



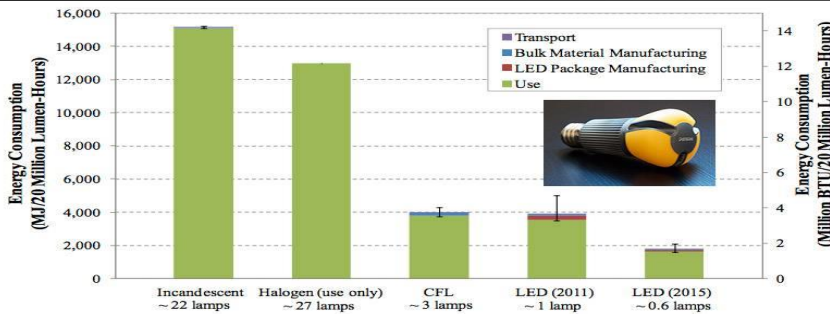
LIFE CYCLE COST ANALYSIS OF LED LIGHTING

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Introduction

A Life Cycle Cost Analysis (LCCA) is used to assess the total cost of a materials life. This is split into 4 main categories:

- 1) Construction
- 2) Operation
- 3) Maintenance
- 4) End of Life



4) End of Life

When an LED has stopped working, there parts can be stripped and re-cycled for other uses. In fact, **95%** of LED's are recycled to produce other LED lights.



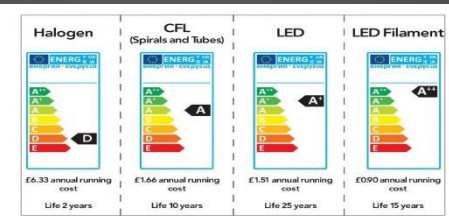
Acknowledgements

<https://www.viribright.com/lumen-output-comparing-led-vs-cfl-vs-incandescent-wattage/>
<https://life.wilko.com/switched-on-your-guide-to-choosing-the-right-light-bulb/>
<https://www.mnn.com/earth-matters/energy/stories/should-i-buy-led-or-cfl-light-bulbs>

1) Construction

This stage is the cost of producing a LED light. The average cost to produce a LED is £11.75, as most parts come from recycled LED lights.

Also, the other materials included in the light are: Indium gallium nitride (InGaN), Aluminium gallium indium phosphide (AlGaInP) and Aluminium gallium arsenide (AlGaAs).



3) Maintenance

The average life of a 20w LED light is 60,000 hours. This means that if the light is running for 18hours every day, then it will need to be replaced roughly every 3 years.

The calculation is below:

18 hours x 365 days x 3 years = 19,710 hours, therefore no replacements in 3 years
 $\frac{60,000}{19,710} = 3$, which means a replacement 19,710

This means a replacement every 9 years

2) Operation

Operation costs are the costs to buy and energise the LED light. Therefore, this is called the initial and energy costs, as listed below.

For example, the cost to energise a 20w LED light for 18hours a day, 365 days a year for 3 years is shown below.

Initial Cost – price of materials

20w LED Light = £25

Energy Costs – the cost to use the LED light

20w = energy required (watts)

365 = days in the year (days)

3 = years

18 hours = national average for LED's running

£0.15 = national average cost of electricity per kWh

$(20 \times 365 \times 18 \times 3) = 394.20 \text{ kWh}$

$\frac{1000}{394.20}$

£0.15 x 394.20 kWh = £59.13 to run 1 LED light for 3 years

Also, LED's are 90% cheaper to run.

