



# It's not just possible, it's practical

**Philips EnduraLED Retrofits** The new LED lighting from Philips is here, and it can change everything

**PHILIPS**  
sense and simplicity



# The best partner. The best performance. The best portfolio.



## **Why Philips?**

**Because Philips is a global leader in lighting,** and can provide best in class products and services for all of your lighting needs.

**Because Philips is a leader in LED lighting,** and has the most advanced and innovative technology.

**Because Philips is committed to sustainable practices,** and to delivering high-performance, energy-efficient lighting solutions.

For a century and counting, Philips has been a leader in lighting innovations, providing meaningful solutions that transform our world—visually and practically. With end-user needs as our starting point, Philips is driving the switch to energy-efficient products—and shaping the future with exciting new lighting technologies.

## **Why LEDs?**

Advanced white LED lighting improves ambience, energy efficiency, and comfort. Using a new energy-saving and long-lasting lamp technology, today's LEDs open the path to a greener, healthier tomorrow.

## **Why EnduraLED?**

The Philips EnduraLED family of retrofit lamps deliver performance you can count on. EnduraLED: The simple, efficient and sustainable way to upgrade to LED lighting—the future of lighting.

# The best partner

## Creating meaningful solutions

Solid-state lighting is changing the world. And Philips is driving this transformation with a whole new world of light. At Philips, every innovation is driven by the needs of the people, to help them feel more comfortable and to improve the functionality of their surroundings.

The Philips EnduraLED line of screw-in and twist-in retrofits brings all the benefits of LEDs to your current fixtures and systems. They are backed by our technological leadership, unrivaled experience in designing and deploying LED lighting solutions, our market-driven system infrastructure, and the customer care you expect from Philips.

## We understand lighting

Philips is a leading authority on LEDs, investing deeply in its future through research and product solutions. It's more than a mastery of technology—it's knowing what people need, too. We call it meaningful innovation, and Philips EnduraLED reflects this commitment.

Our expertise is total integration of concept and design, manufacturing, and delivery of illumination. Philips innovates with lamps, ballasts, drivers, controls, fixtures and dynamic solutions. Meeting or exceeding today's codes and standards. Backed by third-party and internal testing. Delivering product performance and reliability.



Hospitality Lighting



Retail Lighting



Commercial Lighting

## A leader in LED lighting

	Philips Leadership	Advantage to You
<b>LED Technology Development</b>	<p><b>Industry standards</b></p> <ul style="list-style-type: none"> <li>• Founding member of the Next Generation Lighting Industry Alliance</li> <li>• Spearheading the U.S. DOE's LED "technology roadmap"</li> </ul> <p><b>R&amp;D investment</b></p> <ul style="list-style-type: none"> <li>• Launched program to develop 80 lumens/watt LED-based replacement lamps for 60W incandescents to meet the efficacy of nearly all conventional light sources with U.S. DOE awarded grant</li> </ul>	<p><b>Product consistency and reliability</b></p> <ul style="list-style-type: none"> <li>• Some LED lighting can have large variations in lifetime, performance and color. Philips EnduraLEDs are designed to be stable, dependable and consistent</li> <li>• New ENERGY STAR® criteria for LED lighting</li> </ul> <p><b>Performance assurance</b></p> <ul style="list-style-type: none"> <li>• Philips offers a 3-year limited warranty for all EnduraLED white-light retrofit lamps</li> </ul>
<b>Energy Efficiency and Sustainability</b>	<p><b>Energy efficiency leadership</b></p> <ul style="list-style-type: none"> <li>• Helping develop the U.S. DOE's ENERGY STAR® criteria for LED lighting</li> </ul> <p><b>Green leadership</b></p> <ul style="list-style-type: none"> <li>• First lamp manufacturer to join the U.S. Green Building Council</li> <li>• Phasing out inefficient lighting products as part of the Lighting Efficiency Coalition</li> </ul>	<p><b>Unsurpassed efficiencies</b></p> <ul style="list-style-type: none"> <li>• Philips is a partner that is leading technology development in LED lighting</li> </ul> <p><b>Reduced energy consumption and waste</b></p> <ul style="list-style-type: none"> <li>• With long rated average lifetimes and low-wattage retrofit options, Philips EnduraLED offers more ways to reduce energy use and product use</li> </ul>
<b>Standards</b>	<p><b>Standardization</b></p> <ul style="list-style-type: none"> <li>• Participate in various regulatory associations that create and promote standards specifically around LED lighting</li> </ul> <p><b>Optibin manufacturing</b></p> <ul style="list-style-type: none"> <li>• Uses a special process to minimize the inherent variance of LEDs</li> </ul> <p><b>Color quality improvements</b></p> <ul style="list-style-type: none"> <li>• Creating new Color Quality Scale (CQS)</li> </ul>	<p><b>EnduraLED consistency</b></p> <ul style="list-style-type: none"> <li>• Tested to IES standards, Philips LEDs excel in reliability, stability and performance</li> </ul> <p><b>EnduraLED meets</b></p> <ul style="list-style-type: none"> <li>• RoHS, FCC, UL standards</li> <li>• Philips EnduraLED products can accept line voltage, reducing installation costs and complexity</li> </ul> <p><b>Improved color rendering</b></p>

### We're making LED lighting work better

It requires market leading expertise in LED technology, and an understanding of the complexities and challenges critical to the development of effective LED lighting to be a global market leader. From chips and optics to thermal control and lamp design, Philips EnduraLED retrofits combine advanced technology with products designed for convenience and performance.

See for yourself, just twist-in an EnduraLED retrofit into an existing socket. From the start you can save electricity and maintain that quality of light you have come to expect. And thousands of hours later, EnduraLEDs will still outshine conventional sources with color consistency and stability.

In addition to being the first entry into the L Prize competition, Time magazine names the Philips L Prize LED lamp one of "The 50 Best Inventions of 2009"

Sponsored by the U.S. DOE, the L Prize is the first government-sponsored technology competition designed to spur lighting manufacturers to develop high-quality, high-efficiency solid-state lighting products to replace the common light bulb.

TIME



# The best performance

Delivering new uses of light

**Transforming conventional light sources to LED.** Philips is driving the switch to energy-efficient solutions, and shaping the future with exciting new lighting applications and technologies.

More than that, we care about your success. Getting it right means relying on a leader in quality product design with a solid installed track record. EnduraLED's design addresses key issues: Heat management and overall lifespan. To do this, we combine leading research and product advances in optics, electrical LED packages, lamp shape and heat.

## Quality design and components

The unique performance characteristics of LED lighting demand careful integration of both quality components and design.

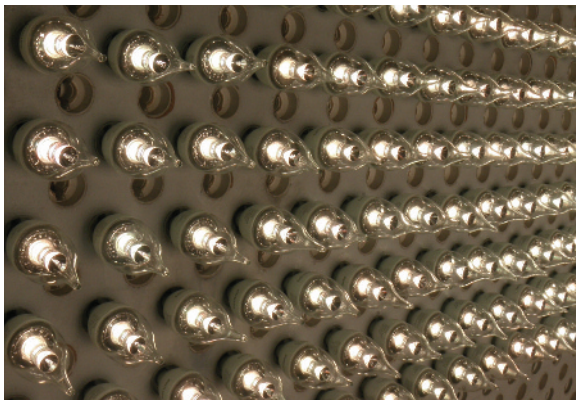
Diode quality is the first step in effective lighting, but the package and components of the lamp are even more important to product life span. For example, heat generated by the electrical modules can severely limit chip longevity. So heat control is vital for long-lasting lamps and fixtures.

Philips EnduraLED lamps, with superior heat sink designs, sustain 70% of initial lumen output at 45,000 hours<sup>1</sup>—that's 5 years of 24-hour use, seven days a week.

## Product testing and compliance

Behind EnduraLED is our commitment to reliability, and to environmental and safety standards and codes.

Our quality process starts with rigorous testing—in the factory and out in the field—to confirm product lifetime and reliability.



Robust testing labs insure product performance.

- Every lamp gets a 48-hour “burn-in” test before shipment
- Samples from each production run are set aside for extended life testing with regular photometric checks until the products reach half of their published life spans
- Reliability tests are conducted with all LED suppliers

While some LED sources boast about diode wattages or high “instant-on” lumens, what matters most is tested light output over time. Philips conducts third-party testing of EnduraLEDs for long-term, thermally stable lumen performance.

LED manufacturing also demands careful sorting and grading of chips. Philips employs a proprietary Optibin technology to ensure consistent, stable light sources. Philips is also at the forefront of improving LED color rendering.

It's a serious commitment—with real results: Each EnduraLED retrofit lamp will deliver performance you can count on, with a 3-year limited warranty period to back it up. We test against the Illumination Engineering Society's criteria for LED lumen maintenance (IES LM-80) and LED luminaire electrical and photometric evaluations (IES LM-79). EnduraLED lamps also meet FCC and Underwriters Laboratories (UL) standards.

## Life-cycle performance and payback

EnduraLEDs are designed as simple retrofit replacements of existing inefficient technology, reducing installation cost and complexity. Further cutting project and maintenance requirements, they consume less energy and last longer than the sources they replace.

## What goes into EnduraLED?

Three leading technologies combine to make EnduraLED lamps excel: Lens optics, the LED electrical package, and the lamp body.

**Optics:** A global leader in lens and optics design, Philips uses precise optical engineering to create beam angles with focus and uniformity.

**LED package:** Diode light sources are embedded in an electrical assembly that stabilizes lumen output and extends lamp life. Our Optibin manufacturing process controls the color temperature of the LEDs. An integral driver, similar to a ballast, allows dimming and regulates lamp performance over time.

**Lamp body:** The EnduraLED thermal and mechanical features are packaged into aesthetically pleasing lamp designs. But their primary function is to control heat, wattage and lumen output—stabilizing the sources and extending lamp life.



### The rewards of better light

The immediate payoff is bright white lighting that enhances any setting.

Long term, you save even more. Just by replacing 100 standard 90W PAR38 halogen lamps with EnduraLED 13W PAR38 lamps, you could save \$4,620 or more in annual energy costs.<sup>2</sup> Even better, these lamps have a rated average life of 45,000 hours<sup>3</sup>, which could cut maintenance and relamping costs to a mere fraction of your current expense.

It's a sustainable choice, too. Less energy means a smaller carbon footprint, and reduced relamping means less waste goes to the landfill.

## Return on a lighting investment

Measures	Philips EnduraLED Features	ROI Benefits
<b>Energy Efficiency and Sustainability</b>	<ul style="list-style-type: none"> <li>• Low energy use</li> <li>• No hazardous substances</li> <li>• Long-lasting, durable products</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced electricity costs</li> <li>• Improved disposal options</li> <li>• Fewer replacements needed</li> </ul>
<b>Rapid Pay-back</b>	<ul style="list-style-type: none"> <li>• Sleek retrofit design</li> <li>• Long rated average life</li> <li>• High efficiency</li> </ul>	<ul style="list-style-type: none"> <li>• Quick retrofit installation</li> <li>• Reduced maintenance and operating costs</li> <li>• Reduced disposal costs</li> </ul>
<b>High Quality Light</b>	<ul style="list-style-type: none"> <li>• Instant-on lighting</li> <li>• Color stability</li> <li>• No UV, IR and little heat</li> <li>• Ambience of traditional sources</li> </ul>	<ul style="list-style-type: none"> <li>• Better performance over time than traditional light sources</li> <li>• Significantly reduces fading, no wasted inventory</li> <li>• Quality ambience</li> </ul>

1) Based on test in accordance with LM-79.

2) Based on replacing 100 90W halogen PAR38 lamps operating 6000 hours/year at a cost of \$0.10/kWh—with an annual energy cost per space of \$5400, with 100 13W EnduraLED PAR38 operating 6000 hours/year at a cost of \$780. kWh may vary depending on geographical region.

3) Rated average life is the length of operation (in hours) at which point an average of 50% of the lamps will still be operational and 50% will not. Rated average life based on engineering testing and probability analysis.

# The best portfolio

Making possible uses where before just didn't seem practical

**Bringing high-quality white LED light to mainstream applications.** EnduraLED is helping building owners in a variety of applications by capturing energy savings and other benefits. Any conventional lighting fixture with a standard socket is a candidate for long-life, energy-saving retrofit LED lamps. Whether it's a simple lamp upgrade or an entire building renovation, Philips EnduraLED lamps are ready for your retrofit challenges.

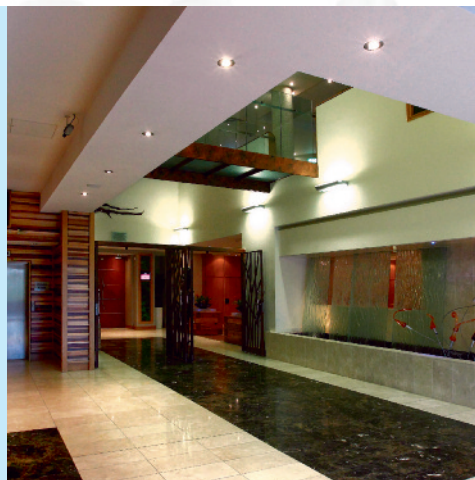
## EnduraLED LED retrofits match your needs for:

- **Color temperature.** Improve ambience and usability with the color temperatures you need. EnduraLEDs range in color temperature from 2700K to 4200K.
- **Consistent performance.** As an example, the EnduraLED 11W PAR30 has a rated average life of 45,000 hours<sup>1</sup>, and color temperature of  $\pm 125^\circ\text{Kelvin}^2$ . This rated average life performance is calculated on the design of the complete lamp—not just the LED chip.
- **Design freedom.** EnduraLED lamps provide the freedom to put more light where you need it with less wattage. They come in a carefully engineered package that simply installs into existing fixtures and sockets—so there is no rebalasting or renovation needed.
- **Range of types.** PARs, R and MR16 spots and floods, A-shape lamps, and frosted and clear candles, are all part of the EnduraLED retrofit family. Many are available with dimming.



## Decorative accents

Retail displays, lobbies, architecture, display cases, and shelves



## 24/7 operation

Corridors, lobbies, and window displays

1) Rated average life is the length of operation (in hours) at which point an average of 50% of the lamps will still be operational and 50% will not. Rated average life based on engineering testing and probability analysis.  
2) Rated average life and color temperature ratings are based upon engineering testing and probability analysis.



## Solutions for every need

Whether for hotels, offices or schools, stores, factories, warehouse or hospitals, the Philips EnduraLED portfolio brings you plenty of retrofit options. Durable and efficient, LEDs can deliver high-quality white light to the most difficult lighting challenges.

	EnduraLED Benefits	Special Applications
<b>Critical for accent and ambience</b>	Designed for superb color consistency and sharp optics, EnduraLED is ideal for close-range and general accent lighting. With no harmful UV radiation and virtually no heat, LEDs won't fade colors and avoids inventory spoilage.	<ul style="list-style-type: none"> <li>• Accent</li> <li>• Focused spot and spotlight</li> <li>• Track lights and decorative</li> <li>• Retail display</li> <li>• Signage</li> <li>• Museum and archive</li> <li>• Heat- and UV-sensitive</li> </ul>
<b>Hard to maintain or replace</b>	With average lifetimes estimated in tens of thousands of hours and great end-of-life lumen maintenance, EnduraLED is perfect for hard-to-reach fixtures or areas that are difficult to maintain.	<ul style="list-style-type: none"> <li>• Escalators</li> <li>• Stairwells and egress</li> <li>• High ceilings</li> <li>• Secure areas</li> <li>• Façade and rooftop</li> </ul>
<b>Around-the-clock operations</b>	Similarly, fixtures that burn 24/7 need to be as efficient and long-lasting as possible. The payback can be quite attractive.	<ul style="list-style-type: none"> <li>• Display windows</li> <li>• Security lighting</li> <li>• Stairwells and egress</li> <li>• Hotel corridors and lobbies</li> </ul>



### Hard-to-reach areas

High ceilings, escalators, elevators, staircases, and corridors



### Ambience and mood setting

Guest rooms, lounges, and lobbies

# Why LED retrofits?

**Meeting today's needs.** Lighting retrofit projects mean improving performance to benefit people and organizations immediately—but with an eye for the future, too. For lighting, that means getting more lumens per watt; longer life from every lamp, better quality and color rendering with fewer resources. It often means upgrading to LED light. To understand how LED lighting offers meaningful innovation today, we've put together this overview of its benefits and challenges.

## The benefits of LED retrofits.

LEDs have long been used for colored lights and signage. Now they're seen as effective for general-purpose, white light. Even better, LEDs are now designed to be used for retrofit lamps in place of conventional light sources, such as incandescent, halogen, and fluorescent.

- 1. LEDs are cost-effective to own.** LED retrofits make sense mainly because the economics are right. They have a long rated average life, which reduces replacement costs. LEDs are very energy efficient, making them green and lean. In many applications, they deliver a fast payback to the owner and user, too.
- 2. LEDs are easy to use.** Long-lasting LEDs are now packaged in traditional lamp shapes that mimic the light sources they replace. The new retrofit products are easy to install: Just take out the old lamps, and screw-in or twist-in the LED replacements.
- 3. LEDs are better for the environment.** LEDs are inherently energy efficient, making them a big part of our sustainable future. They run cool, produce zero UV and infrared (IR), and contain no mercury. Their long rated average life mean less waste and fewer replacements needed. LEDs offer excellent life-cycle advantages, from cradle to cradle.
- 4. LEDs are better for people and property.** LED illumination has been called "harmless light" because it has no UV or IR rays. The light itself has no radiated heat, either. LED retrofits won't spoil inventory or fade merchandise or precious artwork—and they won't prematurely age building finishes.
- 5. LEDs improve ambience and performance.** Today's advanced LED lighting, such as Philips EnduraLED white light retrofits, enhance our buildings in many ways. For scene setting, many LED retrofits are dimmable and offered in both warm and cool white. On a lamp-to-lamp level, LEDs offer superior color point consistency. Combined with high lumen output in directional, well-defined beams, new LED retrofit lamps are a great replacement for conventional light sources.

## LEDs, the greenest of the green.

Lighting accounts for almost 18% of global electricity use, and lighting in the U.S. consumes a fifth of the amount—a cost of about \$40 billion annually<sup>1)</sup>. Yet LEDs could reduce those energy needs, reducing greenhouse gases and shrinking our national carbon footprint.

It's no wonder that LED lighting is championed by green leaders. Among those encouraging LED lighting are the U.S. Green Building Council, EPA's ENERGY STAR®, and the U.S. Department of Energy.

## Choosing the right LED lamps.

At some point, the thinking goes from why to choose LED lamps to how to choose them.

Because LEDs work so differently from other lighting systems, it's important to focus on a few basic performance facts. Always compare LED lamps based on the whole lamp, not just the LED chips. Once you know this and other facts, choosing a lamp becomes much easier.

## Key questions to ask about LED white-light retrofit lamps:

- **How bright?** Key performance measures are output (lumens) and efficacy (lumens per watt). Make sure to learn the delivered lumens of the whole lamp, not the lumens of individual chips or diodes. And for reflector lamps, compare Maximum Beam Candle Power (MBCP), not lumens.
- **What's the color?** For LED lamps, it's not just color temperature, but also color consistency that matters. In addition to the lamp's color temperature, look for a published maximum range of color variation.
- **How long will it last?** Lamps are tested for their average rated life. Make sure to compare the lifetime for the entire LED lamp, not just the chip.
- **What's the light distribution?** You should know if the lamp is for directional lighting, measured in candela, or general ambient lighting, measured in lumens.

1) "LEDs Poised to Outshine all Others in \$4.4B Lighting Market Buildings", Greenbiz.com, <http://www.reuters.com/article/idUS419223718320100520>, June, 2010.

## Philips—creating memorable spaces that simply make life better.

For advanced LED solutions as for all of your lighting needs, Philips is your partner for the future. We pride ourselves on producing tomorrow's products today—and in responding to our customer needs as we go.

### **On the Forefront**

Philips is engaged at the highest level in advancing LED technology. From our unmatched R&D investment to our leadership in key industry groups, we're committed to the success of LEDs as a sustainable lighting solution.

### **Customized Solutions**

With years of experience and time-tested installations, Philips delivers innovative solutions that work. Whether you're planning a simple lamp replacement or an entire facility renovation, we can offer integrated solutions that draw upon capabilities from across the entire Philips group.

### **One Partner, Many Solutions**

Only Philips delivers a full portfolio of lighting solutions, giving customers the luxury and flexibility of choice. And only Philips instills the confidence of partnering with an industry leader.

When it comes to LEDs, Philips is your choice for the **best partner** offering the **best overall performance** through the **best portfolio**.

### **Philips EnduraLED—retrofit LED lamps.**

Once you appreciate the benefits and basics of LED lamps, Philips is ready to help. Take advantage of today's most advanced and efficient lighting—with the confidence that comes with the Philips name.

# PHILIPS

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