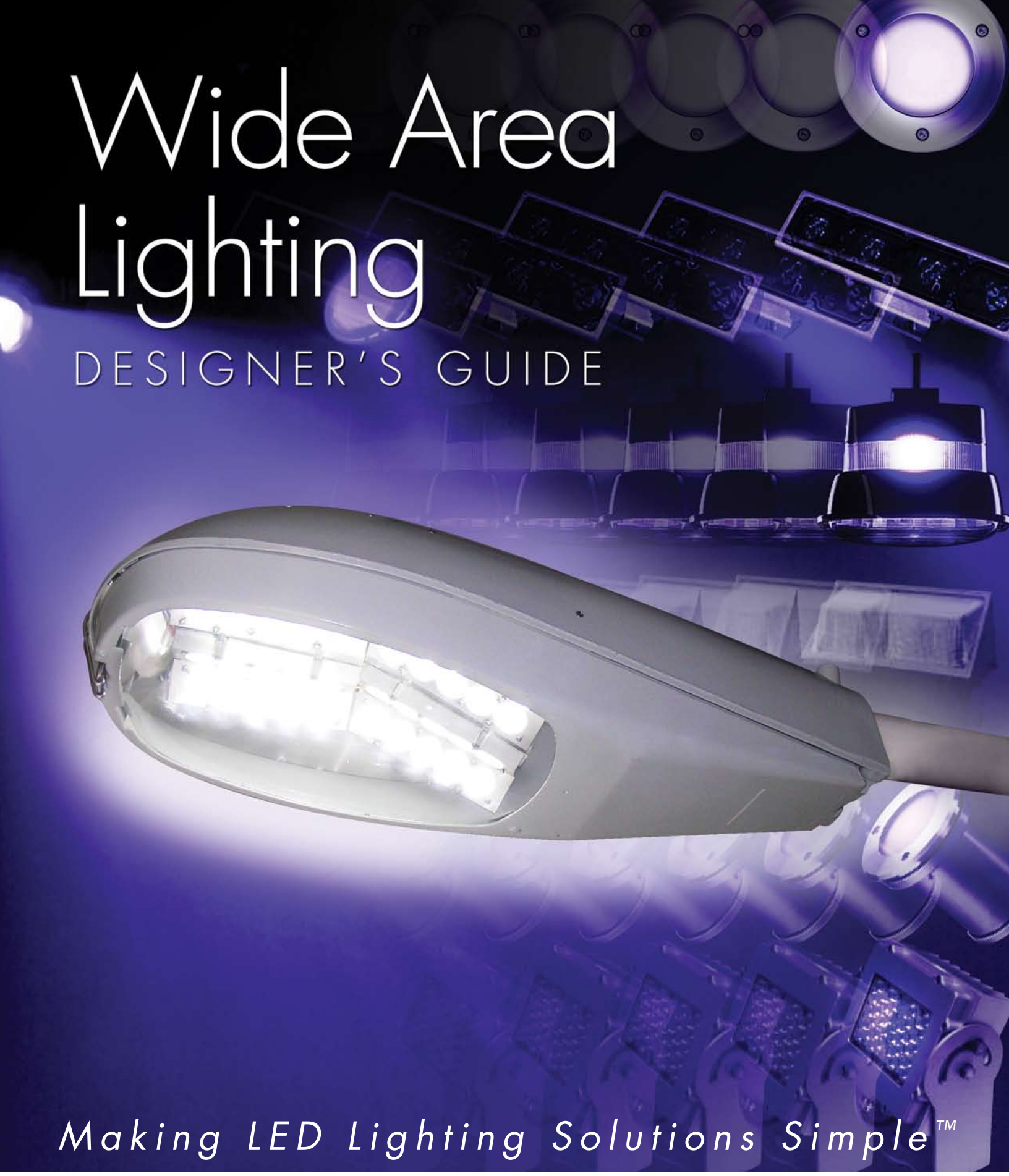
Wide Area Lighting

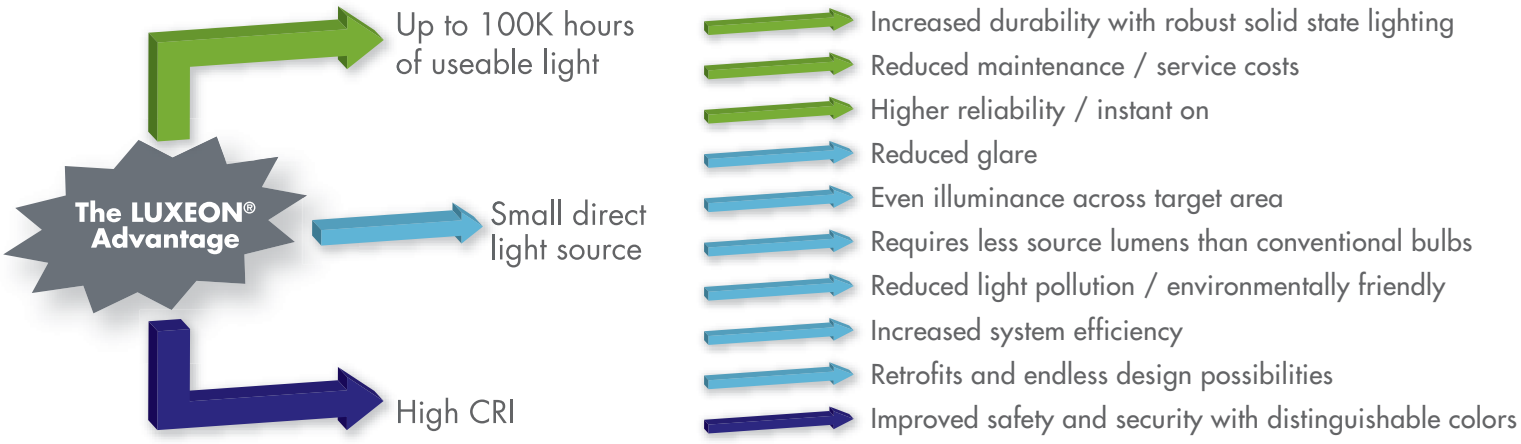
DESIGNER'S GUIDE



Making LED Lighting Solutions Simple™

FUTURE
Lighting Solutions

LUXEON® VALUE PROPOSITIONS



SEGMENTS & APPLICATIONS

LUXEON® LEDs have now enabled never before possible applications which traditionally used HID and halogen bulbs. LED applications include roadway, pathway, warehouse security, parking lot (indoor and outdoor), landmarks, architectural and canopy lights to list a few.

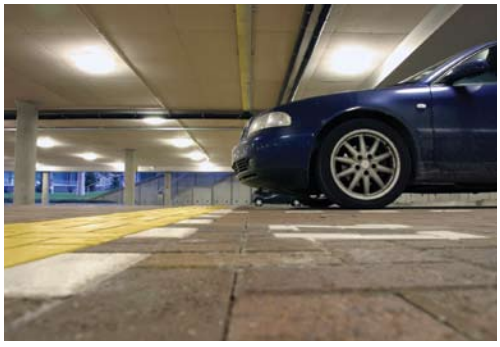
LUXEON® LEDs have rapidly improved in light output over the last few years. Within solid state lighting systems they provide better energy consumption and lower maintenance costs compared to traditional light sources.

Canopy lighting includes airports, drive-through facilities and gas stations.

White LUXEON® LEDs can be used to provide dramatic lighting effects on office buildings and architecture.

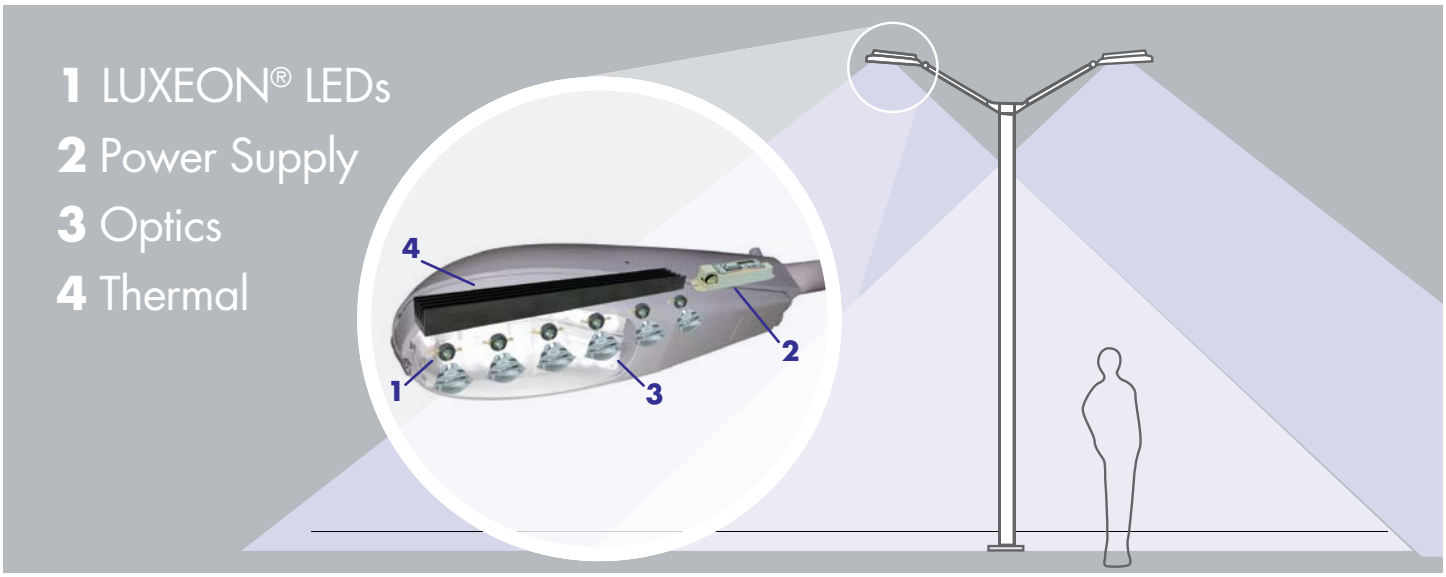
LUXEON® LEDs allow for directed light, eliminating light pollution in applications such as residential sidewalks, parks and pathways.

LUXEON® can be used to enhance esthetics on landmarks and monuments.

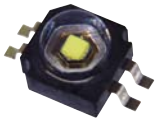
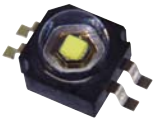


Low bay interior lighting such as parking garages, benefit from energy savings and lower maintenance costs.

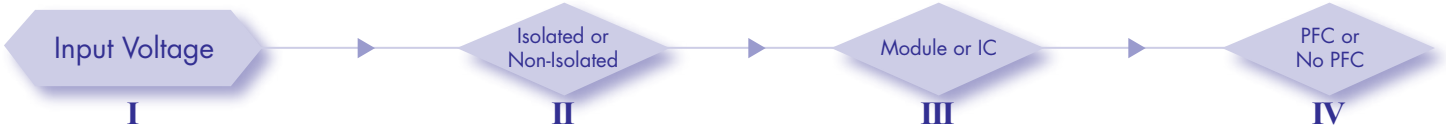
High light output exactly where required, and the ruggedness offered by LUXEON® LEDs are key advantages for security lighting for warehouses and other secure facilities.



1. LUXEON® WHITE LEDs

	Emitter		Star		Emitter	
	LUXEON® I	LUXEON® III	LUXEON® I	LUXEON® III	LUXEON® K2	LUXEON® K2
						
Typical Flux (lm)	45	65	45	65	45 / 60	100 / 120
Drive Current (mA)	350	700	350	1000	350	1000
Max Junction Temperature (°C)	135	135	135	135	150	150
Thermal Resistance (°C/W)	15	13	20	17	9	9
Size (mm)	14.5 x 8.0 x 5.9	14.5 x 8.0 x 5.9	19.9 x 19.0 x 7.4	19.9 x 19.0 x 7.4	11.7x7.3x5.8	11.7x7.3x5.8
Part #	LXHL-PW01	LXHL-PW09	LXHL-MW1D	LXHL-LW3C	LXK2-PW12-R00/ LXK2-PW12-S00	LXK2-PW14-U00/ LXK2-PW14-V00

2. POWER SUPPLY



Considerations when specifying a power supply

I Determine the input voltage (110, 230 or 277 Vac)

II Choose an Isolated or Non-Isolated solution
- Isolated systems provide added safety by eliminating high voltages at the LEDs
- UL regulations for light fixture may dictate the approach

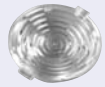
III Determine whether a snap-in power supply is required or whether a power supply can be designed

IV Is power factor correction necessary?
- IEC (International Electromechanical Committee) currently specifies that all lighting applications in Europe over 25W be power factor corrected
- North America does not follow the same standards

Note: Generally. Power supplies should have a MTBF similar to the LEDs.

For power supplies visit **www.lumiledsfuture.com/products/power.cfm**

3. OPTICS

		Low Profile				Standard			Reflectors
		Polymer	Fraen	Carclo	L2 Optics	Polymer	Fraen	L2 Optics	IMS
									
Full Angle	(°)	12, 50	10, 30, 45	12, 30, 50	10, 30, 45	12, 50	10, 30, 45	6, 12, 24	10
Diameter	(mm)	15	19	20	20	25	30	26	17, 20, 27
Part Nomenclature		12 x/y	FLP-HxB3-y-z	100003/x	OP-0x + OH-y-z	15x	FHS-HxB1-y-z	OPK2-1-003	S0yXA
Nomenclature Options	[x] *Beam Spread*	[N]=Narrow (10°) [W]=Wide (45°)	[N]=Narrow (10°) [M]=Medium (30°) [W]=Wide (45°)	[ ]=Narrow (12°) [15]=Medium (30°) [25]=Wide (50°)	[05]=Narrow (10°) [15]=Medium (30°) [25]=Wide (50°)	[2]=Narrow (12°) [3]=Wide (50°)	[N]=Narrow (10°) [M]=Medium (30°) [W]=Wide (45°)	[ ]=Spot (6°) [OPAA-1DFJ]=Narrow (12°) [OPAA-1-WSL]=Medium (24°)	—
	[y]	[121]=LUXEON® I & III Emitter [128]=LUXEON® III Star [151]=LUXEON® K2	[LB01]=Batwing [LL01]=Lambertian	—	[ES]=LUXEON® I & III Emitter [S35]=LUXEON® III Star	—	[LB01]=Batwing [LL01]=Lambertian	—	[17]=Small (17mm) [20]=Medium (20mm) [27]=Large (27mm)
	[z]	—	H: with holder	—	[CL]=clear holder [WH]=white holder [BK]=black holder	—	H: with holder	—	—
Remarks		—	—	black, clear, white holders available	black, clear, white holders available (OH-y-z)	the holder is part of lens	—	for narrow and medium beam patterns, the sub lens (OPAA-) must be added to the base lens (OPK2-)	—
Line		LUXEON® I, LUXEON® III, LUXEON® K2	LUXEON® I, LUXEON® III	LUXEON® I, LUXEON® III, LUXEON® K2	LUXEON® I, LUXEON® III	LUXEON® I, UXEON® III, LLUXEON® K2,	LUXEON® I, LUXEON® III	LUXEON® K2	LUXEON® I, LUXEON® III, LUXEON® K2

Four considerations in selecting your optical solution

1. Determine the area which you wish to illuminate
2. Determine the distance of your target area to your light source
3. Calculate the viewing angle required
4. Select your optic based on viewing angle requirement

4. THERMAL MANAGEMENT

LUXEON® LEDs need to be mounted on a thermal substrate. The material you select for this substrate will determine how well you can transfer the heat from the LED to the heatsink.

Thermal Substrates Considerations

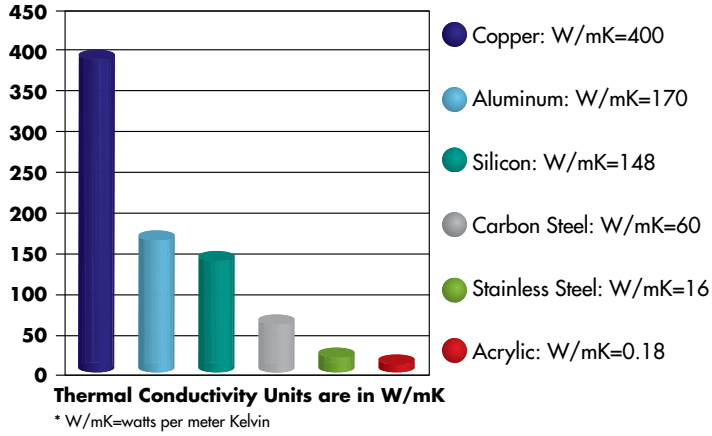
Thermal conductivity is the measure of how well a material conducts heat. Its unit of measurement is watts per meter Kelvin (the higher the number the better; see chart).

For retrofits (proof of concept or prototype), it is possible to use standard heatsinks to allow for maximum dissipation of heat.

New designs offer the flexibility to use the entire fixture as the heatsink which will allow the LUXEON® LEDs to run cooler. This will increase luminous efficiencies and decrease power consumption.

Aavid Thermalloy is a heatsink manufacturer providing a large selection of finned heatsinks.

Thermal Conductivity of Different Materials



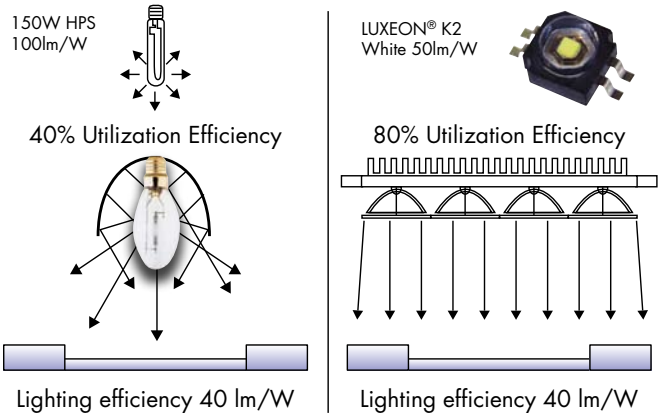
* W/mK=watts per meter Kelvin

For thermal management visit **www.lumiledsfuture.com/products/thermal.cfm**

USING LUXEON® LEDS TO MAXIMIZE SYSTEM EFFICIENCY

Directed Light

FIGURE A



A typical solid state Exterior Wide Area Lighting system consists of LUXEON® LEDs, secondary optics, heatsinks and a power supply.

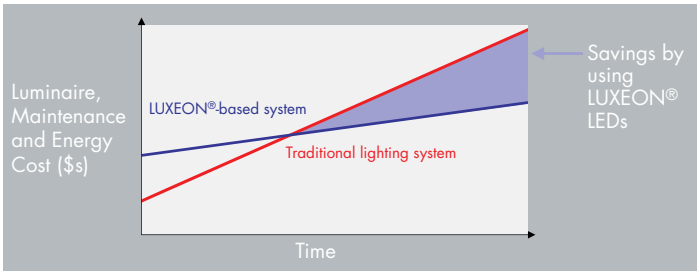
System efficiency is the ability to capture as much light as possible produced by the LUXEON® LED, and project it onto the intended target.

Large omni directional light sources allow light to escape the reflector. This results in light that is not managed and misses the desired area of illuminance.

LUXEON® LEDs are small directed light sources which can be coupled very efficiently with a secondary optic. Increased system efficiency means less wasted light and more light where you need it (see Figure A).

Reduced Maintenance and Service Costs

FIGURE B



Using LUXEON® LEDs versus traditional light sources translates to less source lumens needed to achieve desired illuminance levels – meaning less power consumption and increased energy savings over time (Figure B).

Improved Light Management

Wasted light can lead to light pollution such as glare (the result of excessive contrast between bright and dark areas in the field of view – see Figure C), light trespass (unwanted light falling on non-targeted areas – Figure D), and sky glow (a glowing effect in the sky – Figure E).

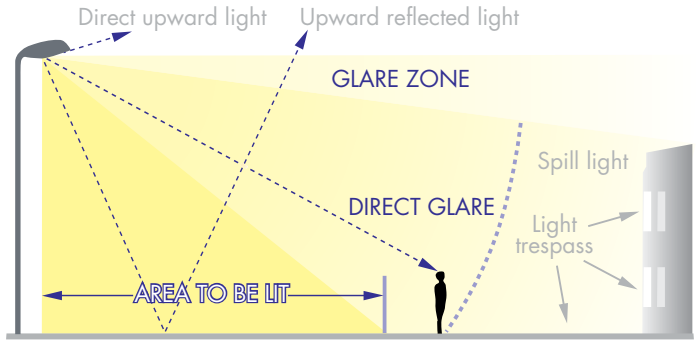
FIGURE C

FIGURE D

FIGURE E

Using LUXEON® LEDs, light pollution will be reduced as more light is managed and projected to the intended target (Figure F).

FIGURE F



Increased Uniformity

LUXEON® LEDs coupled with secondary optics allow designers greater light control. With the correct optics, LUXEON® LEDs are able to throw more even light across the intended target, avoiding hot spots and dark areas between poles (see Figure G).

FIGURE G

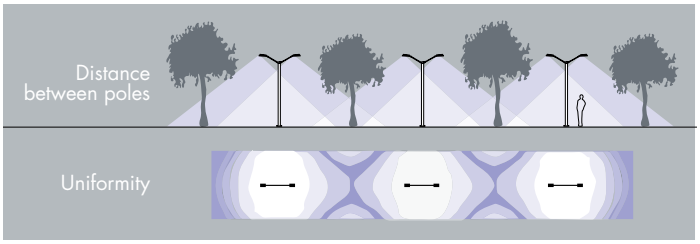


Image showing pole spacing and lighting effects of the "City Wing" product, courtesy of Philips.

DESIGN AND MANUFACTURING ASSISTANCE

Future Lighting Solutions can assist in the design and manufacture of your fixture. Through a network of Certified Solutions Partners, Future Lighting Solutions utilizes a wealth of experience in LUXEON® LED, Power, Thermal and Optics design and integration anywhere around the world.

This network of Certified Solutions Partners, titled the LUXEON® Lighting Network, exists to provide the confidence of predictable performance of LUXEON®-based lighting systems.

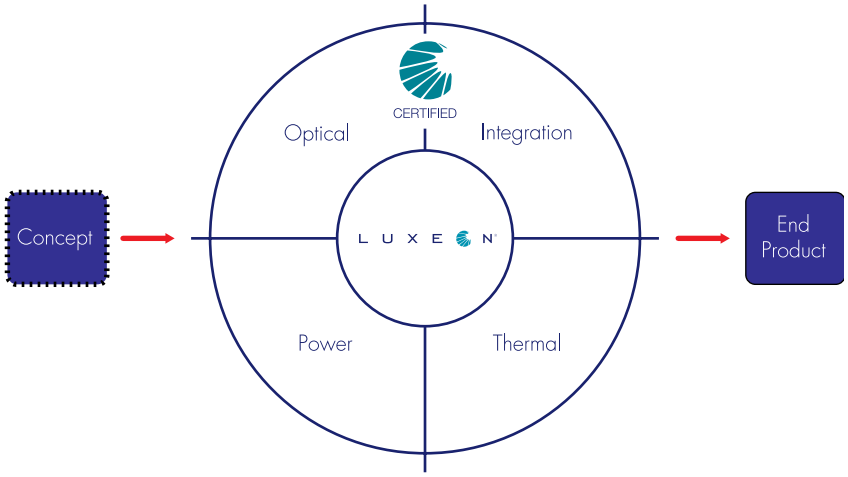
When you work with a Certified Solutions Partner, you are guaranteed that you are dealing with an expert who has been trained and certified to enable LUXEON® solutions.

CERTIFIED

Whether you are looking to retrofit an existing fixture or design a completely new one, our Certified Solutions Partners are the most qualified to assist you.

Find out more about the LUXEON® Lighting Network™ and our Certified Solutions Partners here:

www.lumiledsfuture.com/luxeonlightingnetwork/



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Making LED Lighting Solutions Simple™

ABOUT FUTURE LIGHTING SOLUTIONS

A division of Future Electronics, the third largest electronic components distributor in the world, Future Lighting Solutions (FLS) is dedicated to the LED lighting industry. With more than 6 years of power LED experience, FLS is the pioneer in delivering the most comprehensive worldwide LED lighting solutions support structure in the industry. FLS offers customers LED Lighting knowledge, resources, programs, partners, solutions and logistics support, focused on enabling the adoption of LUXEON®-based solid state lighting technology.

Future Lighting Solutions' innovative approach is built around its team of world class LED lighting experts, its highly specialized and experienced partners, and its exclusive worldwide relationship with Philips Lumileds Lighting Company.

Future Lighting Solutions; **Making LED lighting solutions simple™.**

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