

# NYC LOCAL LAW 97

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## **Leverage Lighting Investments Today for the Demands of Tomorrow**



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## EXECUTIVE SUMMARY

**Local Law 97 (LL 97)** mandates significant increasingly stringent carbon reductions for NYC buildings over 25,000 sq ft, demanding net zero emissions by 2050. Quality lighting and intelligent lighting controls play a pivotal, early-stage role in achieving compliance with building performance standards (BPS), and deliver enterprise-wide impact. Integrating internet of things (IoT) building controls presents unique opportunities to further reduce operating expenses, while transforming the organization.

The latest LED lighting – combined with intelligent sensors and controls and integration with building management systems – slash lighting energy consumption up to 88% and unlock infinite potential value propositions. Premium LED luminaires ensure the long-term reliability and advanced controls compatibility demanded for code compliance, and capitalize on investments in line with any ESG goals and strategies.

Upgrading to high-performance lighting fixtures enhances the occupant experience, often differentiating properties in a competitive real estate marketplace. Research shows that different lighting installations can

- represent the space as energizing, comfortable, or visually appealing
- improve task performance
- empower individuals with control over their lighting to boost motivation
- diminish business interruptions due to upgrades and maintenance

Notably, even small changes in lighting yield outsize returns. Effective, attractive lighting cultivates greater well-being in visitors and occupants.

IoT (internet of things) smart sensors and controls transform a lighting system into a comprehensive building intelligence platform. They leverage data on energy consumption, occupancy, and environmental conditions, inspiring proactive facility management and energy optimization. Robust risk management, including SOC 2 cybersecurity certification, ensure data security and system integrity.

Financial incentives such as tax credits, subsidies, and property tax abatements continue to fuel the adoption of energy-efficient lighting technologies and advanced controls. Today, avoiding penalties for non-compliance with **Local Law 97** is a crucial financial driver, stressing the importance of highly reliable and effective electrification upgrades.

Caveat emptor: not all LED lighting retrofit products are created equal. Inexpensive solutions can degrade the visual environment and bring unexpected (but predictable) maintenance headaches and expenses. Further, basic lighting controls will not provide the premium benefits that contribute to a building’s decarbonization results.

Intelligent lighting bolsters long-term property values and delivers strategic advantages for NYC building owners and other stakeholders. Beyond compliance with **Local Law 97**, scalable and future-proof lighting and energy management solutions propel organizational sustainability toward a decarbonized future. Their synergy maximizes investments in compliance, enhancing operational efficiency through advanced technologies and client partnerships.

## INTRODUCTION

As New York City advances its ambitious climate goals, building owners and operators are challenged to navigate increasingly stringent decarbonization regulations under **Local Law 97**. This cornerstone of the city’s strategy to reduce carbon emissions, mandates that buildings over 25,000 square feet achieve net zero operating emissions by 2050.

Throughout the buildings sector, the goal of compliance is not just to avoid penalties, but to capitalize on strategic opportunities that enhance property value and contribute to the enterprise’s triple bottom line.

- Achieve compliance
- Reduce operating costs for ROI
- Advance sustainability and ESG goals
- Optimize operations
- Enhance property value
- Future proof

Lighting, an oft-underestimated but fundamental aspect of building infrastructure, can propel this transformation. Modern LED lighting systems, coupled with intelligent controls and IoT-enabled integrations, supercharge investments to reduce energy consumption; they elevate the occupant experience and ensure compliance with future building performance standards (BPS). Moreover, as the backbone of data collection and integrated controls, these systems have the potential to unleash advantages across the enterprise.

Superior LED light sources deliver consistent illumination over a long service life: sustained quality with minimal degradation. The result is enduring energy savings, that meets performance standards, and occupant satisfaction.

A correct replacement luminaire will also improve the ambiance of the space, enhancing employee retention, occupant satisfaction, and productivity. Numerous real-task studies have demonstrated that interior lighting impacts health, well-being, and task performance (P.R. Boyce, Human Factors in Lighting 2014).

Because requirements (and codes) change over time, owners require the flexibility to customize, configure, and easily reconfigure lighting to meet exacting needs and preferences. Investing in state-of-the-art lighting systems ensures simple, wireless upgrades; easy maintenance; and a cohesive visual experience.

Unfortunately, many LED retrofit lamps and kits on the market may degrade both operations and the visual environment, to the expense of occupants, visitors, and finishes and furnishings. Do not automatically expect compatibility with existing lighting controls or advanced, intelligent controls. A cheap, poorly matched retrofit may indeed require higher energy consumption to achieve equivalent light levels.

As the real estate market continues to evolve, the integration of smart lighting solutions represents not just a compliance strategy but a significant opportunity to differentiate properties in a competitive marketplace. With the right approach, building owners can turn regulatory requirements into a catalyst for optimization and growth, ensuring their assets remain attractive, efficient, and resilient in the face of future challenges.

NYC building owners, managers, and stakeholders require tools and information to navigate the complexities of decarbonization, while positioning their properties at the forefront of profitability, sustainability, and innovation.

## OVERVIEW OF BUILDING PERFORMANCE STANDARDS

Building construction has operated under energy codes for 50 years. Codes like Title 24 and ASHRAE 90.1 mandate energy efficient design and construction for new and renovated buildings. As climate change concerns escalate, governments and municipalities are shifting towards zero-energy and carbon-neutral building performance codes. These mandate that building operators achieve zero carbon or GHG emissions, regardless of the buildings’ original design and construction.

### The Big Picture

Buildings, including residences, are responsible for almost a third of total US GHG emissions. But in cities, with their efficient transportation, those numbers surge above 50%, reaching 75% in New York City. Thus, NYC building professionals find themselves at the forefront of zero carbon building performance standards (BPS).

Much of NYC’s Greener, Greater Building Plan (GGBP), which spawned LL 97, emphasizes energy consumption transparency through motivational audits and submetering. According to the city, the GGBP may cost \$5 billion and save \$12 billion. Knock-on benefits of efficiency – like new green jobs, improved health for city residents, and scaled-down energy infrastructure – are not included in an owner’s return on investment.

With zero carbon as the goal, there are sufficient carrots and sticks to change the way the real estate market views energy management. Green building certifications like LEED or WELL bring boons like premium property appeal and tenant retention. Just watch as decarbonization benchmarking and emissions standards for buildings emerge in multiple states and municipalities across the US. Intelligent lighting and sustainability upgrades as strategic investments that enhance tenant appeal and long-term property value.

Retro-commissioning and lighting and controls upgrades were adopted early on as low-hanging fruit that can also enhance the occupant experience. **Local Law 88** requires that existing buildings meet the current energy code before 2025. Using today’s LED lighting and basic controls to replace legacy technologies accrues energy savings and pays back investments quickly, within 2 to 4 years.

IoT lighting integrated with other building systems brings additional operational improvements and data-driven decision-making.

### What is Net Zero Operation?

Net zero energy means that a building produces as much renewable energy as it consumes. Initially, the industry relied investments in offsite renewable energy, or offsets, to meet net zero due to practical challenges. However, today’s renewable energy and efficiency technologies enable each building to operate at net zero carbon. Eschewing fossil fuels, a greener grid – where the local utility generates electricity using renewables – advances this goal.

Zero energy and zero carbon codes follow a phased adoption process, implementing increasingly strict mandates for operating emissions over time. Strategic investments create long-term value, readying properties for the integration of next-level building controls and decarbonization. In an uncertain future, smart technologies like IoT are future-proof. Aligned with sustainability goals, analytics and space-planning capabilities deftly exploit data, automation, and AI in scalable solutions for building management.

### The Carrot

Fortunately, even basic efficiencies and GHG reductions bring upshot benefits. These include resilience in the face of climate change, housing affordability, and improved air quality. A foot in the door, NYC’s **Local Law 87**, first passed in 2009 requires building owners (for buildings larger than 50,000 sq ft) to conduct energy audits and retro-commissioning every 10 years.

**LL 87’s** energy audit conducts an extensive building equipment/asset inventory, uncovers energy-saving opportunities, and optimizes existing systems through retro-commissioning. Such audits can propel building operations to higher efficiency and effectiveness, and may be required for rebate and incentive programs

NYC’s benchmarking code (**Local Law 84**), requiring annual measurement and reporting of energy consumption, has also been in effect for 15 years. The city has established a database for large buildings, serving to compare energy consumption amongst buildings.

### Local Law 97

**Local Law 97** (2019) sets carbon caps for buildings. The phase that took effect in January 2024 includes buildings greater than 25,000 sq ft and will ratchet up emissions limits (per sq ft) every 5 years. Each building’s carbon limit depends on its size, property type and compliance year. (**So do consult a local compliance professional.**) The goal is for covered buildings to achieve net zero operational emissions by 2050.

A building’s operational carbon footprint encompasses its total energy use across a variety of fuel types, such as electricity, natural gas, or fuel oil. The law assigns a “carbon coefficient” to specify the carbon content for each fuel type. A building’s annual emissions are determined by combining total energy use for each fuel type multiplied by its corresponding carbon coefficient.

The carbon coefficient from electricity will decrease over time as the grid becomes greener. For instance, New York State’s mandates for renewable energy predict that a kilowatt-hour of electricity will emit about 50% less carbon in 2030 than it does in 2024. This drives a push for electrification in both the building and transportation sectors.

Under **Local Law 97** there are two primary paths for an existing building to reduce its carbon footprint:

1. eliminating fossil fuel consumption from building systems (like HVAC and hot water) through electrification and
2. implementing energy efficiency measures. Renewable energy credits, local carbon offsets, or battery storage are also options. Certain buildings are exempt, and others, like affordable housing, must follow a different path to decarbonization.

Covering more than 8,000 NYC properties, Article 321 provides a prescriptive path to compliance. According to the nonprofit Urban Green Council, half of all multifamily buildings and one-third of all covered properties fall into this category. In addition to these mandated energy conservation measures and documentation requirements, **LL 97** provides guidance and resources to help owners and building professionals overcome obstacles.

### Risks of Noncompliance

**Local Law 97** imposes penalties for noncompliance (i.e., exceeding the increasingly stringent annual limits) at \$268 per ton of CO<sub>2</sub> equivalent emissions. The city also imposes hefty penalties for noncompliance in filing annual emissions reports.

Penalties incentivize building owners to invest in decarbonization upgrades that offer longer-term ROIs. Some US jurisdictions with BPS laws even publicize noncompliant properties. Buildings that are out of compliance may face reputational damage and decreased property values by discouraging renters or return-to-the-office initiatives.



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# The financial case for quality retrofit solutions and advanced lighting controls: NY Times

The New York Times Building opened in 2007, featuring 52 stories of mixed office and retail spaces. Designed by Renzo Piano in collaboration with FXCollaborative, the glass-clad New York Times Building featured the cutting edge in integrated building technologies when it opened.

As 2020 loomed, the Times' building-management team sought to benefit from maturing LED lighting technology.

*"The fluorescent technology was outdated, and The New York Times management knew it," said Attila Uysal of Lumen Architecture, who worked on both the original Newsroom Office lighting and the 2022 refurbishment to LED. "They knew it had to be compatible with the existing light fixtures and digital control system. It was a complex retrofit with a lot of details."*

The Times building-management team tested a variety of LED retrofit products, including T5 LED replacement lamps and off-the-shelf retrofit kits. But the options they explored initially were just not compatible with the original Zumtobel fixture. Either they failed to improve energy efficiency, or they produced irregular beam patterns or were overly expensive to install.

The Times staff brought in Attila Uysal, the original lighting consultant, now with Lumen Architecture in New York City. Uysal narrowed the viable solutions, introducing the Times team to an affordable, custom-developed refurbishment kit from Zumtobel.

This optimized LED solution would meet the energy efficiency requirements and actually improve the overall visual environment.

The Zumtobel NY Times refurbishment kit provides an end-to-end luminous appearance of the fixture itself and broadens the batwing light distribution of the original T5 configuration. The entire chamber behind the metal louver is illuminated, eliminating shadows once thrown by the fluorescent lamp bases and sockets. Thus improving the overall visual comfort of the illuminated fixture.

The way it was designed, a kit can be installed in as little as 20 minutes (half as long as the other kits evaluated), minimizing disruption to the busy Newsroom and offices.

As a company, Zumtobel is focused on significantly reducing energy consumption and CO<sub>2</sub> emissions, pursuing the objective of becoming a climate-neutral company by the year 2025.

## COMMITTED TO ECOLOGICAL LIGHTING THE NEW YORK TIMES LIGHTING REFURBISHMENT INCLUDED:

- 80-90% of the original aluminum and steel fixture reused in the solution
- 50% energy reduction by replacing the source from fluorescent to LED
- DLC Qualified luminaire
- No plastic packaging
- Less cardboard used in the packaging for lighter, smaller shipping footprint



READ THE FULL CASE STUDY  
FOR MORE DETAILS



## LIGHTING RETROFITS: STEP 1 TO COMPLIANCE

Government agencies push the market with building energy codes and building performance codes. They compel building owners and managers to monitor energy consumption and explore lighting upgrades, even those who might not regularly invest in their properties.

### What is a Lighting Retrofit?

Retrofitting encompasses any changes to building systems, equipment, or materials post construction and occupation. As technology develops, building retrofits can significantly reduce energy and water usage. This work can also improve amenities for the building’s occupants and improve the performance of the building.

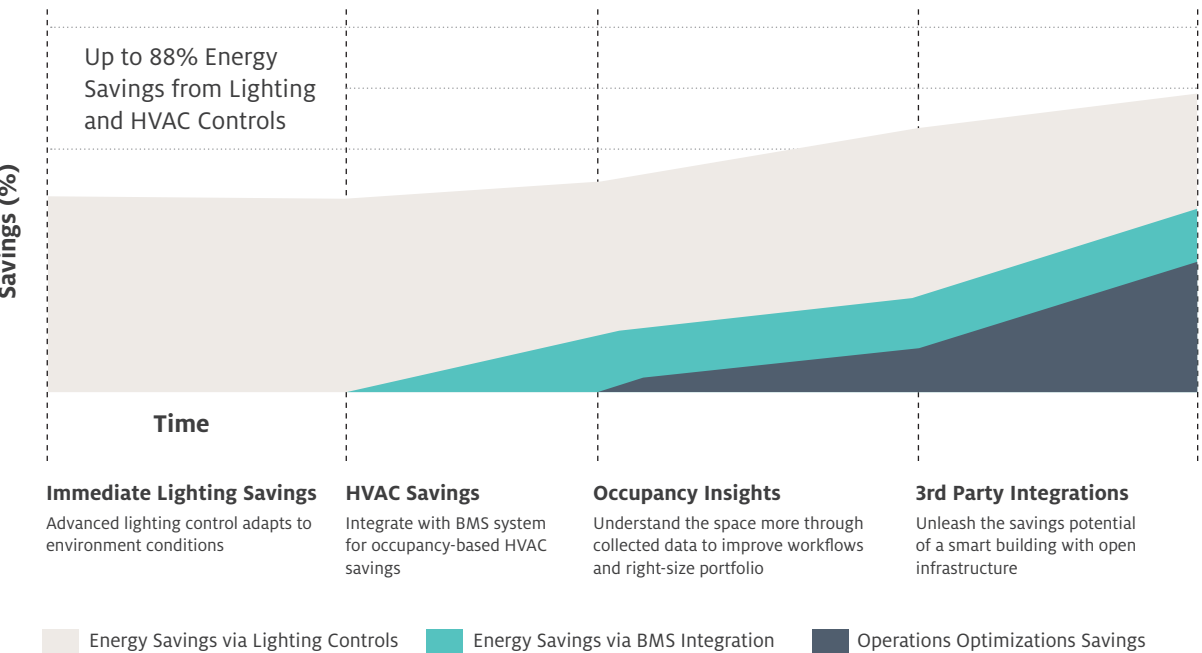
However, in the context of a building decarbonization plan, lighting upgrades compete with multiple systems, valued in terms of decarbonization impact versus cost for installation and maintenance.

Improvements to LED lighting technologies in the 2010s sparked a tsunami of lighting retrofits from legacy incandescent and fluorescent light sources. Today’s LED technologies consume about one-sixth the energy of incandescents, and roughly half of legacy fluorescent lighting. Simple retrofits to LED lighting can expect a payback in 2–3 years.

Quality LED lighting combined with one or two intelligent lighting control strategies unlocks savings of up to 88% of legacy installations.

### HOLISTIC END-TO-END SAVINGS AND EFFICIENCY

Continue Progress to Decarbonization Goals with Space Data Analytics and 3rd Party Integrations



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## QUALITY LIGHTING RETROFIT CONSIDERATIONS

Quality leads the agenda in any performance-based lighting retrofit. Long-term compliance, with minimal maintenance, requires consistent performance over the expected service life, with minimal degradation in light output or color qualities. Quality LED lighting solutions produce and deliver lighting efficiently, while intelligent controls use light more efficiently.

Controls provide the flexibility to configure lighting according to the specific programming of the space and the needs of occupants. And as needs change in the future, lighting must often be reconfigured while also achieving a cohesive visual experience. A well integrated system will minimize expensive interruptions to business operations during upgrades, and require minimal, easy maintenance.

### RETROFIT GOALS

- Save energy
- Elevate the aesthetics of the lighting and the space
- Reduce glare, eyestrain, and fatigue
- Enhance occupant satisfaction and productivity
- Optimize product lifetime
- Enhance flexibility of the space

Yes, quality lighting installations meet the visual needs of occupants and visitors. But today’s digital lighting technologies offer expanded options and varied value propositions. Refurbish becomes “up-furbish”.

**Why Not just Replace the Original Lamps with LED Lamps?**

More light bulb bans are coming. California, often a leader, has legislated that all major forms of fluorescent light sources be discontinued, in favor of energy-efficient LED lamps (bulbs) and light fixtures (luminaires).

It sounds easy to just replace all fluorescent lamps quickly with LED tubes: a one-for-one, plug-and-play replacement. However, commercially available LED replacement lamps, and some kits, are not designed for a specific luminaire’s optic and thus cannot reproduce the requisite amount of light or its beam pattern. The result can be glary, cave-like, or entirely insufficient lighting. LED replacement lamps often lack color uniformity or color consistency over life.

Do not expect compatibility with existing lighting controls or advanced, intelligent controls. Retrofit LED lamps and kits may even require higher energy consumption to achieve an equivalent light level.

Furthermore, the luminaire is not tested for electrical safety after an LED retrofit, voiding the warranty and **posing significant safety risks**. Unexpectedly high temperatures and shortened life are also concerns. Certifications like UL and ETL are likely void.

**Therefore, unqualified retrofitting of luminaires is strongly discouraged.**



**Savings reliability**

Where building performance standards are in effect, energy upgrades must deliver the promised energy savings over their expected life. If a fixture’s electrical or controls issue fails to deliver the expected savings, a building owner could face high utility bills and potentially onerous fines from the authority having jurisdiction. This is in addition to the costs of maintenance and interruptions due to downtime.

Widespread lighting retrofits can be inconvenient or disruptive to business operations. Cost-effective fixtures install quickly, within an expected timeframe, with no contractor confusion, overtime, or return service calls. Ask the manufacturer about their failure rate.

**Future-Proofing Assets**

Selecting a new, high-quality luminaire from a company with a proven track record guarantees long-term reliability is essential to meet overarching decarbonization goals. Leading manufacturers will have a longstanding reputation for producing innovative, excellent-quality luminaires with versatile controls compatibility.

When evaluating retrofit lighting systems, look for a quality manufacturer that has demonstrated service over the long term. Look for:

- Product families that are compatible in operation and performance, so that systems can be scaled up or adapted as needs change.
- Extended guarantees (minimum 5 years) with a low failure rate
- Rigorous third-party testing and transparent data on lifecycle performance.
- Legacy lighting fixtures that can be refurbished with UL-tested LED light engines. (Replacing only components of existing luminaires achieves retrofit objectives at reduced costs and lower carbon footprint.)
- Digital lighting control capabilities as standard options to allow further energy savings and infinite potential value propositions.
- Quality retrofit luminaires (and LED retrofit kits that are UL-tested for specific housings) designed with flexible occupant needs and preferences in mind. These will elevate the property value and utility of the space.
- Long-lived products that maintain their illuminance over time, requiring only a wipe down every few years, at most. No relamping needed.

Likewise, a dependable IoT lighting controls company offers future-proof software, firmware, and hardware upgrades. A reliable company will have a proven track record of contributing to customers’ sustainability goals, both small businesses and enterprise-level solutions, spanning decades.

Intelligent lighting controls must also be scalable, to accommodate future operational demands and market conditions as the business expands. Look for:

- Scalable wireless network infrastructure that can orchestrate 10,000+ sensors per building.
- Sensor data collected and transferred via a gateway either to the cloud or on-premises storage.
- Data management on premises or in the cloud for remote processing and reporting.

**RETROFIT PITFALLS WITH LED TUBES AND SOME KITS:  
WHAT TO CONSIDER BEFORE COMMITTING**

1. Insufficient energy savings for compliance
2. Poor-quality illumination or dark areas
3. Glare or harsh appearance
4. Low light levels
5. Incompatibility with existing controls
6. Inconsistent appearance due to poor optical distribution and color variations
7. Unexpected failures
8. Safety issues with retrofit kits or lamps
9. Flicker

# The carrot and the stick – staying ahead

Avoiding penalties for noncompliance brings returns beyond just operational savings. Thus, BPS regulations like **LL 97** incentivize building owners to pursue decarbonization upgrades offering longer-term ROIs. Investing in state-of-the-art digital lighting supports long-term sustainability goals and strengthens market position.

Many property owners have sustainability goals, even explicit environmental, social, and corporate governance (ESG) initiatives. They collect benchmarking and operational data to document progress toward stated goals.

In this age of corporate social responsibility, watch for jurisdictions that publicize noncompliant properties, which could damage an owner’s or manager’s reputation or discourage sustainability-conscious tenants.

Corporate tenants with ESG goals may indeed require a highly energy-efficient or zero carbon building, to be seen as leaders in innovation and sustainability. Improved “green leases” include obligations on the part of both landlords and tenants to enhance operational savings or source renewable energy, or share the costs of zero carbon upgrades. Submetering to track energy use may be used to reward tenants who institute conservation or demand response measures.

Tax credits, subsidies, property tax abatements, and penalty-avoidance serve as essential financial drivers to achieve zero operational carbon emissions. But smart, sustainable, and tenant-friendly technology position the property as a leader.

## TRANSFORMATIVE OPPORTUNITIES WITH INTELLIGENT LIGHTING

A switch from legacy lighting to well-chosen, quality LED luminaires guarantees baseline energy savings of 50%, elevating ambiance well-being and productivity. The longevity of quality LED systems also reduces maintenance costs. A one-time retrofit can eliminate dozens of individual service calls for a single luminaire, and the associated inconvenience.

Opportunities for enhanced ambiance and see ability in the space abound, with associated impacts like improved safety and security, brightness, comfort, wayfinding, appearance, and more.

In most businesses, employees are the primary asset, so recruiting prime talent and retaining trained personnel are both crucial. A comfortable, functional, and attractive workspace leads to efficient operation, as well as employee satisfaction and retention.

Real estate markets with high vacancy rates must attract and retain tenants. Quality lighting with IoT controls represents a relatively inexpensive investment in amenity with tremendous impact on attractiveness that then pulls in higher rents.

**LEED-CERTIFIED VS. NON-LEED-CERTIFIED OFFICE BUILDINGS**

	LEED	Non-LEED
Buildings	2,842	17,755
– Class A	85–	59–
– in Downtown	66–	40–
Average Age –years–	39	46
– Major Renovation	40–	35–
Average Rentable Area	314,000 SF	110,000 SF
Rent –Per SF Per Year–	–38	–29

Source: USGBC, CBRE, CBRE Research 2022

**Non-Energy Benefits of Networked Lighting Retrofits**

It may seem counter-intuitive that LED technologies, with their small power draw, need smart controls to turn them down or off. However, the “non-energy benefits” of IoT controls can deliver greater value than just lower utility bills. Data collection can qualify these non-energy value propositions, helping stakeholders quantify anticipated loss prevention and safety enhancements, extended equipment lifecycles, and more.

According to research by the DesignLights Consortium, non-energy benefits produce several times the ROI of energy savings alone. Further, building operators see significant savings in terms of labor costs. These results are based on surveys, as well as an extensive review of the literature (20+ years). They may be conservative.

**Finally, the research identified a nearly 8% boost in occupant-reported productive time.** Workers identified

- Improved feelings of safety and security
- Improved quality of light
- Improved efficiency and effectiveness in their job

The DLC proposes adding these monetizable values to payback and ROI calculations, and quantifying broader value propositions – such as higher rents and reputation enhancement.



**IoT Smart Lighting**

Adding intelligent lighting controls to a lighting scheme conforms to both traditional energy codes and helps meet building performance standards like **Local Law 97**. Intelligent lighting provides detailed energy reports about consumption and savings for compliance with mandated energy reporting and ESG objectives. A constant stream of data allows for alerts and nimble responses to issues, before they cause outages, excessive energy use, or fines. A BACnet interface (or similar) facilitates centralized access to energy-saving dimming, emergency overrides, fault detection, and demand response cues.

IoT (internet of things) smart lighting solutions can elevate the overall occupant experience over the course of the day and night. Human-centric circadian lighting manipulates luminance, light color, lighting mood, and aesthetics to enhance sleep, mood, and well-being. In one study of federal buildings (Figueiro 2018), workers reported less sleepiness along with feeling significantly more vital, energetic, and alert. Window blinds and lighting should be automatically adjusted in response to available daylight, allowing exposure to daylight and views without glare or undue burden on cooling systems.

**Proptech and Data**

In the age of remote work and evolving technologies, the occupancy costs of real estate can be underestimated. A ceiling lighting system provides the ideal framework for building-wide data collection. Organizations can leverage advanced analytics to optimize space utilization and facility use, resilience, the occupant experience – even right-sizing real estate holdings.

**Electrification Cost Savings**

Beyond sophisticated lighting configurations, occupancy data can be integrated with BMS HVAC controls to prevent unnecessary conditioning of unoccupied or sparsely occupied spaces. In commercial real estate, tenant-centric solutions like controlling lighting and HVAC according to occupancy can realize up to 90% savings utility expenses.

In the move to decarbonization via electrification, investments in power systems are formidable. Intelligently managing loads supports the safety, health, and comfort of employees throughout the day without the need to expand utility service or expensive electrical infrastructure.

**Innovate to Optimize Sustainability Investments**

Investments in building management systems are meant to maximize the value and capabilities of real estate. Building the facility of the future includes redesign and flexible space management that adapts to changing uses and value propositions. Feeding occupancy data into security operations helps protect both assets and personnel. In an emergency, knowing where facilities are densely occupied or completely unoccupied can inform the priorities of first responders.

Particularly in hybrid work environments, facility cleaning and maintenance routines that aren’t adapted to space usage can lead to inefficient deployment of staff. Data can inform and help coordinate maintenance and restocking routes with high-use areas and times. Expensive, labor-intensive schedules may be optimized according to current and past occupancy data.

Further, high-value asset tracking (including personnel and visitors) can be invaluable in reducing costs while maximizing sales, productivity, or safety. Wherever data provides insights on occupant behavior, building operators can exploit potential technical capabilities and cost-per-square-foot savings, even in existing projects.

**Flexible Space Booking**

As remote employees return to the office, they seek flexibility, comfort, productivity, and personalization of their in-office experience. Studies prove that a human-centric approach generally results in more satisfied employees. Allowing occupants direct control of their environment, or AI-driven controls that adjust hyperlocal lighting and HVAC temperature settings, facilitate productivity gains with paybacks far higher than any energy savings. An intelligent desk reservation and building occupant system, usually with an app interface, lets workers choose unoccupied desks where they will be most productive while optimizing space utilization.

CHOOSING IOT SMART LIGHTING

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IoT smart sensors constitute the foundation of more efficient and safer building operations that conform to **Local Law 97**. Beyond lighting, a future-proof smart building infrastructure will unlock unanticipated applications that will add property value and benefit building occupants and operators. AI integrations unimagined (as well as building performance standards yet to come) will require distributed data and controls. Individual luminaires that collect data and integrate with other building systems act as part of a flexible, holistic system.

Integrated into ceiling lighting fixtures, a grid of sensors, gathering information dozens of times per second, produces massive volumes of building and occupant data. Combined with a user-friendly dashboard, the system creates a smart building infrastructure and unlocks advanced applications.

A future-proof, easily upgradeable system is key to meeting future possibilities and demands. Industry-standard communication protocols provide a robust API. For instance, a REST-based API uses HTTP requests to support reading, updating, and creating operations related to data resources. In response to user requests, the server sends data to the client as, for instance, XML, JavaScript, or plain text, for interpretation. Error codes, time stamps, and other information are included.

**IoT Smart Sensors**

In contrast to dedicated hardware devices that control information flow, IoT systems use software to create a virtual network. At the heart of any IoT energy-management system, a software-defined smart sensor measures:

- Ambient light
- Motion/presence (PIR)
- Energy consumption
- Ambient temperature

These sensors should also carry Bluetooth capabilities and wireless connectivity for communications and further integrations.



## ZUMTOBEL AND ENLIGHTED: SMART BUILDING SOLUTIONS

The future focus on IoT is underscored by the global partnership between Zumtobel and Enlighted incorporates Zumtobel's premium LED lighting products with Enlighted's proven IoT sensors and platform. Close technical integration provides a seamless suite of innovative, intelligent lighting solutions for sustainable, efficient building operations and optimal occupant well-being.

### A Sustainable Future

The strategic, global partnership of Zumtobel and Enlighted initially focuses on intelligent lighting for commercial buildings, higher education, and smart hospitals. These systems are galvanizing the decarbonization of vast building sectors. **They maximize energy efficiency and occupant comfort, and provide detailed reporting and analysis for code compliance as well as asset and investment optimization.** Owners and lessees both benefit from savings, plus benchmarking and monitoring of progress towards ESG or sustainability goals.

Meeting benchmarking and building performance standards, like New York City's **Local Law 97**, requires this kind of system-based approach.

: On the one hand, there are regulations and an increasing number of requirements that companies have to meet. On the other hand, however, there are also new opportunities that arise. By utilizing these opportunities, we create added value for the Zumtobel Group and a differentiation. As the sustainability team, we help the organization navigate, trying to create a shared understanding. Ultimately, however, all of this will only work across companies.:

— Sebastian Gann, Zumtobel Group Sustainability Director

Intelligent lighting, coupled with smart IoT data collection and analysis, enables secure integration with multiple building and personnel systems, including advanced operational decision-making and real-time tracking and utilization of valuable assets. The wireless network design brings easy installation, commissioning, and reconfiguration.

Integrated solutions help building managers and owners meet escalating building performance standards and further leverage these investments. Accelerated access to integrated technology solutions, services, and value propositions ensures fast, effective deployment – today and in the future.



T H E   L I G H T



**ZUMTOBEL**



**Enlighted**

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