Retrofitting Healthcare Buildings

There are over 13,000 hospitals and urgent care facilities in the U.S., treating nearly 200 million patients per year. The demands on these facilities are extreme – they are open 24 hours a day, every day, and have the highest requirements for environmental cleanliness in order to minimize Hospital Acquired Illnesses (HAIs).

Facility operators, maintenance, engineering, sustainability managers and environmental safety managers recognize that lighting impacts both the cost to operate the facility and the quality of the facility as a health and wellness environment. Operationally, the lighting system provides the ambient and task lighting, consuming 43% of the annual energy costs according to the U.S. Department of Energy. It requires specific, time-consuming and costly maintenance to reduce the spread of contaminants. But an LED lighting retrofit also enhances overall patient wellness, visitor experience, and staff productivity and has a quick payback.

Benefits of a Lighting Retrofit in Healthcare Facilities:

From the Patient's Perspective	How does LED lighting affect hospital operations?
It helps patients heal, delivering the right amount and type of light including downtime lighting, without flicker or ballast buzzing	It dramatically lowers energy costs, as much as 70% with controls
It helps define the hospital's brand, attracting patients and investors	It significantly reduces routine maintenance time and costs while minimizing future recycling costs
It enables improved safety and wellness of the visitors and staff using the facility	It can enable digital lighting control of scenes in zones based on location, time and occupancy
Lights are on when and where needed using occupancy controls and scheduling	It enhances the architectural appeal and facility value
	It helps meet sustainability goals and tightening building codes
	Lights are on when and where needed using occupancy controls and scheduling thus optimizing electrical consumption

Common Types of Hospital Lighting

There are two common types of indoor lighting applications in a healthcare building:

1. **Ambient Lighting – Standard Height or Low Bay Areas**
   Ambient lighting in the low bay areas of a healthcare building, such as the waiting areas, hallways, patient rooms, examination and treatment rooms, surgical and imaging areas, may use linear T8 LED tubes or LED fixtures. By adding occupancy sensors and controls Energy Savings, Safety, and Productivity in these spaces can be improved. Universal Lighting Technologies' numerous linear LED retrofit kits and lamps, flat panel and troffer fixtures, vapor tight fixtures and lighting controls deliver value throughout the facility and grounds.

2. **Signage Lighting**
   Outdoor signage at a healthcare building helps with advertising and conveys information to direct patients and visitors to specific areas of the facility. Universal Lighting Technologies' LED Drivers and Sign tubes are the perfect and economical way to efficiently illuminate these signs and are easily installed.

Common Types of Lighting Controls:

1. **Stand-Alone**
   Wired or wireless occupancy control for a defined space, usually individual rooms and private offices.

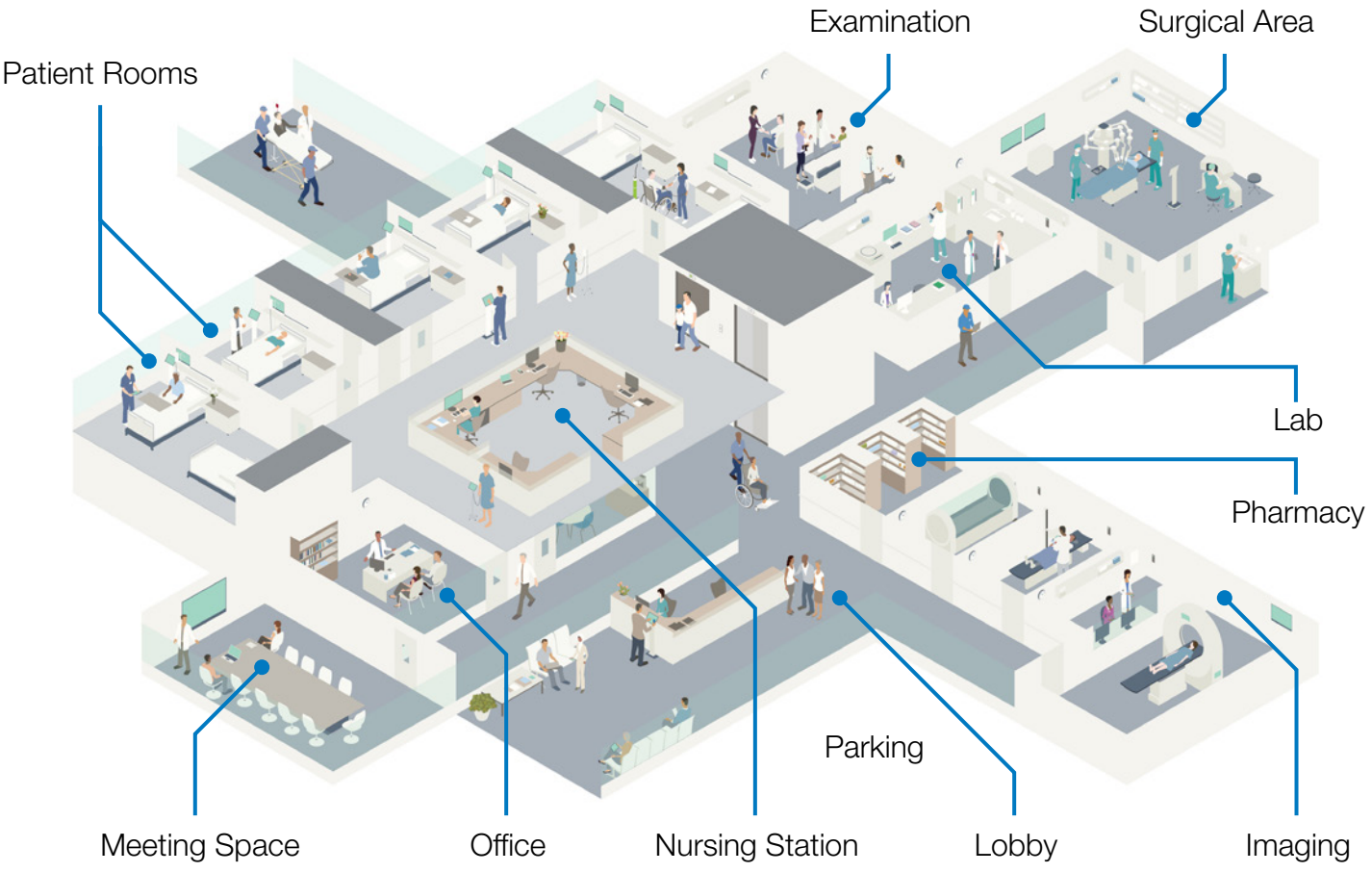
2. **Networked**
   Wired or wireless occupancy, scheduling, and advanced modes to manage lights throughout an entire facility.

Why Use Lighting Controls?

Building codes will require lighting controls for most new construction facilities. Depending on the extent of the lighting retrofit in existing facilities, controls may also be required. Facility operators or managers may also want to include controls in their retrofit even if they are not required because the controls cost can be quickly recovered from the additional energy savings by adding controls.

What type of Lighting is used in a Hospital?

Lighting is used throughout a healthcare facility and on the facility grounds. The example below of a hospital shows some of the many areas that have ambient lighting within the main building. The type of fixture used for ambient lighting depends on the area in which it's installed. For example, an office may have a decorative fixture whereas a lab or imaging area might use a vapor tight linear fixture.



Top Benefits of LED Lighting:

✓ **Energy Savings / Energy Efficiency**
LEDs use less power. This lighting technology is up to 50% more efficient than fluorescent and HID lamps, before adding controls that save even more energy. This is especially helpful in places that are lit for extended periods of time. Look at Efficacy (lumens/watt) when doing comparisons between LED and other light sources.

✓ **Lower Maintenance / Longer Lifespan**
Traditional light sources have short lifespans relative to LEDs, and cycling, temperature and other environmental conditions can adversely affect those lifespans. When a fluorescent or HID reaches it's end of life, the result is a dark space which interferes with building function and demands immediate attention. End of Life for LEDs means the light output has gradually degraded (probably without notice) to about 70% of its original value. This luminaire will continue to operate and provide light to the building occupants. It does not demand an immediate response.

✓ **Safety and Productivity**
LED lights efficiently direct light down to the workspace. The quality of light improves safety and productivity. There's no caving, shadows are minimized, and the color is consistent across the space. With occupancy sensors, employees and visitors will never be in the dark, even after hours. LEDs are environmentally friendly. They contain no toxic mercury or lead, which is safer and reduces recycling costs.

✓ **Architectural Appeal and Building Value**
LED lighting fixtures, like the Professional Volumetric Series from Universal Lighting Technologies, delivers energy savings, maintenance savings and quality of light. But it also makes a striking visual impact on the appearance of the space. The old 9-cell or 18-cell parabolics are replaced with a modern, contemporary design that adds value to the facility.

✓ **Sustainability**
One of the greatest challenges for a Health Facility Manager is to reach sustainability goals and stay ahead of tightening energy codes. An LED lighting retrofit addresses the anxiety over code compliance by deep energy usage cuts. To add even more future-proofing, add controls to manage dimming and detecting natural light levels and occupancy.

✓ **Better Light Quality**
There are four parts to superior light quality that a LED light source delivers compared to other light sources. Together, these can have a dramatic effect on the value and quality of the experience in a space and can improve the overall health of its employees and patients.

- **CRI (Color Rendering Index):** LEDs are available with a standard >80 CRI and high color rendering >90 CRI to provide high color rendering for demanding applications. Recent fluorescent systems had CRI's of >80 while older fluorescent systems had CRI's of >70.
- **CCT:** LED lights are available in a wide range of correlated color temperatures (CCTs) from warmer, more yellowish incandescent white, to cooler, more bluish daylight
- **Distribution:** LEDs are directional light sources, dispersing light in one direction, as opposed to other light sources that are omni-directional and require reflectors to bounce lights back into the intended space or suffer light loss
- **UV/IR:** LEDs produce little UV or IR as compared to other light sources that can waste electricity as Infrared (IR) or radiant heat. Furthermore, LEDs emit virtually no Ultraviolet light (UV), which can damage materials.

Top Benefits of Lighting Controls:

✓ **Energy Savings**
Lighting Controls automatically control lights through ON/OFF, Dimming, and scheduling to optimized lights when and where it's needed thus saving energy.

✓ **Extending the Life of Lights**
Controls will extend the life of lights because they are only used when needed or dimming to an appropriate level to maximize daylight.

✓ **Comfort**
Lighting controls can automatically adjust lights to a preferred light level either through daylight harvesting strategies, dimming controls, or even tuning light levels for brightness and warmth to create comfortable environments.

✓ **Environmental Impact**
Saving energy is a positive impact on the environment.

✓ **LEED Certification**
Using Lighting Control systems and strategies are beneficial to acquiring points towards LEEDs certification.

Healthcare Facility Manager Challenges of an LED Lighting Retrofit

Funding the retrofit	An LED and controls retrofit pays for itself quickly, but there's still the challenge of funding the upfront retrofit project. There are several ways to do this including an Energy Savings Performance Contract with an ESCO, allocating internally funding, or subscribing to a Lighting as a Service (LaaS) solution. Universal Lighting Technologies makes it easy to explore these options by locating an Energy Select Partner in your area.
Overcoming uncertainty about performance	It's important to evaluate your facility requirements and the options available for a retrofit. A retrofit project plan by Universal Lighting Technologies or your local Energy Select Partner will help design the plan and run the numbers on expected performance.
Figuring out payback, ROI and utility rebates	A LED retrofit project typically has a short payback period. The size and type of facility, local energy rates, utility company rebates, and future maintenance costs are just a few factors in the calculation of ROI and payback. Universal Lighting Technologies has a ROI Calculator, Energy Select Partners and our Encentivizer Rebate Search Tool at your disposal to help you minimize your upfront costs and determine how fast your investment pays off.
Navigating through all of the options to make informed decision	A lighting retrofit project can be a challenge to set up, plan and implement. If it seems overwhelming, find your local Energy Select Partner. They're experts at guiding you through the process and preparing a plan and analysis that will answer all of your questions. If you want to learn more on your own, Universal Lighting Technologies also hosts the Universal University, our online knowledge center for everything LED.

Encentivizer™ is a trademark or registered trademark of Encentiv Energy

Comparing Installation Options

Replace the fluorescent tubes with plug and play ballast driven LED tubes

[+] Pros: This is the fastest way to retrofit – simply change the traditional tubes with compatible LED tubes. It maintains the look of the existing fixtures and has the maintenance benefits of LED lighting.

[-] Cons: Because the fluorescent ballast is left in place to power the LED tubes, the extent of rebates may be less than those offered for full fixture conversion or replacement to LED. The ballast may not be compatible with dimming, limiting the ability to control the light levels. The age of the ballast may still require additional fixture maintenance in the near future.

Replace the fluorescent tubes with a direct wire (Ballast Bypass) LED tube

[+] Pros: This approach also maintains the look of the existing fixture with a very efficient system that is rated for at least 50,000 hours.

[-] Cons: Although it is quick and easy to install, this requires an electrician to rewire the fixture to use these lamps. It is as easier for the electrician to install than replacing a ballast.

Convert traditional fixtures with a LED retrofit module or LED kit (includes tubes and LED driver)

[+] Pros: This approach delivers greater energy and maintenance savings (eliminates ballasts that will eventually fail) and maintains the look of the original fixture. Now the fixture

has been converted to LED making it controllable and eligible for greater utility rebates. This solution provides superior lumen maintenance than an LED tube retrofit.

[-] Cons: It has somewhat higher upfront costs and is a more complicated project, requiring an electrician.

Replace existing fixtures with new LED fixtures

[+] Pros: This is an opportunity to maximize energy savings and utility rebates while refreshing and modernizing the look while providing controllable lighting fixtures. Replacing the fixture generally provides the highest Utility Rebates.

[-] Cons: Will require code compliance and likely, the need for lighting controls (which has its own benefits). The upfront cost may be higher.

Control Considerations

The best time to add controls to your facility is during your LED retrofit project. Access to areas, use of contractors, and limited disruptions are all to adding controls during your retrofit. As well, the added energy cost savings are maximized when using lighting controls so the sooner the controls are used, the sooner the increased savings can be achieved.

To minimize construction costs, retrofit projects need to be as time efficient as possible. Opening up walls and fishing control wire through walls takes time and adds costs. Wired lighting controls systems need to have network control wires run so they tend to be more commonly used when walls are open during a retrofit. With Wireless lighting control systems, controls wires are not needed and therefore make for an ideal solution for adding lighting controls to retrofit projects.

Healthcare Building Payback Savings Example:

ENERGY:			Power (W)	Annual Hours	KWh	Annual Energy Cost
EXISTING	2x4 Troffer	3 x F32T8	88	6000	528	$52.80
RETROFIT	LRK Retrofit	LRK24-46L	42	6000	252	$25.20
					Annual Savings	**$27.60**

LABOR:	Material	Labor	Quantity 10-years	Cost
Lamp replacements	$20.00	$10.00	2	$60.00
Ballast replacement	$21.00	$20.00	1	$41.00
			10-Year Total Cost	**$101.00**
			Annualized Cost per Year	**$10.10**

** Energy Consumption rate of $0.10/KWH*

42W Replaces 88W =

$37.70

Annualized Savings per Fixture

How to Finance the LED Retrofit Project

LED lighting retrofits provide fast paybacks and continue to deliver energy savings for many years. Three financing strategies for the upfront investment are described below.

1. **Energy Savings Performance Contracts (ESPC)**
   An ESPC is an agreement between a building owner and an energy services company (ESCO) that identifies, designs and installs energy-related improvements and guarantees their performance. ESPCs are typically structured so that guaranteed energy cost savings are large enough to cover principal and interest payments for financing. A performance contract often includes continuing operations and maintenance services. **Universal Lighting Technologies has an online tool to help you find a local ENERGY Select Partner to plan your retrofit project.**

2. **Internal Cash**
   Funding may come from the healthcare building's operating or capital budget. This is often the fastest and most direct way to pay for energy-related improvements. One way to reduce the upfront cost of the retrofit project is to identify local utility company rebates, which vary based on the LED product, controls, square footage and location. The rebates can be significant. **Universal Lighting Technologies has an online tool to help in the identification of eligible products and utility rebates. Try the Encentivizer Rebate Tool and see how much you can save on your retrofit project.**

3. **Grants**
   Grants are external sources of capital that hospitals do not need to repay. They can help to lower the overall cost of hospital energy-related improvements, enhancing project economics, but restrict their use in the project. While grants are an attractive source of funds, they are scarce and often require a time-intensive grant application process. Check the Database of State Incentives for Renewables and Efficiency (www.DSIRE.org) to search for incentives in your state.

4. **Lighting as a Service (LaaS)**
   Similar to an ESPC, a LaaS agreement, now commonly available through local distributors, is another option to finance a lighting retrofit project. LaaS agreements include the cost of the planning, materials, labor, and installation, plus maintenance over the term of the agreement. There is no upfront cash required. The cost of the lighting retrofit project is paid by sharing the energy savings with the lessor until the retrofit project has been paid for, typically 1-3 years. Once the retrofit project has been paid off, the healthcare facility retains 100% of the energy savings and the installed lights. This type of service arrangement is often a better option than a traditional leasing agreement, which is merely a financial transaction and doesn't use the energy savings as a means of financing the agreement.

Common Solutions for Healthcare Spaces

Universal Lighting Technologies makes a broad range of LED retrofit products for healthcare applications. Use the chart below to start your exploration of Universal Lighting Technologies solutions for the patient and staff areas of your healthcare facility.

		Patient / Visitor Areas									Staff Areas					
		Lobby / Foyer / Restrooms	Hallways / Stairwells	Imaging / Surgical Areas	Examination / Treatment Rooms	ICUs / Isolation Areas	Meeting Spaces	Restrooms / Locker rooms	Retail Shops	Parking Garages	Nursing Stations / Corridors	Labs	Pharmacy	Food Service / Storage	Storage Rooms	Docks / Warehouse
Tubes	Ballast Driven Linear T8 Tubes	X	X		X	X	X	X	X		X	X	X		X	
	AC Direct Linear Tubes	X	X		X	X	X	X	X		X	X	X		X	
	Coated Linear T8 Tubes	X	X	X	X	X	X	X	X		X	X	X	X	X	
	Ballast Driven Linear T5HO Tubes										X	X	X		X	X
	AC Direct Linear T5HO Tubes										X	X	X		X	X
Kits	Linear Retrofit Kit T8 Tubes and Driver (LT+D)	X	X		X	X	X	X	X		X	X	X	X	X	
	Low Power Linear Retrofit Kit T8 Tubes + Driver (LT+D)	X	X		X	X	X	X	X		X	X	X	X	X	
	Linear Retrofit Kit (LRK)	X	X		X	X	X	X	X		X	X	X	X	X	
	High Bay Retrofit Kit (LRK44)															X
	Retrofit Assembly (LRA)	X	X	X	X	X	X	X	X		X	X	X	X	X	X
	LED Driver Upgrades	X	X	X	X	X	X	X	X		X	X	X	X	X	X
	Professional Retrofit Kit (PRK)	X	X		X	X	X	X	X		X					
Fixtures	Professional Volumetric (PLA)	X	X		X	X	X	X	X		X					
	Volumetric (VLA)	X	X		X	X	X	X	X		X	X	X		X	
	General Prismatic (GPA)	X	X		X	X	X	X	X		X	X	X		X	
	Wraparound (WRP)	X	X		X	X	X	X	X		X	X	X	X	X	X
	Linear High Bay (BLC)															X
	Industrial Bay (BLI)															X
	Vapor Tight (VT)	X		X		X		X		X		X		X	X	X

Our Lighting Controls Partner

Douglas Lighting Controls is part of the Panasonic Group of Companies as is Universal Lighting Technologies. We share a common goal of making lighting systems more effective for our customers.

Douglas Lighting Controls has been a leading provider of lighting controls in the North American market for over 50 years. The chart below provides an overview of their lighting controls solutions that should be considered during your LED retrofit upgrades.

	Occupancy Control	Daylight Harvesting	Scheduling	Facility Wide Control	Remote Access	BACnet
Stand-Alone Wired	X	X				
Stand-Alone Wireless	X	X				
Networked Wired	X	X	X	X	X	X
Networked Wireless	X	X	X	X	X	X

Resources for your Retrofit Project

- Speak to a Local Energy Sales Manager about your Project: marketing@unvlt.com
- Search for your local utility rebate program for qualified products with the Encentivizer Rebate Tool: https://unvlt.com/support/esco-rebates
- Evaluate your ROI with this online lighting proposal tool: https://unvlt.com/support/roi-calculator
- Request samples: marketing@unvlt.com
- Need a lighting audit, contact marketing@unvlt.com.
- Find an ENERGY Select partner in your local area: https://unvlt.com/support/energy-team-support
- Explore Universal's retrofit educational article and video series: https://unvlt.com/products/led-retrofit-kits-luminaires/
  - LED Benefits
  - Common LED Specs Explained
  - LED Lighting Top Tips and Things to Avoid
  - Understanding L70 and Why It Matters
  - Maximizing LED Lighting Payback
  - LED Lighting Retrofits Start with a Plan
- Check out Universal's Retrofit Capabilities: https://unvlt.com/support/energy-team-support
- Learn more with Universal's Commercial Building Capabilities Brochure: https://unvlt.com/pdf/applications%20docs/Commercial.pdf

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