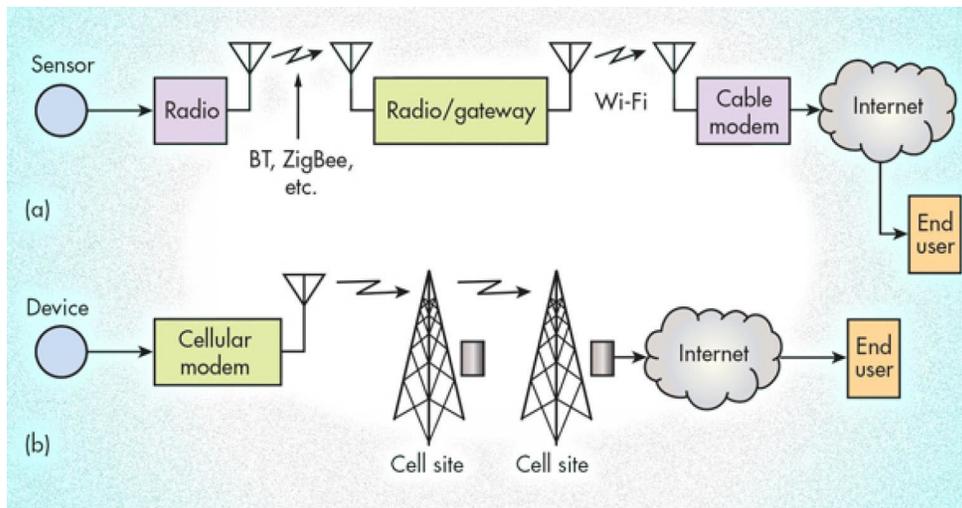
► PROS

- Out-of-box functionality
- Distance only limited by max wire run

► CONS

- High labor cost in retrofit applications
- Limited functionality
- Difficult to modify settings after installation

Wireless Solutions

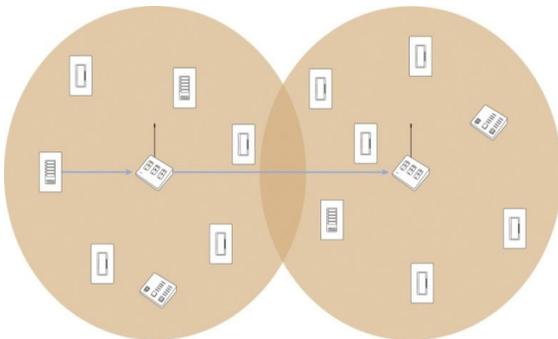


- ▶ Multiple options for wireless communication
 - ▶ Radio Frequency
 - ▶ Bluetooth
 - ▶ WiFi
- ▶ In standalone systems, connection to internet not necessary

Wireless Network Architectures

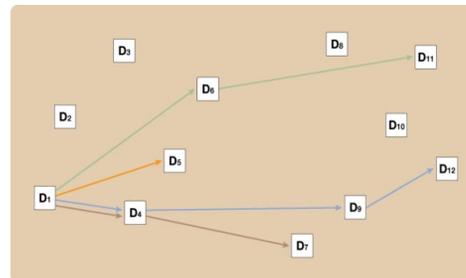
1) Fixed Networks

- Dedicated sending, receiving, and computing stations provide RF coverage
- Messages move through the network in a predetermined manner producing short delivery times
- Location of source and destination device do not affect performance
- Distance is limited by number of repeaters

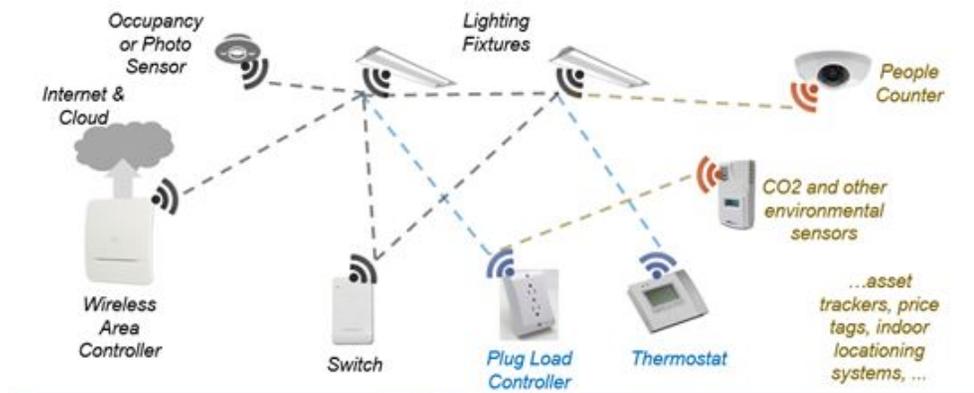


2) Mesh Networks

- System devices form a “matrix” of possible message delivery routes
- Messages can be relayed through any system device
- Assuming enough system devices, no repeaters are required (potentially lower cost)
- Covers further distance



Wireless Solutions



► PROS

- Lower labor cost in retrofit applications
- Great for areas with asbestos or lead
- Can be used in historical buildings
- Increased functionality
- Ease of setting customization post-install

► CONS

- Commissioning required for devices to communicate
- Limited distance for communication



Networked Solutions

► Pros

- Integration with building controls
- Data utilization
- Remote system monitoring
- Highest energy savings

► Cons

- Highest material cost
- Requires IT department

► Wired or Wireless Systems

Analysis of Options

► New Fixtures - No Controls

Energy Analysis

Existing kWh	Proposed kWh	kWh Saved	Annual Energy Savings
3,741,545	1,097,777	2,643,768	\$317,252.16

► New Fixtures with Integrated Controls

Energy Analysis

Existing kWh	Proposed kWh	kWh Saved	Annual Energy Savings
3,741,545	823,333	2,918,212	\$350,185.47

► New fixtures with Networked Controls

Energy Analysis

Existing kWh	Proposed kWh	kWh Saved	Annual Energy Savings
3,741,545	548,888	3,192,656	\$383,118.78

Analysis of Options

Lighting System Comparison

Financial Summary - Total Installed Cost

FINANCIAL	NO CONTROLS	FIXTURE INTEGRATED CONTROLS	NETWORK CONTROLS SYSTEM
PROJECT INVESTMENT	\$447,120	\$579,705	\$785,080
REBATE	\$65,000	\$100,000	\$100,000
NET INVESTMENT	\$382,120	\$479,705	\$685,080
ANNUAL OPERATING SAVINGS	\$399,189	\$439,580	\$479,971
PAYBACK	0.96	1.09	1.43
5 YR LEASE PAYMENT @ 7%	\$7,566	\$9,499	\$13,565
MONTHLY SAVINGS	\$33,266	\$36,631.67	\$39,997.57
MONTHLY CASHFLOW	\$25,699	\$27,133	\$26,432
LIFE CYCLE SAVINGS	\$10,488,731	\$15,362,309	\$25,109,463
NET PROJECT RETURN	\$10,106,612	\$14,782,604	\$24,324,383

** Tax is not included in this proposal

** Rebates are subject to utility company's Terms and Conditions and need to be verified at time of order

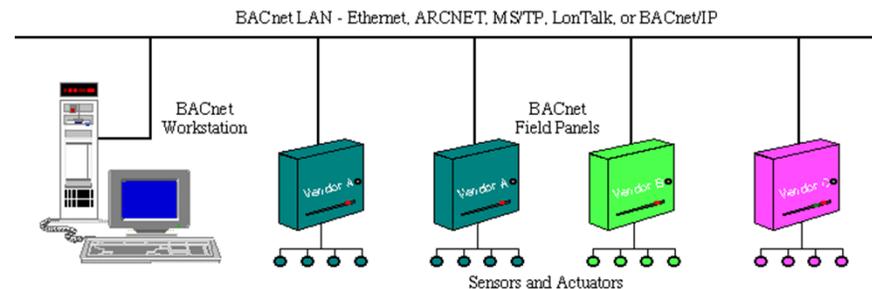


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Integration with other Building Controls



- ▶ Most common protocol for integrating HVAC and lighting systems
- ▶ How do they communicate?
- ▶ Useful points
 - ▶ Light levels
 - ▶ Peak demand monitoring
 - ▶ Schedules
 - ▶ Occupancy data
 - ▶ Historical energy data



Best Practices - Occupancy Sensing



What are the best locations?



Where to place in the room?



Room sensor versus fixture sensor

Best Practice - Daylight Harvesting



Use multiple daylight rows



Do not implement daylighting on a switching system!



Dim to minimum light level instead of off

Why use lighting controls?



On top of saving energy, lighting controls also:

- ▶ Improve occupant comfort
- ▶ Improve productivity
- ▶ Allow the use of the building to change over time

