

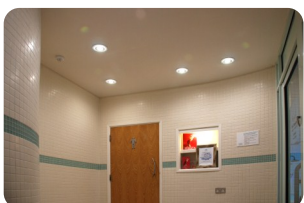
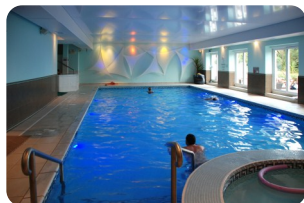


Application

This example is an overview of a complete hotel refurbishment where the previous installation was predominantly halogen MR16s. As many hotels are still using conventional incandescent bulbs, the example is conservative in the power savings that might be achieved.

Hotels by their nature have a very high demand on their lighting with many areas lit for 18 to 24 hours a day. Conventional light sources such as incandescent and halogen not only consume large amounts of power, but with short lifetimes between 1000 and 3000hrs, failed lamps are an ongoing problem. Maintaining a halogen lit hotel of this size requires over 1400 lamp replacements per year, costing in the region of £30,000 in parts and labour.

The movement towards green tourism marketing, and government funding initiatives for carbon reduction rewards hoteliers who choose to upgrade their lighting systems to the latest low energy alternatives. Compact Fluorescent lamps have been popular in homes, but for the hotel industry they do not offer the quality of light required. A slow warm up time means that CFLs do not function well with other energy saving measures such as occupancy and lux sensors, and if used with them have a dramatically reduced lifetime whereby maintenance costs become a problem.



LED Solution

Operating Costs

- In this application there is a 90% reduction in annual lighting operating costs from £29,236 to £2,741
- Cashflow is increased in year one by £24,636 (with ECA and Carbon Trust Loan)
- Savings over 5 years including capital purchase are over £111,000

Payback

- Payback period less than 14 months for refurbishment installation

Light Quality

- Illumination levels are better or equal to similar halogen and CFL fittings
- Illumination levels are far superior to LED replacement bulbs
- Quality of light is as good as halogen and far superior to CFLs

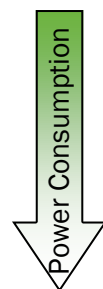
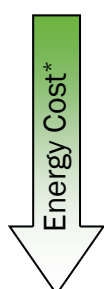
Functionality improvements include:

- Instant on (compatible with occupancy sensors for further energy savings)
- No failed bulbs—improving impression of a well maintained hotel, and bringing safety benefits
- Reduced excess heat in kitchen
- Can be used in all areas including swimming pool.

Carbon Reduction

- The carbon footprint for lighting in this hotel is reduced by 80% from 74.6 to 15 tons per year
- Long life product guaranteed for 5 years meets guidelines to reduce, reuse and recycle unlike CFLs and Halogen.

Annual Savings

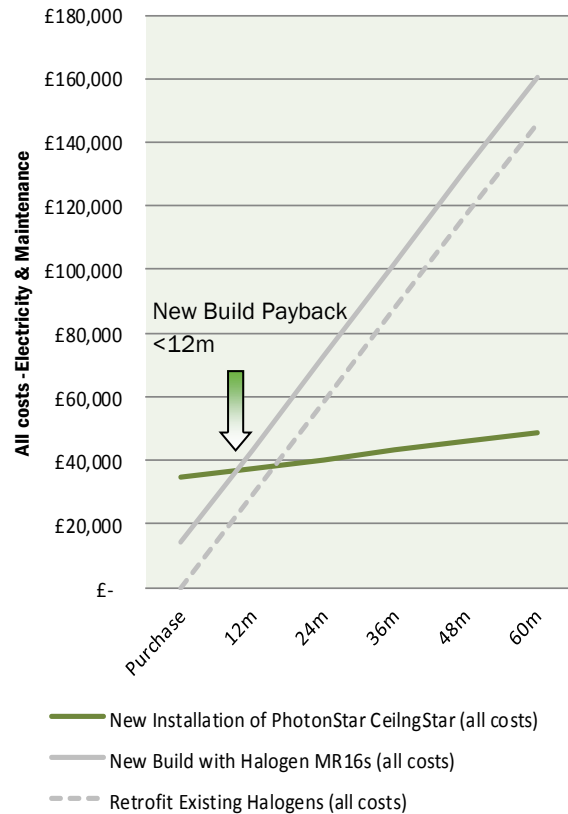


*Based on energy cost of 0.10 per kWh , 0.4Kg CO2/kWh, 0.544Kg CO2/kWh, savings over 80,000 hrs operational lifetime

5 Year Cost comparison	Purchase	12m	24m	36m	48m	60m
New Installation of PhotonStar CeilingStar (all costs)	£34,848	£37,589	£40,331	£43,072	£45,813	£48,554
New installation of Halogen MR16s (energy costs only—no maintenance costs)	£14,256	£27,962	£41,669	£55,375	£69,082	£82,788
Retain existing halogen MR16s (Energy Costs only—no maintenance costs)	£ -	£13,706	£27,413	£41,119	£54,826	£68,532
MR16 (Halogen) Maintenance costs	£ -	£15,530	£31,060	£46,591	£62,121	£77,651
New installation of Halogen MR16s (all costs)	£14,256	£43,493	£72,729	£101,966	£131,203	£160,439
Retain Existing Halogens (all costs)	£ -	£29,237	£58,473	£87,710	£116,947	£146,183
Savings with new CeilingStar installation (Over a new installation of halogen MR16s)	- £20,592	£5,903	£32,399	£58,894	£85,390	£111,885
Savings with new CeilingStar installation (Over a retained existing of halogen MR16s)	- £34,848	£8,353	£18,143	£44,638	£71,134	£97,629

1 Year operating cost comparison	Halogen	PhotonStar LED Luminaires	Annual Savings with LED
Total kWhrs	137,065 kWh	27,413 kWh	109,652 kWh
Total Annual energy cost @10p/kWh	£13,706.48	£2,741.30	£10,965.18
Replacement lamps	£10,112.69	-	£10,112.69
Maintenance Labour	£5,417.51	-	£5,417.51
Total Annual Costs	£29,236.68	£2,741.30	£26,495.39

Total Cost of Ownership

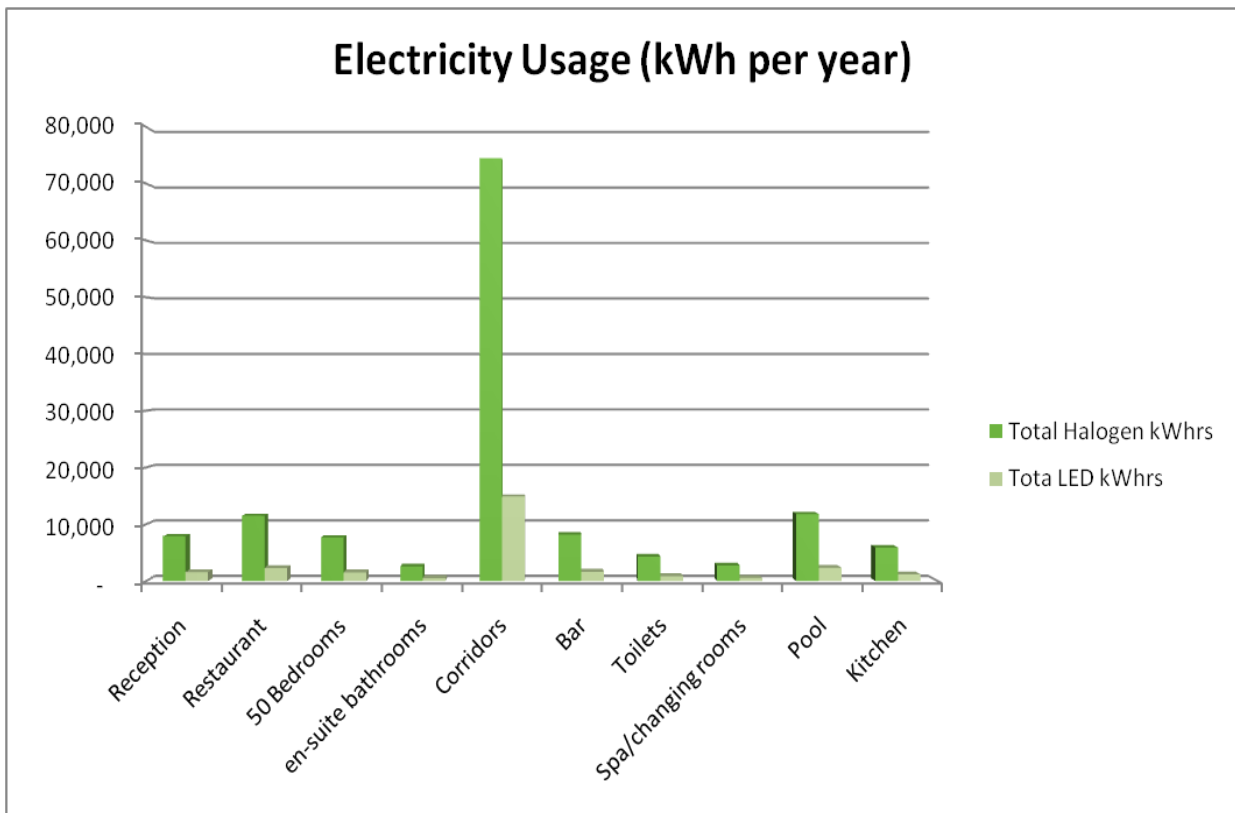


Summary of Savings

- Total annual operating costs reduced by over 90% - from £29,236 to £2,741
- Payback period led than 14 months for refurbishment installation
- Payback period less than 12 months for new build installation
- Savings over 5 years including capital purchase is over £111,000



	No. of fittings	Hrs./day	Hours use per year	Halogen Watts/fitting	Total Watts for Halogen Fittings	kWhrs for all Halogen Fittings	LED Watts/fitting	Total Watts for LED fittings	kWhrs for all LED fittings
Reception	18	24 hrs	8,760hrs	50W	900W	7,884kWh	10W	180W	1,577 kWh
Restaurant	35	18 hrs	6,570hrs	50W	1,750W	11,498kWh	10W	350W	2,300kWh
50 Bedrooms	150	4hrs	1,460hrs	35W	5,250W	7,665kWh	7W	1,050W	1,533 kWh
En-suite bathrooms	50	4hrs	1,460hrs	35W	1,750W	2,555kWh	7W	350W	511kWh
Corridors	170	24hrs	8,760hrs	50W	8,500W	74,460kWh	10W	1,700W	14,892kWh
Bar	25	18hrs	6,570hrs	50W	1,250W	8,213kWh	10W	250W	1,643kWh
Toilets	14	24hrs	8,760hrs	35W	490W	4,292kWh	7W	98W	858 kWh
Spa/changing rooms	12	18hrs	6,570hrs	35W	420W	2,759kWh	7W	84W	552 kWh
Pool	36	18hrs	6,570hrs	50W	1,800W	11,826kWh	10W	360W	2,365kWh
Kitchen	18	18hrs	6,570hrs	50W	900W	5,913kWh	10W	180W	1,183 kWh
Hotel Total	528	170hrs				23,010W		4,602	27,413 kWh

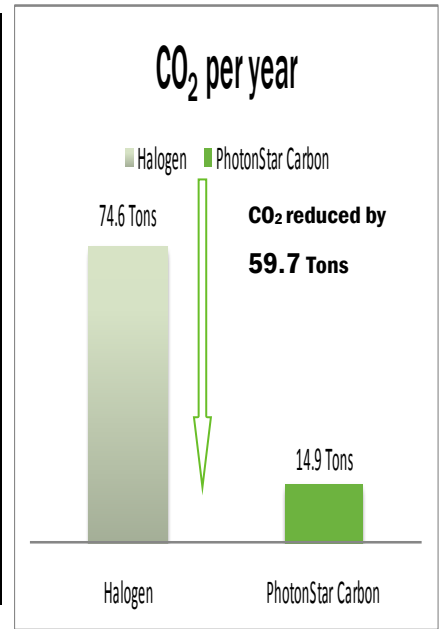


Advantage

In many hotels 30% of energy costs are directly attributable to lighting. Reducing the amount of electricity required by over 80% gives the hotel a competitive edge by reducing overheads. Freedom from fluctuating energy prices allows for better business planning.

Carbon Reduction

Carbon Emitted per year (Tons)	Halogen	PhotonStar	Carbon Saving
Reception	4.3	0.9	3.4
Restaurant	6.3	1.3	5.0
50 Bedrooms	4.2	0.8	3.3
En-suite bathrooms	1.4	0.3	1.1
Corridors	40.5	8.1	32.4
Bar	4.5	0.9	3.6
Toilets	2.3	0.5	1.9
Spa/changing rooms	1.5	0.3	1.2
Pool	6.4	1.3	5.1
Kitchen	3.2	0.6	2.6
Hotel Total	74.6	14.9	59.7



Green Marketing 7 Branding

The carbon trust loan scheme provides interest free loans to SMEs for qualifying carbon reduction improvements. Repayments over two to five years allow improvements to be paid for out of electricity savings—resulting in an immediate improvement in cashflow.

The enhanced capital allowance scheme (ECA) is intended to encourage businesses to invest in energy saving plant. For qualifying equipment, the scheme allows businesses to write off the whole cost of investment against taxable profits in the year of purchase. This can help to boost cash-flow. In this example, the capital cost is £34,848, reducing the tax bill under ECA by £9,757. If the hotel were making a loss, the losses attributable to ECA can be surrendered in exchange for cash payment. In this example, £6,621.



Green Marketing

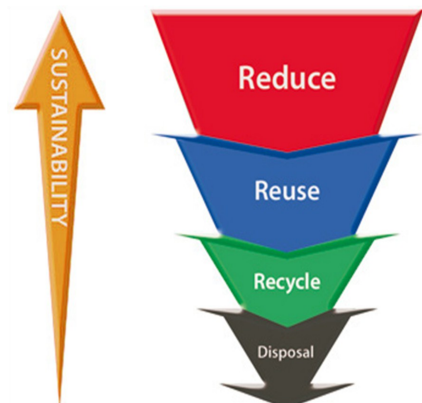
The Green Tourism Scheme is one of the growing number of schemes that identify and acknowledge the environmental improvements made by suppliers of tourist accommodation. The hotel in this example had prior to installation achieved the silver level of award. On completion of the installation the environmental improvements were acknowledged with a gold award. Subsequently they have benefited from enhanced marketing services promoting the hotel as an environmentally responsible business.



ReduceWaste

Historically lighting has been the target of campaigns to reduce energy consumption. This has often been at the expense of larger environmental issues and has for example created problems with disposal of toxic items (particularly mercury). By nature light bulbs are a consumable item and their disposal has always had some cost to both the environment and the business.

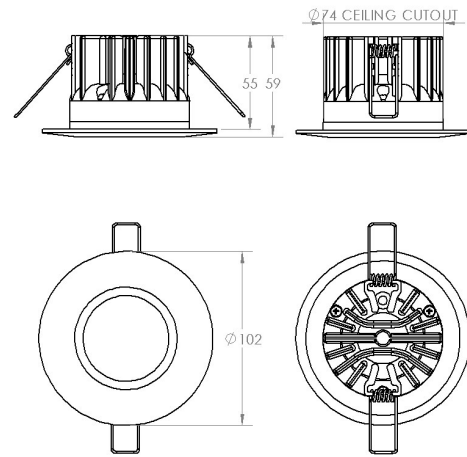
PhotonStar luminaires are one of the first technologies to think about wider environmental impact. Engineered from 85% recycled materials, the system results in **REDUCED** consumption with a long life and no lamp to change. At the end of life, the unit is easily refurbished allowing it to be **REUSED** with negligible environmental impact. Finally, as it is made from benign materials which may then be 100% **RECYCLED**, The total environmental cost is very low.



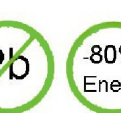
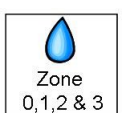
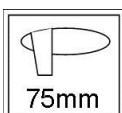
CeilingStar

LED downlight to replace 35W and 50W halogen in zones 1 & 2

- This range provides equivalent illumination to 50W MR16 fixtures from just 7-10W of power with an excellent efficacy up to 78.9lm/cW and total delivered output of up to 741lm.
- Same form factor as a tungsten halogen downlight
- Low void depth
- Available in standard and tuneable light engines
- IP65 for use in multiple locations



Key Features	Reception	Restaurant	Bedrooms	en-suite bathrooms	Corridors	Bar	Toilets	Spa/ changing	Pool	Kitchen
Energy Saving	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Compatible with Insulated Ceilings & sound proofing						✓		✓	✓	
Instant On (compatible with occupancy sensors)			✓	✓	✓		✓	✓		
IP 65 for wet areas							✓	✓	✓	✓
Excellent Colour rendering and quality of light	✓	✓	✓	✓			✓	✓		
Warm 3000K light	✓	✓	✓	✓	✓	✓	✓			
Cool 4000K light								✓	✓	✓
Anti Glare	✓	✓			✓					
80,000 lifetime	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
integrated emergency pack (optional)	✓				✓					
dimnable		✓	✓							

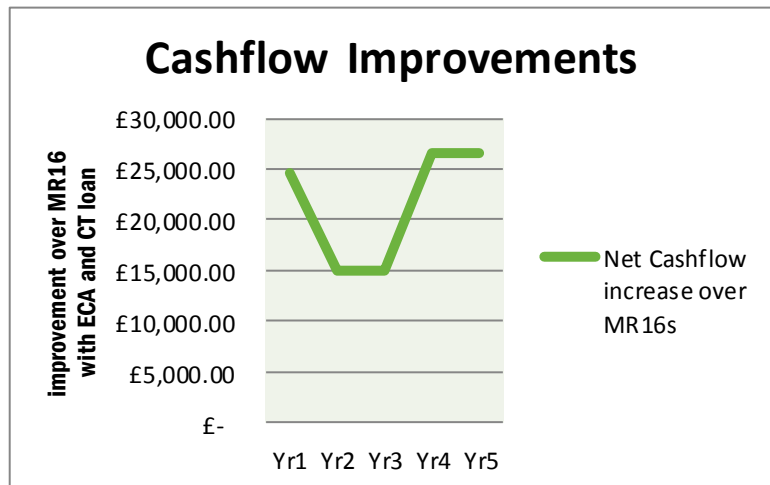


Using both the enhanced capital allowance scheme and carbon trust loan scheme, the project saw an immediate cashflow improvement of £24,636 in the first year:

A Carbon Trust interest free loan provided an advance for the £34,848 capital investment.

Repayments over 3 years of £11,616 offset by 90% reduction in operating costs would result in a net cashflow increase of £24,636 (with ECA) in year one and £14,879 annually for year two and three.

Subsequent years would see a cashflow increase of £26,495 resulting from reduced operating costs.



Further Information



PhotonStar have a series of case studies and product data sheets available for download at

www.photonstarlighting.co.uk



For more information about the enhanced capital allowance scheme, visit

www.eca.gov.uk



For more information about the Carbon Trust interest free loan scheme and other ways of reducing CO2, visit

www.carbontrust.co.uk

