



# Changing the world with energy efficient white light

**Philips CosmoPolis** - shining longer and brighter than ever

**PHILIPS**





# Best energy saving solution

In the past one of the main reasons for using high-pressure sodium lamps was energy efficiency. However, thanks to ongoing innovation, Philips Lighting has made a breakthrough in energy efficiency with the CosmoPolis system. The efficiency of the CosmoPolis system can reach over 120 lm/W. Philips remains committing to further improvements and range extension of CosmoPolis. Gradually the efficiency and the lifetime performance has been increased on all wattages and in 2013 a new range is now added with E27/E40 capbase, named CPO TT. This new TT range allows easy fitting into existing luminaire platforms as such widening the scope of application into the global existing E27/E40 based park being the biggest population worldwide.

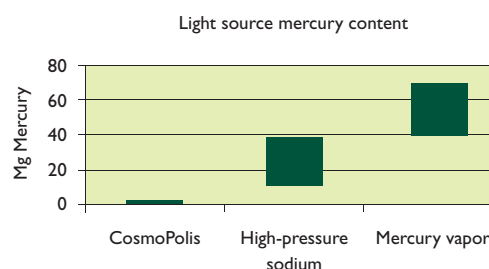
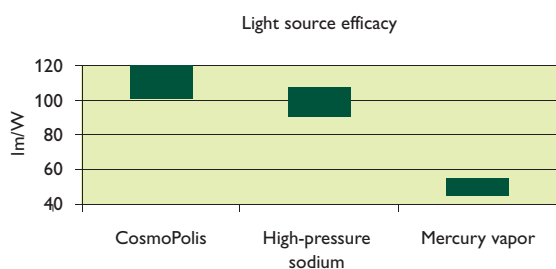
This means that by using CosmoPolis instead of high-pressure sodium lamps in new or even existing lighting installations you can save up to 20% on energy alone. If you use advanced drivers with integrated controls, additional savings of up to 40% can be made through dimming. In renovation projects, energy savings of up to 75% are possible by replacing obsolete technologies such as HPL lamps, ovoid lamps and outdated optics.

MASTER SON-T PIA Plus vs CosmoPolis MASTER CPO-TW

	System power	Annual savings for 100 light points <sup>1</sup>	Energy savings
SON-T 70W EM gear	87 W		
CPO TW/TT 60W Xtra with Xtreme gear	67 W	€ 960,-	30%
SON-T 100W EM gear	124 W		
CPO TW/TT 90W Xtra with Xtreme gear	99 W	€ 1.200,-	20%
SON-T 150W EM gear	194 W		
CPO TW/TT 140W Xtra with Xtreme gear	151 W	€ 2.064,-	21%

<sup>1</sup> @ 0,12 €/kWh

... and the most environmentally friendly





# The smart choice

A public lighting project will typically have a life-cycle of 25 to 30 years. The total cost of ownership over this period consists of the initial investment and ongoing maintenance and energy costs. The energy cost accounts for the largest portion of the total, and therefore offers the greatest potential for savings. A small additional investment can have a huge impact on the energy consumption over the entire life of an installation. This means a return on investment (ROI) for the additional expenditure is positive in 2 to 4 years, depending on energy prices. This certainly is an opportunity too good to ignore.



## Investment cost

The total investment cost depends mainly on the choice of luminaire, lamp system and whether it offers dimming. In many cases extra investment in poles may have to be considered because the use of advanced optics in combination with the CosmoPolis system results in wider spacing and therefore fewer luminaires in the street.

## Energy cost

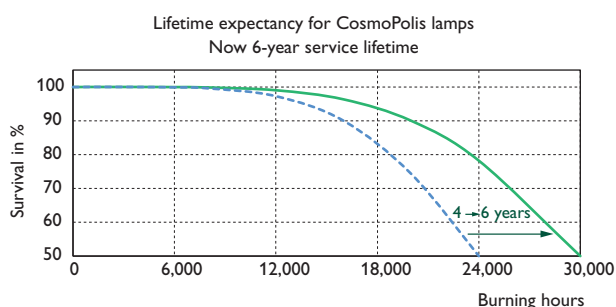
The energy cost depends mainly on the choice of lamp system. CosmoPolis has the highest efficiency (20% better than high-pressure sodium or even other white light discharge lamps) and can be combined with electronic dimming solutions to generate additional savings of up to 40%. The use of white light (see section on white light) can bring lower lighting levels and therefore even greater energy savings.

Actual energy prices vary from one country to another, e.g. € 0.10-0.14 per kWh. If energy costs rise, reducing energy use becomes even more critical.

## Maintenance cost

Thanks to the high reliability and long lifetime performance of the CosmoPolis Xtra system, maintenance cycles can be extended. While the initial service lifetime (90% survivals) of 4 years already set the industry benchmark, continued innovation now delivers reliable performance for up to 6 years (up to 24,000 burn hours) and an average lifetime of up to 30,000 hours.

### The new CosmoPolis Xtra range: service lifetime (90% survivals) upgrade from 4 to 6 years



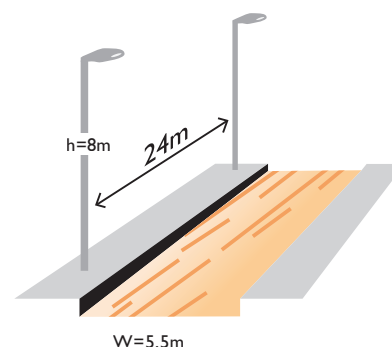
# Example of a TCO calculation

**New CosmoPolis installation compared with new installations using the best high-pressure sodium system available.**

## The challenge

A municipality has asked an installer to renovate an old Me3a-class HPL 250W (mercury) installation.

The municipality wants to evaluate two alternatives, one based on white light (CosmoPolis), the other based on yellow light (high-pressure sodium). The pole height is 8 metres, with a spacing of 24 metres. The road consists of 2 lanes, 5.5 metres wide. The total length of the road is 1 km.



Total luminaires for 1km = 42

Luminance (cd/m<sup>2</sup>) min maintained : 1cd/m<sup>2</sup>

## The results<sup>1</sup>

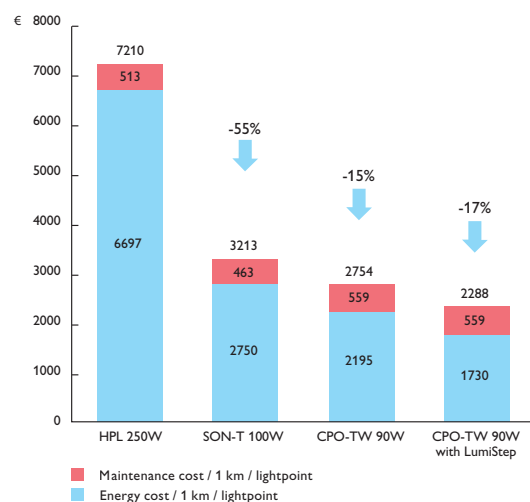
	HPL 250W	SON-T 100W	CPO-TW 90W	CPO-TW 90W with LumiStep
energy / year / light point (€)	159	65	52	41
maintenance cost / year / light point (€)	12	11	13	13
total cost / year / lightpoint (€)	172	76	66	54
energy / 1 km / year (W)	12684	5208	4158	3276
energy costs / 1km / year (€)	6697	2750	2195	1730
maintenance cost / 1km / year (€)	513	463	559	559
total cost / 1 km / lightpoint (€)	7210	3213	2754	2288

<sup>1</sup>@ 0.12 €/kWh

## Conclusion

The ROI vs HPL is best with CosmoPolis (with LumiStep dimming) at less than 4 years.

The ROI of CosmoPolis compared with SON-T PIA Plus is less than 5 years, and less than 3 years with CosmoPolis LumiStep system.









# White light

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When there is insufficient or no daylight, we have to rely on alternatives to illuminate our world. As far back as 1417, lanterns with candles were used on the streets of London on winter nights. The subsequent invention of gas, oil and finally electric street lighting helped bring urban areas out of the dark ages. Today, billions of people take street lighting for granted.

## Historical context of yellow light

High-pressure sodium lamps have been the first choice in street lighting for a number of years, mainly because they produce high levels of light for a given amount of energy and have a long, reliable lifespan. However, their distinctive yellow/orange light makes it difficult to distinguish colours. The unnatural tint of our urban streets at night is something we have become accustomed to through necessity rather than choice.

Today outdoor lighting no longer has to rely on yellow high-pressure sodium light. There is an alternative – CosmoPolis. It combines high-quality white light with a very high efficacy that is superior to that of high-pressure sodium.

## Why apply white light in outdoor lighting?

### Accident prevention

White light makes the streets safer for drivers and pedestrians. Improved visibility means much better road safety. Tests show that drivers are able to detect roadside movement faster and from a greater distance with white light. Crucially, this gives them more time to stop if a child, adult or animal is about to cross their path.

### Mesopic/scotopic vision

Because we experience white light as being brighter than yellow light at low lighting levels, it is possible to actually reduce light output while still giving people the illumination they expect. The savings associated with this are enormous. This advantage has already been recognized by British lighting standards. In the UK the level of illumination required by law on subsidiary roads and paths may be reduced by as much as 30% if the light source has a colour rendering of 60 or more, which is this case with white light

### Sense of safety and crime reduction

White light plays a crucial role in helping people feel safer when they are outdoors at night. Superior colour rendering and a high level of perceived brightness make it easier to distinguish objects, colours, shapes and people. In particular, it makes facial recognition easier, even from a distance, and this really helps to reduce anxiety levels.

Research has shown that white light promotes a virtuous cycle - when people feel safer, they stay in the streets later and in larger numbers. More people on the street in turn reduces opportunities for and occurrence of crime.



# HID Xtreme drivers

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Philips developed the Xtreme propositions specifically for outdoor conditions with moisture, dust, vibrations and shocks.

More than 20 years of lifetime is what should be expected. This performance is specified for a wide temperature range, and under 'worse case', but for outdoor lighting realistic, conditions of low mains voltage.

In an outdoor electrical installation various equipment can generate peaks and surges on the mains lines. With Xtreme technology, the gear is protected against these surges and will not extinguish the light, fail or allow these surges to reduce system lifetime. It even protects the gear from lightning strikes of up to 5kA/10kV.

On top of being highly reliable the Xtreme drivers maximise the energy saving potential of outdoor installations, via the integrated control and dimming options:

- DynaDimmer: 5 steps of dimming at specified hours and at specified light levels
- LumiStep: one step of dimming to 50% light at a specific time
- AmpDim: one step of dimming enabled via the mains to a specified light level
- LineSwitch: one step of dimming enabled via a pilot line to a specified light level
- Adjustable light output: adjust the light output of any HID lamp
- Constant Lamp Output: insure constant light output along a lamp's lifetime



# HID Economy drivers

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Philips created in 2013 the HID Economy drivers portfolio. The range offers both fixed output and dimmable products with more than 15 years of lifetime. The products were designed by the same engineering team which created the top of the art Xtreme range of drivers.

The portfolio was created for customers with budget restrictions who still want to insure great light quality and to enable energy savings via the LumiStep option. These drivers are available for the standard CPO, for the CPO-TT and the SON lamps.





Philips brand for a  
**TOTAL SOLUTION**

**20 YEARS LIFETIME**  
Lifetime 80,000 hours with >90% survivors

Specifically designed for  
**OUTDOOR USE**

**INTEGRALLY TESTED**  
Guaranteed Philips quality

**DALI**  
Bi-directional digital interface

**5kA / 10kV PROTECTION**  
Surge protection

**DOUBLE RE-INFORCED  
INSULATION**  
for easy Class-II design-in



# CosmoPolis system is the key to unlocking energy savings

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The high efficiency of CosmoPolis is driven even higher thanks to electronic dimming gear. By dimming street lighting at appropriate times, CosmoPolis instantly uses even less energy, reduces costs and light pollution. In many countries there is already legislation requiring outdoor luminaires to incorporate a dimming protocol, and more countries are expected to follow this trend. This reflects the pressing need for governments to minimise energy consumption and reduce the total cost of ownership, while at the same time maintaining consistent lighting performance.



While the HID-PrimaVision products have a fixed output power and offer a high level of energy efficiency, the HID-DynaVision can dim the CosmoPolis lamp down to 50% light output without a negative effect on lamp performance. This is true for both the Xtreme versions and the Economy versions of the drivers.

There are several control and dimming options integrated inside the drivers. All these to make sure the end customers reduce their energy bills and become more and more sustainable with the solutions they implement.

There are different control categories:

- standalone (DynaDimmer & LumiStep)
- group control (LineSwitch & AmpDim)
- network control (DALI)
- control over light at source (Adjustable Light Output & Constant Light Output)

For complete information, please refer to the Integrated Controls brochure.





### eHID Xtreme portfolio for CosmoPolis

#### PrimaVision Xtreme

- 45 W, 60 W, 90 W, 140 W, 210 W, 315 W
- Fixed output drivers

#### DynaVision LumiStep Xtreme

- 45 W, 60 W, 90 W, 140 W, 210 W
- Pre-programmed standalone dimming via LumiStep

#### DynaVision Prog Xtreme

- 45 W, 60 W, 90 W, 140 W, 210 W
- Programmable standalone dimming via Dynadimmer
- Group control with LineSwitch or AmpDim
- Fully networked DALI interface
- Light level control with Adjustable Light Output and Constant Light Output

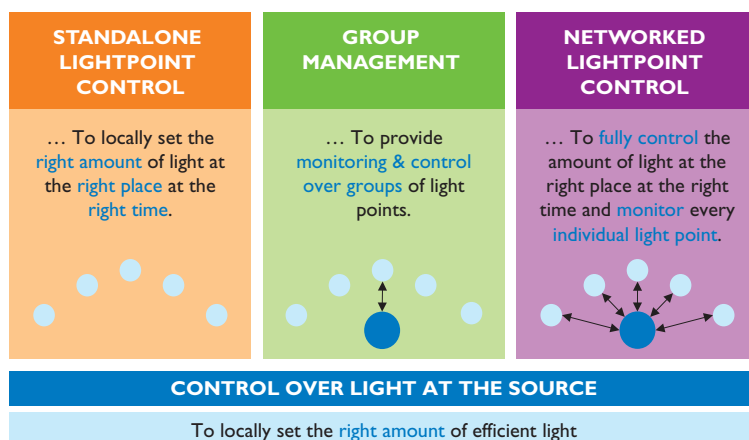
### eHID Economy portfolio for CosmoPolis

#### PrimaVision Economy

- 45 W, 60 W, 90 W, 140 W
- Fixed output drivers

#### DynaVision Economy

- 60 W, 90 W, 140 W
- Pre-programmed standalone dimming via LumiStep



Philips DynaVision product family offers several ways to reduce energy use.



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06/2013

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