THORN
LIGHTING

T5/T8 Refurbishment – Energy Savings and New Legislation

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• T5/T8 REFURBISHMENT – ENERGY SAVINGS AND NEW LEGISLATION

Lamp Legislation

Energy

Sustainability

• T5/T8 REFURBISHMENT – ENERGY SAVINGS AND NEW LEGISLATION

Lamp Legislation

• LIGHT GENERATION THROUGH MERCURY WITH CONSEQUENCES

- For several years the present RoHS exemptions relating to mercury containing lamps have been the subject of a much-delayed review process.
- In December 2021, the draft delegated acts that detail the proposed actions were eventually circulated to the European Parliament and Council for scrutiny

- RoHS stands for "Restriction of the use of Hazardous Substances" and to explain it further, it is referring to the use of mercury(or within the field of lighting), the mercury used in lamps. Considered to be a hazardous substance it is already banned within electrical or electronic equipment with this ban going full steam ahead into the lighting industry. The exemptions that were in place for T5/T8 fluorescent light bulbs and lamps have been amended and as a result from 2023 only HPD lamps and special purpose lamps are exempt and can be produced for another 3-5 years (at the time of writing).

INTRODUCTION TO THE BAN

- GB legislation “UK SI 2021 No. 1095 - ENERGY CONSERVATION –
- The Ecodesign for EnergyRelated Products and Energy Information (Lighting Products) Regulations 2021” phased out many lamp types on 1st October 2021.
- This legislation also included a second stage of 1st February 2024 covering phase out of additional lamp types
- * EU/NI vs GB situation In EU & NI, halogen G9, G4 & GY6.35 lamps are also phased out on 1st September 2023. In EU & NI, fluorescent T8 lamps are phased out by RoHS legislation on 24th August 2023. In GB, fluorescent T8 lamps of lengths other than 2’, 4’ & 5’ are phased out under GB RoHS legislation on 1st February 2024

- **INTRODUCTION TO THE BAN**

FLUORESCENT LAMPS PHASE-OUT

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The timeline at a glance

Lamp Type	EU Phase-out date (legislation)	GB Phase-out date (legislation)
CFLni Non-Integrated 	**24 February 2023** (RoHS)	**1 February 2024** (RoHS)
CFLni Long life (<30W, ≥20,000h) 	**24 August 2023** (RoHS)	**1 February 2024** (RoHS)
T5 	**24 August 2023** (RoHS)	**1 February 2024** (RoHS)
T8 (2', 4' & 5') 	**24 August 2023** (RoHS)	**1 September 2023** (Eco-design)
T8 (other lengths) 	**24 August 2023** (RoHS)	**1 February 2024** (RoHS)
T5/T8 Long life (≥25,000h) 	**24 February 2023** (RoHS)	**1 February 2024** (RoHS)
SON Deluxe (most) 	**24 August 2023** (RoHS)	**1 February 2024** (RoHS)

Chart adapted from The LIA's Guide to the latest announcement on RoHS (2023). The EU published its review of RoHS exemptions on mercury containing lamps on 24th February 2022. In the UK on the 30th January 2023 DEFRA published the Secretary of State's determination applicable to England, Scotland and Wales on the Government's website. The lamp type exemptions mirror the EU, but with extended implementation timescales as listed above.

• INTRODUCTION TO THE BAN

From 1st September 2023, the following lamp types can no longer be placed on the GB market unless covered by an exemption: Halogen G9 lamps Halogen G4 lamps Halogen GY6.35 lamps Fluorescent T8 2, 4 and 5 foot lamp

Halogen G9 lamps	Halogen G4 lamps	Halogen GY6.35 lamps	Fluorescent T8 2, 4 and 5 foot lamps
			

The UK legislation mirrors that also applying in the EU and relates to the **“placing on the market”** of products, this allows products in stock at manufacturers, retailers etc. to continue to be sold until stocks are exhausted. It is not an instant sales ban!

Note: there is a legal definition of ‘placing on the market’ which may mean that certain goods in suppliers’ warehouses are already considered as such.

The proposed UK legislation which applies from 1st September is expected to have a one month transition allowance.

T8/T5 PHASE OUT

Impacts

RoHS Directive

- Change in legislation mean that, T8/T5 lamps are no longer being produced in the EU
- Both T8/T5 contain harmful mercury meaning the RoHS Directive has pushed the ban

T8 lamps aren't efficient!

- T8 lamps aren't energy efficient enough to comply with green building certification
- Inefficiency = higher energy costs!

Availability ↓

Prices ↑

- Availability will start to reduce
- So prices for remaining stock will rise

Energy, Energy, Energy

- LEDs are the RoHS compliant energy saving option offering up to 67% savings
- LEDs will help companies reduce costs through efficiency.

Sustainability Targets

- By introducing efficient LED lighting we can support with carbon reduction targets (meeting sustainability targets too)

• T5/T8 REFURBISHMENT – ENERGY SAVINGS AND NEW LEGISLATION

Energy

- THREE MAIN ARGUMENTS FOR REFURBISHMENT

LIGHTING QUALITY

Improved working conditions, improved architectural impact through a holistic approach to lighting quality with visual, emotional and biological support for people. New normative guidelines are taken into account.

SUSTAINABILITY

Less power consumption thanks to LED technology. Convenient dimming and control reduces energy costs by up to 70%. With emission reduction of CO_2 through lower electricity consumption, i.e. decarbonisation, we support your goals for a climate-neutral company and for gaining access to funding programmes.

COST REDUCTION

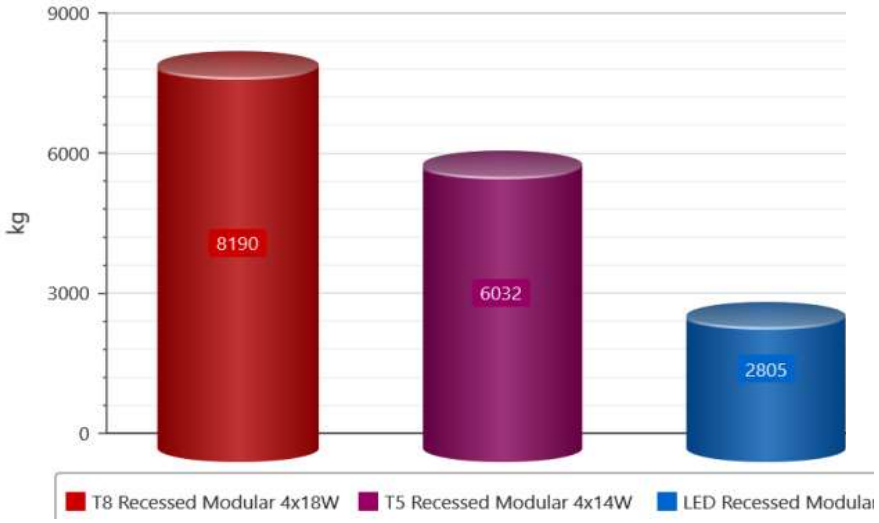
Reduced energy costs, low maintenance and long service life thanks to high-quality technology (e.g. optimised ageing process of the LED with low luminous flux reduction). Cost security through service offers from financing to commissioning and maintenance.

EDUCATION

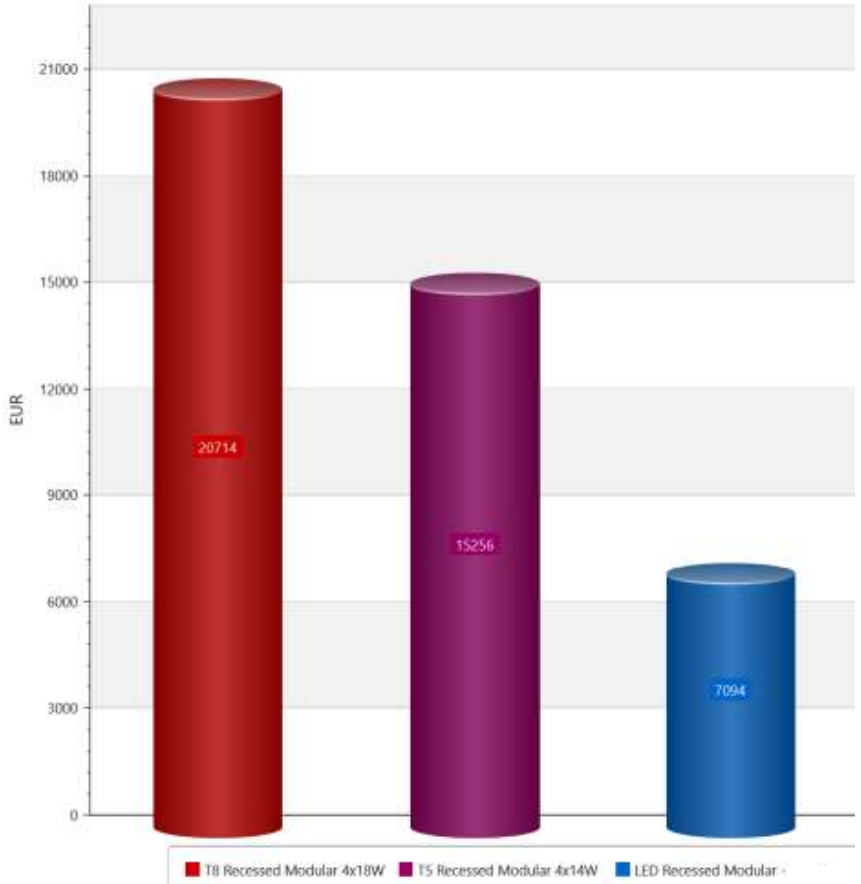
Refurbishment project – Scenario From T5 to LED

Moving to 9 x 32W LED & 2 x 40W LED (500lux)

Total CO2 Emission in use-stage



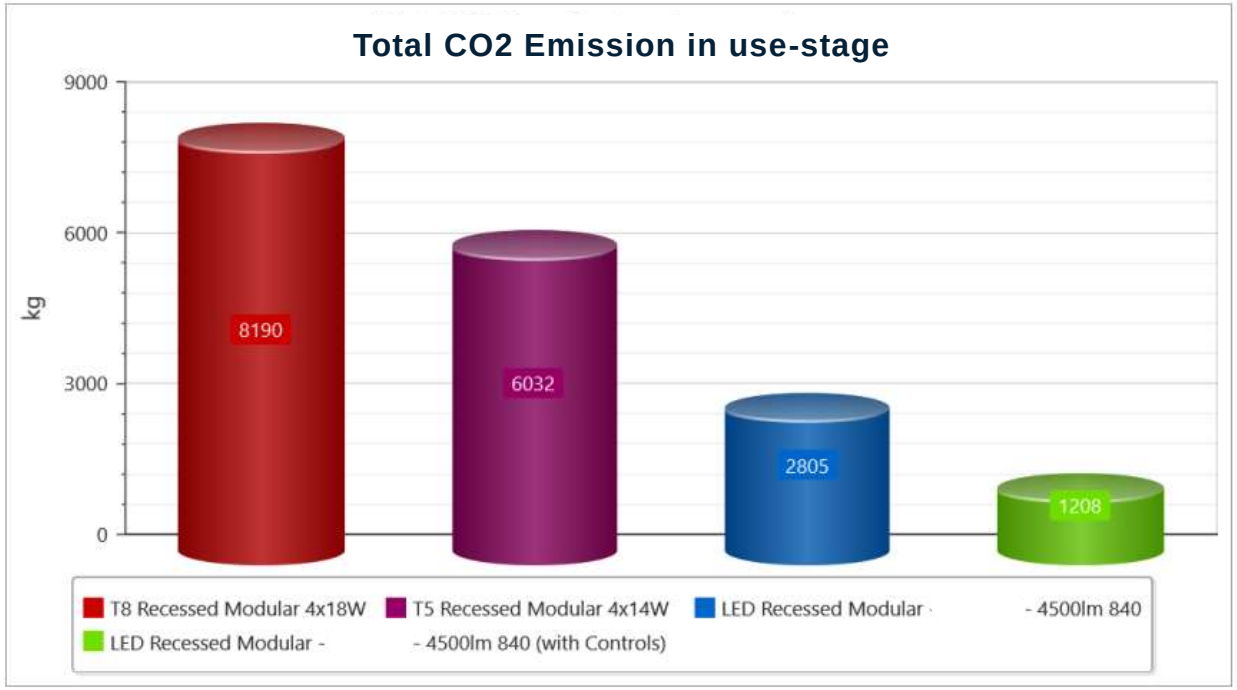
Total energy costs over lifetime EUR

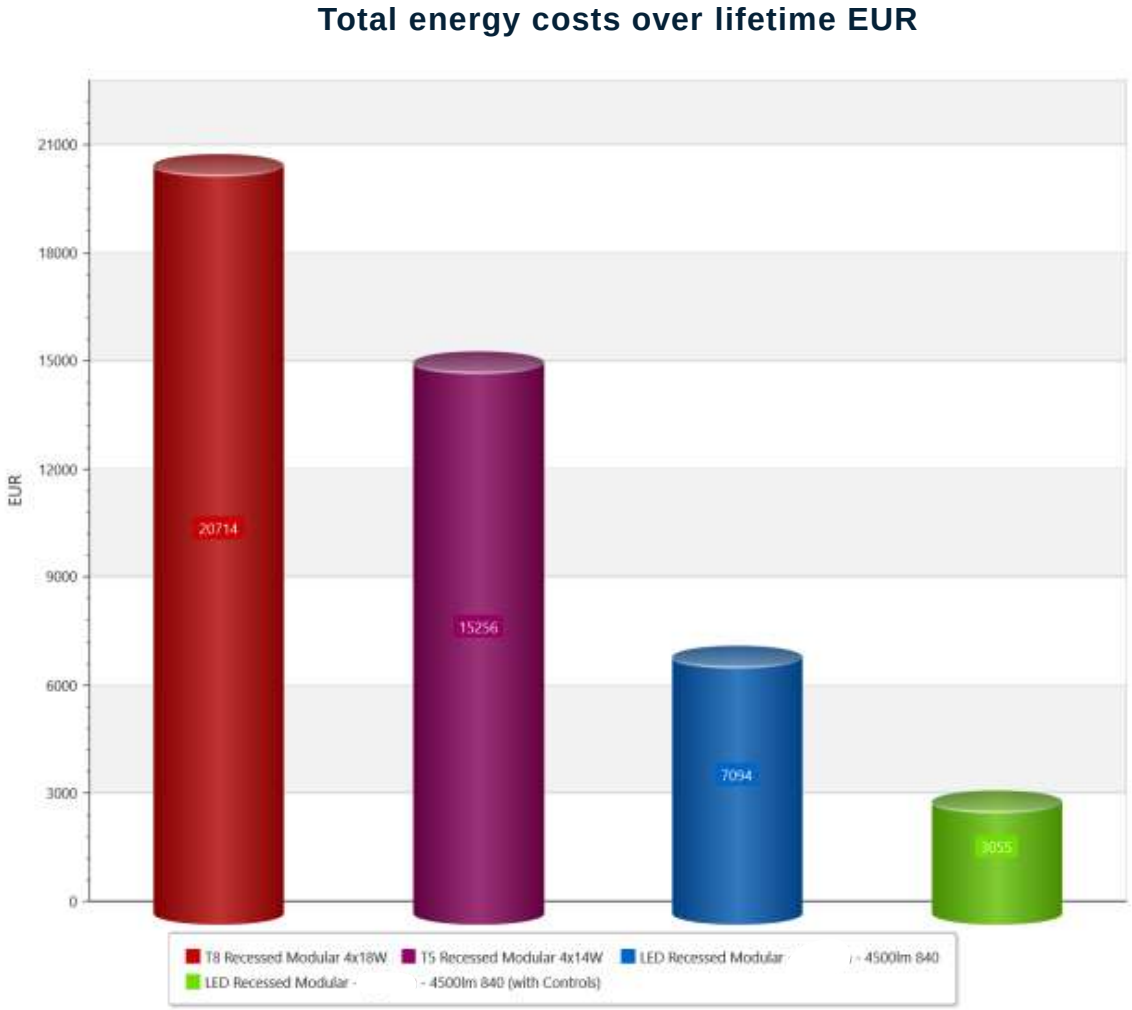


EDUCATION

Refurbishment project – Scenario LED + CONTROLS

9 x 32W LED & 2 x 40W (500lux) + Controls



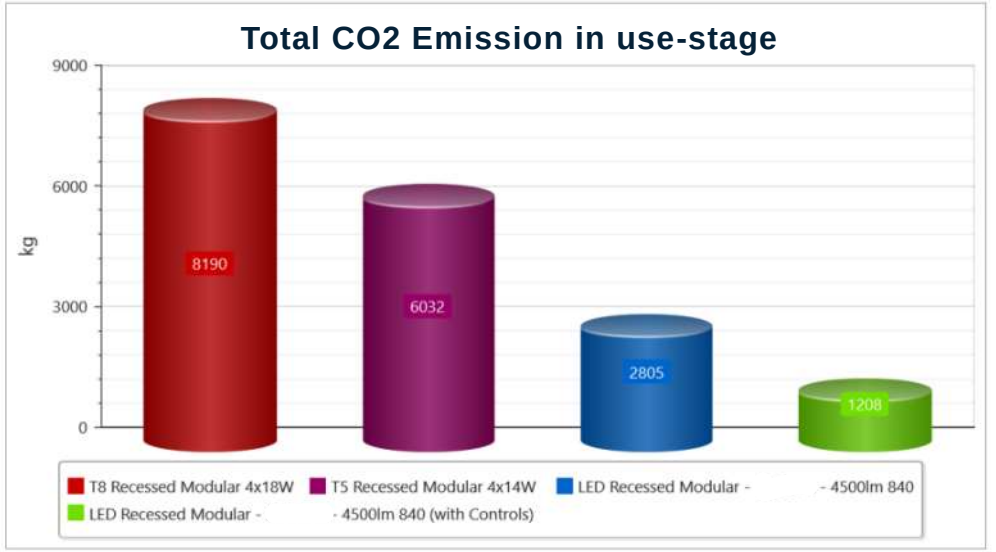


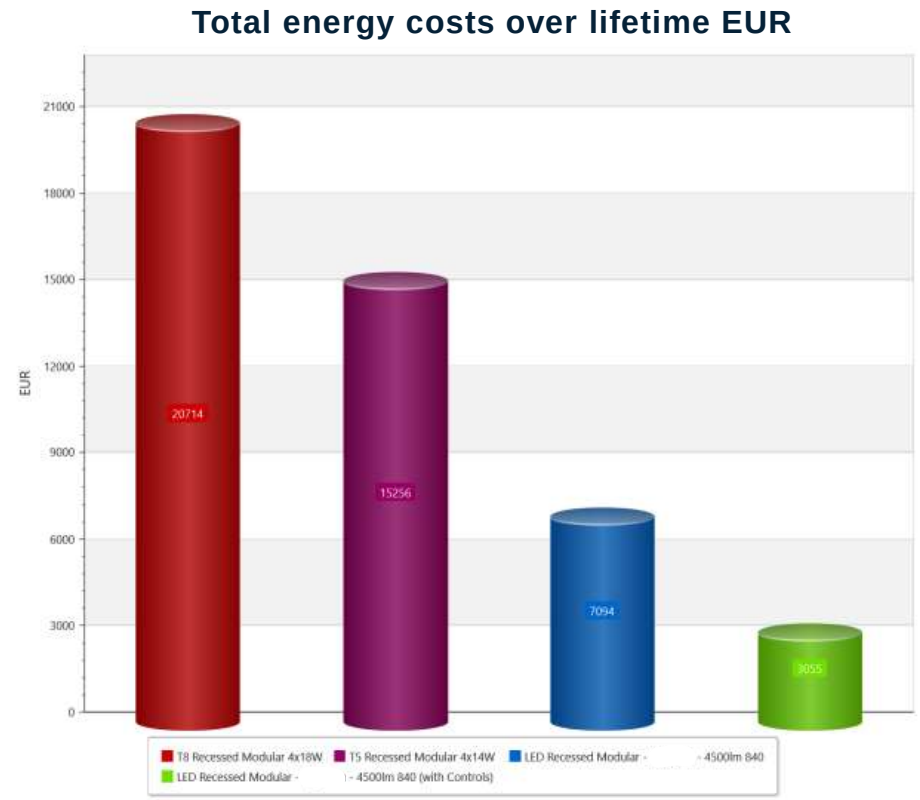
EDUCATION

Refurbishment Project Summary

- Clear reduction in CO2 emissions and energy costs through a move from T8 – T5 – LED.
- Further reductions available when controls are introduced

	T8 Recessed Modular 4x18W	T5 Recessed Modular 4x14W	LED Recessed Modular	LED Recessed Modular - Controls)
Total costs of solution over lifetime (absolute) [EUR]	22 507	17 428	8 252	4 509
Total investment costs [EUR]	1 403	1 553	1 123	1 258
Payback period of solution [a]	Base	0.29	Instantly	Instantly
Total running costs over lifetime [EUR]	22 770	17 312	7 931	3 893
Total energy costs over lifetime [EUR]	20 714	15 256	7 094	3 055
Total maintenance costs over lifetime [EUR]	2 056	2 056	838	838
Average CO2 emission reduction per year (relative) [%]	Base	26.35	65.75	85.25
Average energy consumption per m² and year (LENI) [kWh/(m²a)]	58.63	43.19	20.08	8.65

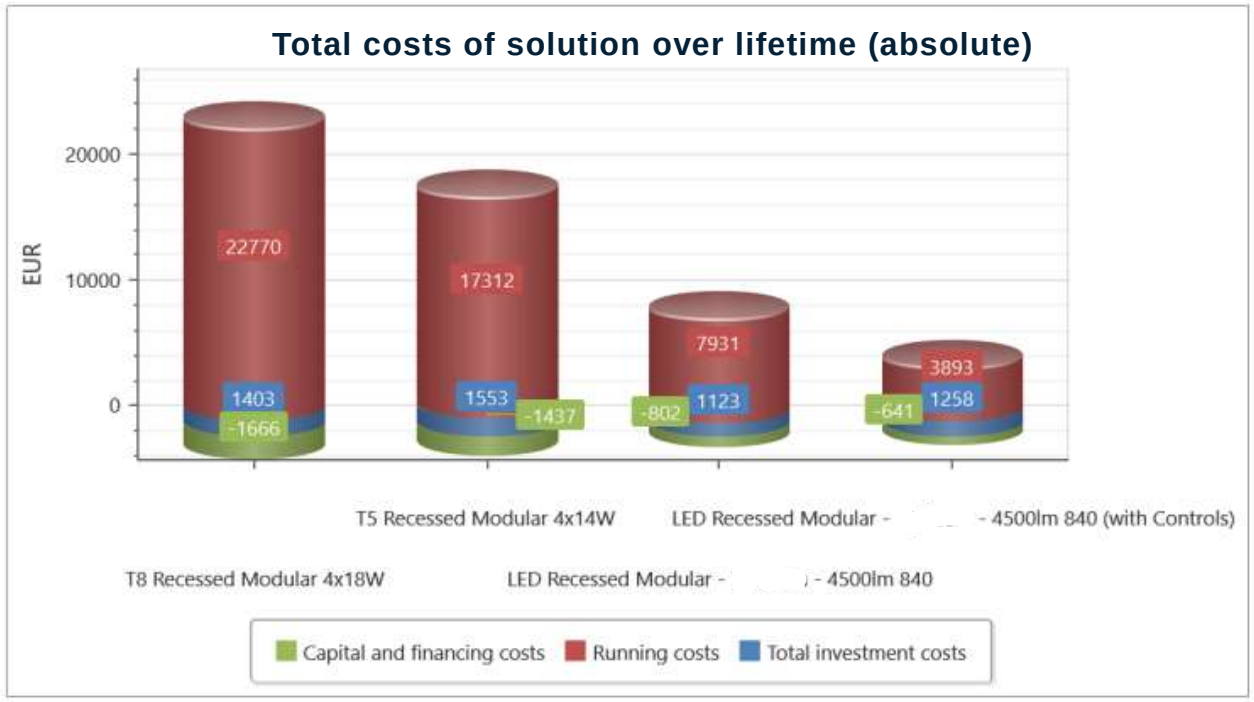


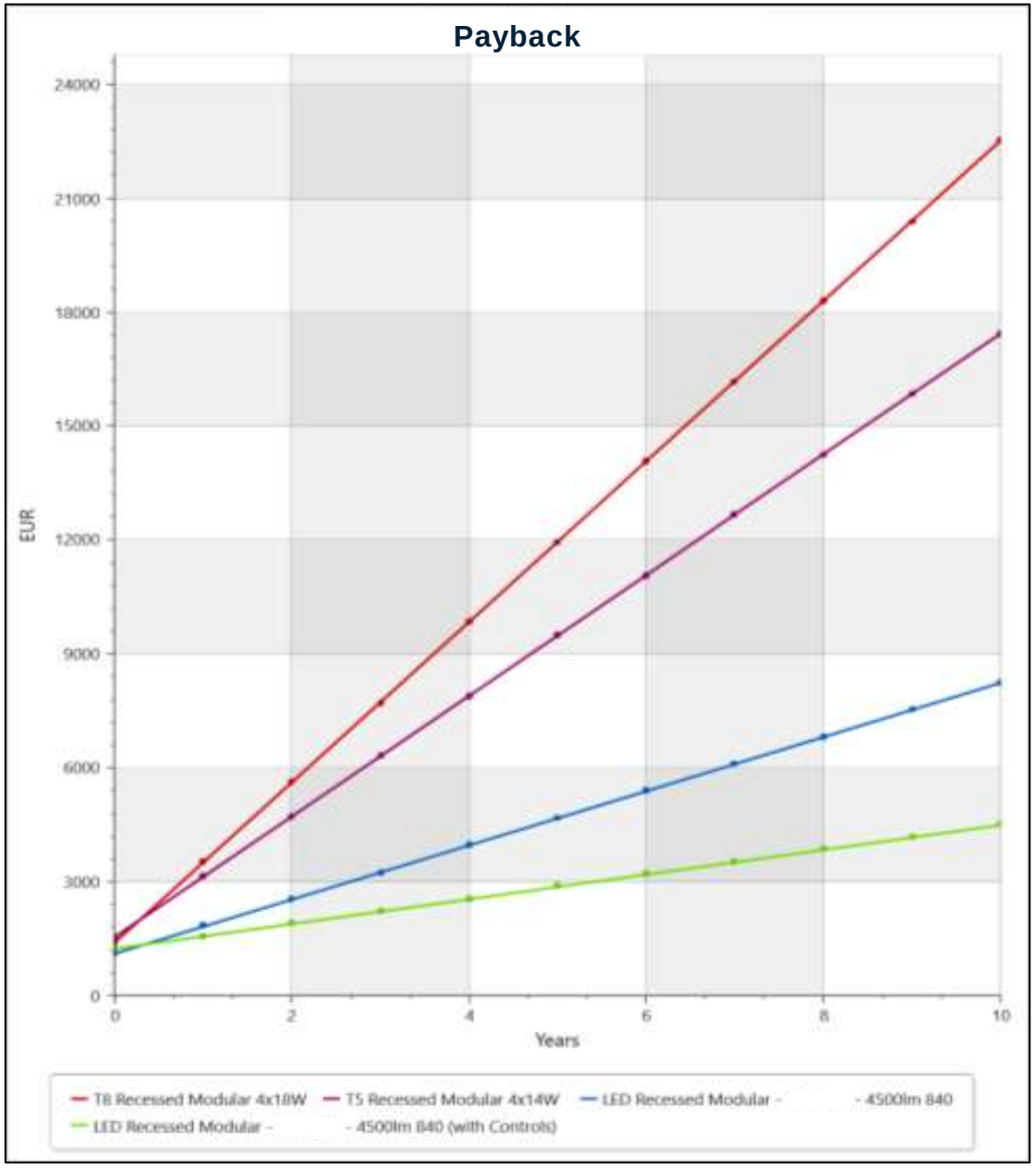


WORKSPACE

Refurbishment Project Summary

- Payback when moving to LED is instant
- When controls are added payback remains instant





CAR PARKS

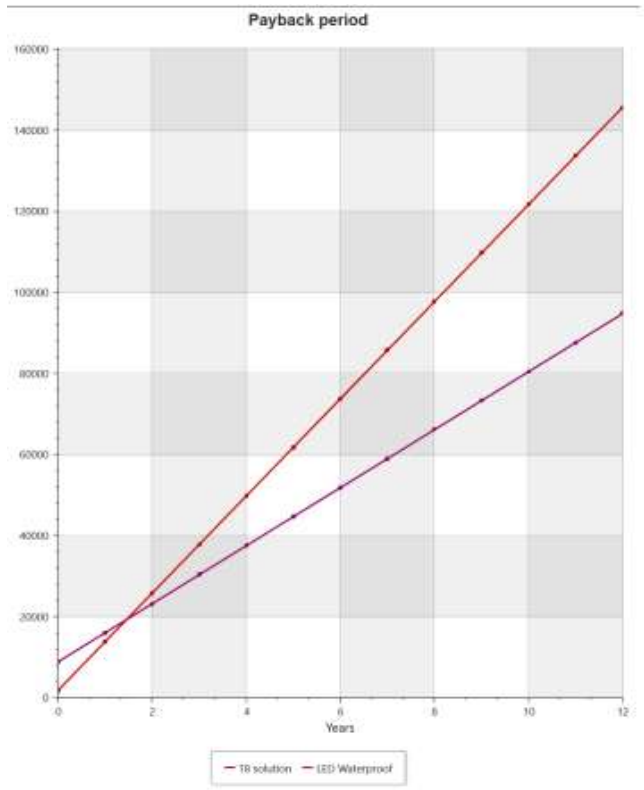
Refurbishment project Upgrade an indoor car park

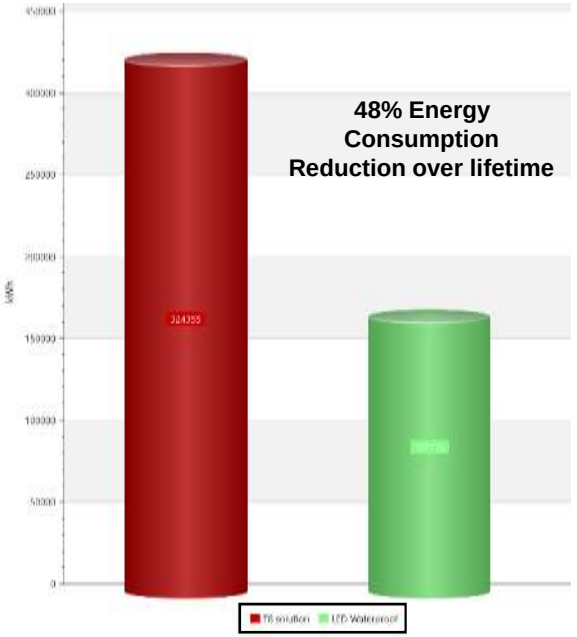
- Upgrade a carpark by replacing the current fluorescent fittings with LED
- The carpark is 90m by 50m with a ceiling height of 2.5m
- In operation 7 days a week, 24 hours a day
- Based on an energy cost of 26.6 (Eur/a)/kW
- Calculations are based on a 12-year lifetime

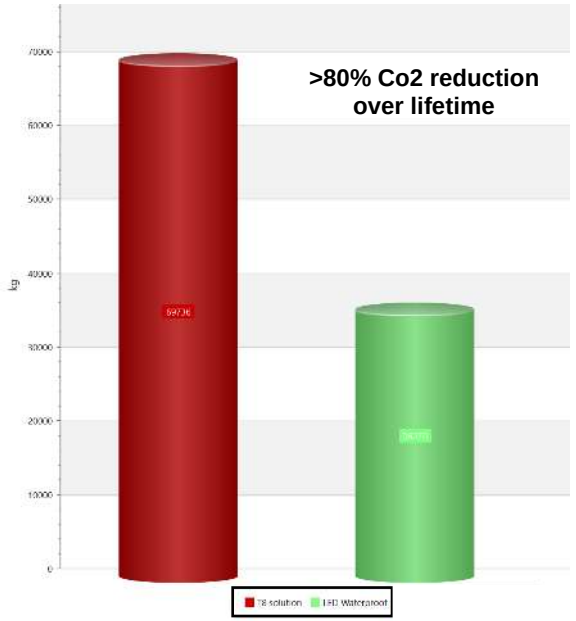
The Solution

- The upgrade will replace 125 1x58W T26 with 125 LED 4300lm with a wide beam optic
- There is a 48% saving on energy usage over the lifetime
- 33666 kg Co2 reduction over lifetime
- Return on investment is just under 18 months

Return on investment within 18 months







CAR PARKS

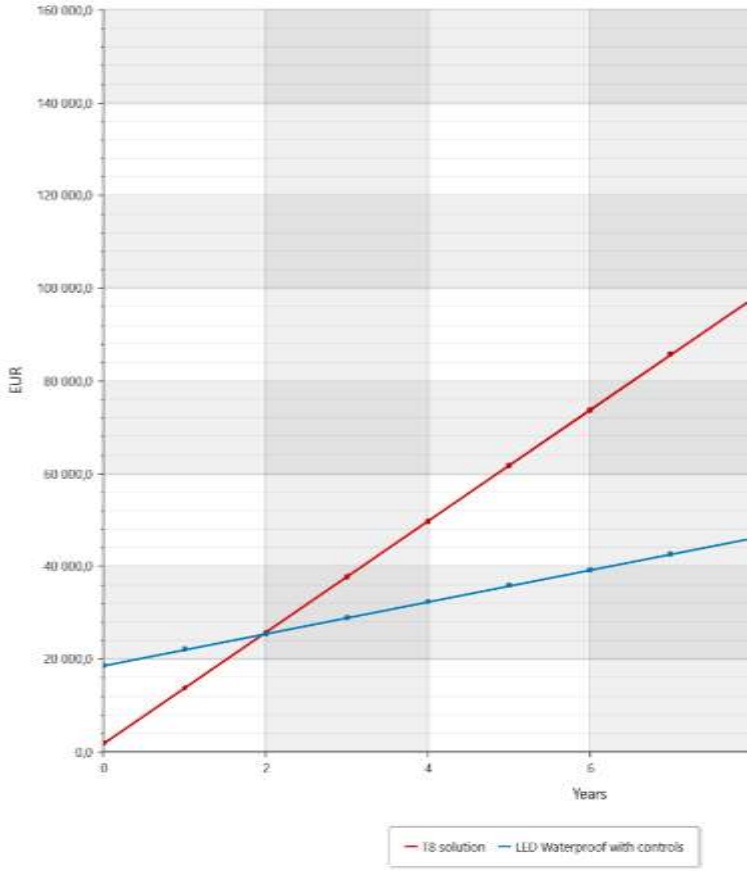
Now let’s add controls

Upgrading the lighting solution in a carpark

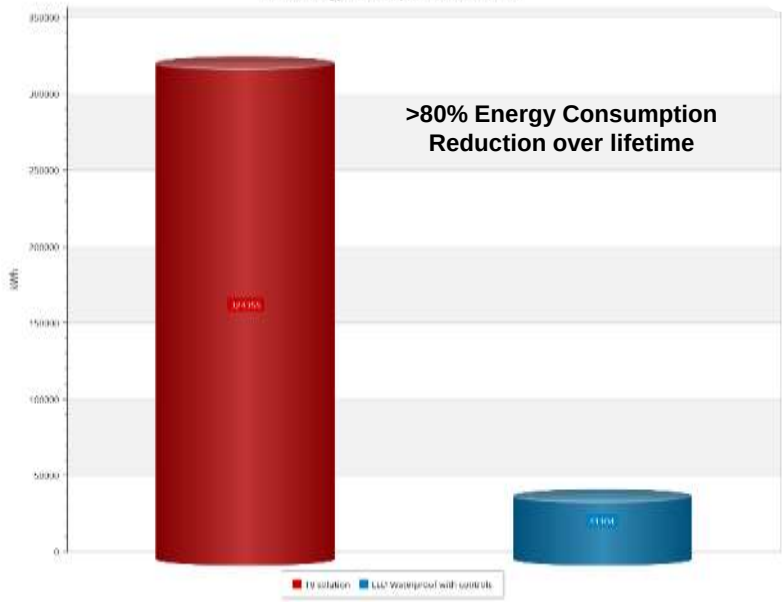
Configuring the system into zones and dimming to 10% when the sensors are not active will save over 80% in energy costs vs the original fluorescent fitting

- Using a wireless system means that no additional wiring is required, saving an additional investment
- 60899 kg Co2 reduction over lifetime
- Return on investment is under 24 months

Return on investment within 24 months

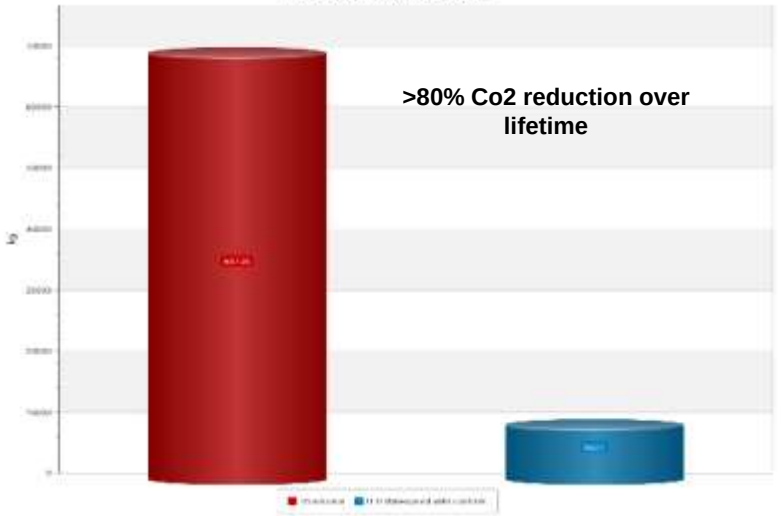


Total energy consumption over lifetime



>80% Energy Consumption Reduction over lifetime

Total CO2 emission in use-stage



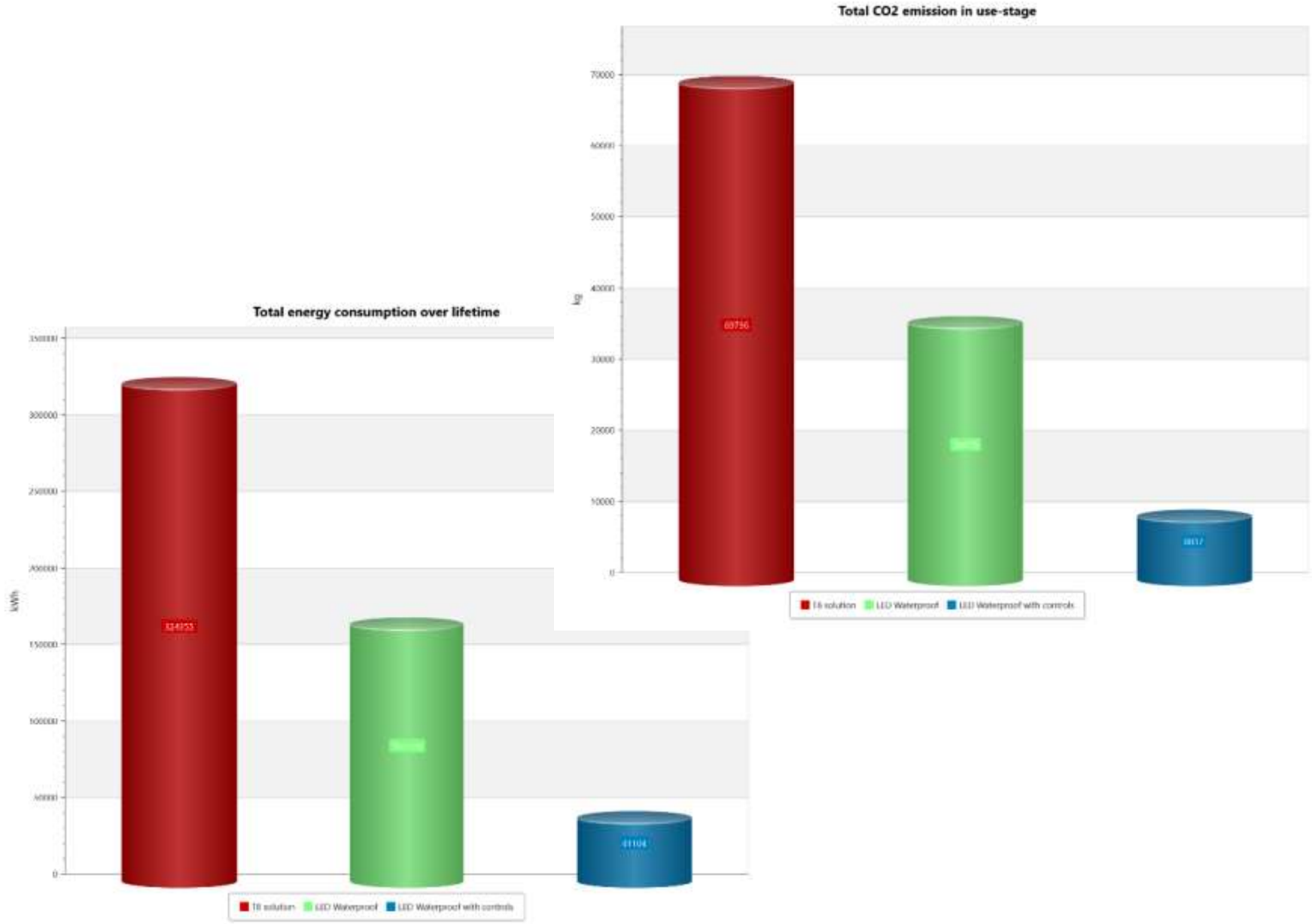
>80% Co2 reduction over lifetime

CAR PARKS

T8 – LED - CONTROLS

- T8 to LED alone resulted in ~48% energy savings and 33666kg C02 saving

- Then through the addition of controls the savings increased to ~87% with a 60899kg C02 saving.

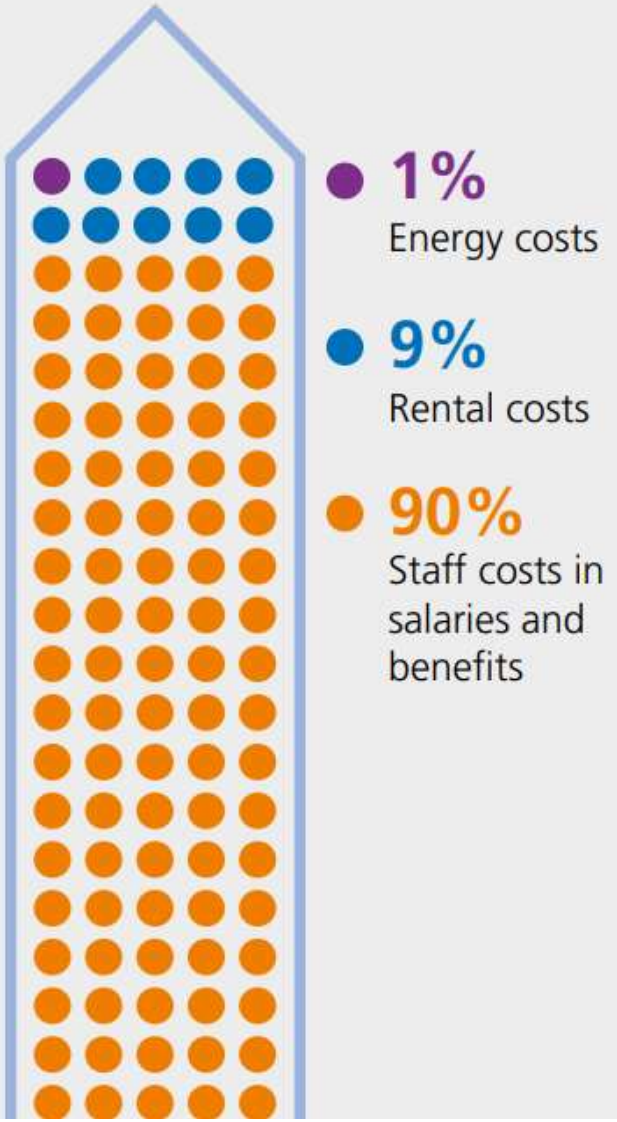


• FOCUS ON HUMANS

- COST ANALYSIS CALLS FOR A RETHINK

- Energy accounts for only 1 % of operating costs
- Energy and investment costs are often focused
- But employees are the largest cost block
- Light and design of the building in close context to the needs of people
- Goal: health and wellbeing

Typical Operation Costs



- Source: World Green Building Council: Health, Wellbeing & Productivity in Offices, September 2014

• HEALTH AND WELL-BEING

- Help to create positive environments, in which light supports people perform their visual tasks.
- Lighting solutions which are planned according to the latest standards will create built environments focusing on people’s needs.
- Light contributing to the health and wellbeing of people doesn’t have to come at the cost of high energy consumption.
- **Upgraded lighting solutions save energy and contribute positively to people's health and well-being.**

• ENERGY EFFICIENCY

- **The goal is to achieve low energy consumption, without compromising on light quality.**
- Efficient high-quality LEDs, reliable electronics and quality optics facilitate suitable light distributions.
- Sensors additionally support savings, and controls and data monitoring facilitate performance and maintenance.

• T5/T8 REFURBISHMENT – ENERGY SAVINGS AND NEW LEGISLATION

Sustainability

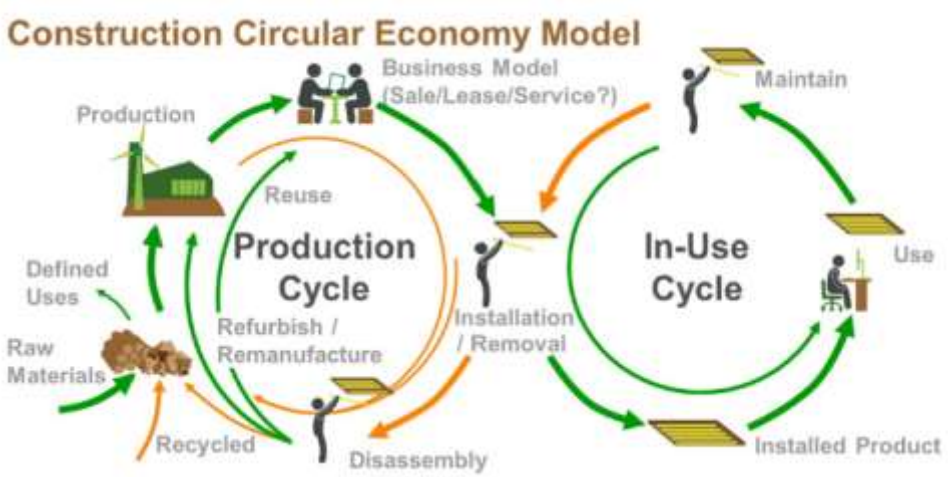
Statement 05: It is wrong to focus only on energy efficiency during the utilisation phase

Calls for energy efficiency during a building’s utilisation phase are actually aimed at reducing the associated emissions. However, the ultimate objective is zero emissions, and this should be clearly stated. In fact, operating the building is only part of the problem. Global construction must shift the focus of its efforts and prioritize a dramatic reduction in embodied emissions.

SUSTAINABILITY

WHAT HAS SUSTAINABILITY TO DO WITH LIGHTING?

Corporate Sustainability	UN SDGs	Green Deal	Green Building	Refurbishment
Health & Well-being	Dark Skies	EPDs	Energy Efficiency	Circular Economy



- *Source: Sustainable Construction Solutions Ltd*

• CIRCULAR ECONOMY

- **Definition**

- A circular economy is based on the principles of designing out waste and pollution, keeping products and materials in use, and regenerating natural systems.
- *source: Ellen Macarthur Foundation*

- The world's current economic model is based on a linear model

- This is a legacy of the Industrial Revolution - The key takeaway being mass production which has led to driving costs down through globalisation but using finite natural resources.

- The Circular Economy holds opportunities for new business based on:
- upgrade & maintenance
- reuse & remanufacturing
- high-value recycling

- **CIRCULAR ECONOMY**

• ASSESSMENT

Circular Economy Assessment Method - Make

(CIBSE TM66 digital tool)

Circular Economy Assessment Method - Specify

Beta version

28th October 2021

Result

Category	Points Scored	Maximum possible points	Assessment
Product design	20.0	35.0	2.3
Manufacturing	10.6	11.0	3.9
Materials	3.0	16.0	0.8
Ecosystem	14.0	22.0	2.5
Overall performance	**47.6**	**84.0**	**2.4**

How to analyse the score	
0 to 0.5	Very poor circular economy performance
0.5 to 1.5	Some circular economy functionality
1.5 to 2.5	Definite/substantial progress to circularity
2.5 to 4.0	Excellent circularity

- The launch of TM66 identifies the guidance and significance of the growing interest and essential focus from specifiers and customers.
- Additional schemes to look to comply with or be approved in luminaire design and the application of light includes Crade-to-Cradle, TM66 & WEEE and circular design.

TM66 CIRCULARITY 012-0008 LIA CIBSE

CERTIFIED cradle to cradle BRONZE

• ENVIRONMENTAL PRODUCT DECLARATIONS (EPDs)

- **Environmental Product declaration Certificate** (EPD)
- Complies with- ISO 14025 & EN 15804

- **Contains:**

- Product make up materials for **RoHS/ REACH**
- **Manufacturing plant** information/ accreditations
- Make & deliver- **embedded carbon**
- In-use energy over design life- **operational carbon**
- Global warming potential- **GWP** data
- End of life- recyclable parts - **WEEE** scheme

- CIRCULAR DESIGN RULES (CDRS)

• CIRCULAR DESIGN

- **CIRCULAR DESIGN**
- Design for disassembly
- Facilitate a long product lifetime
- Foundation for maintenance and upgrade

Lighting Energy
Sustainability
Circular Economy

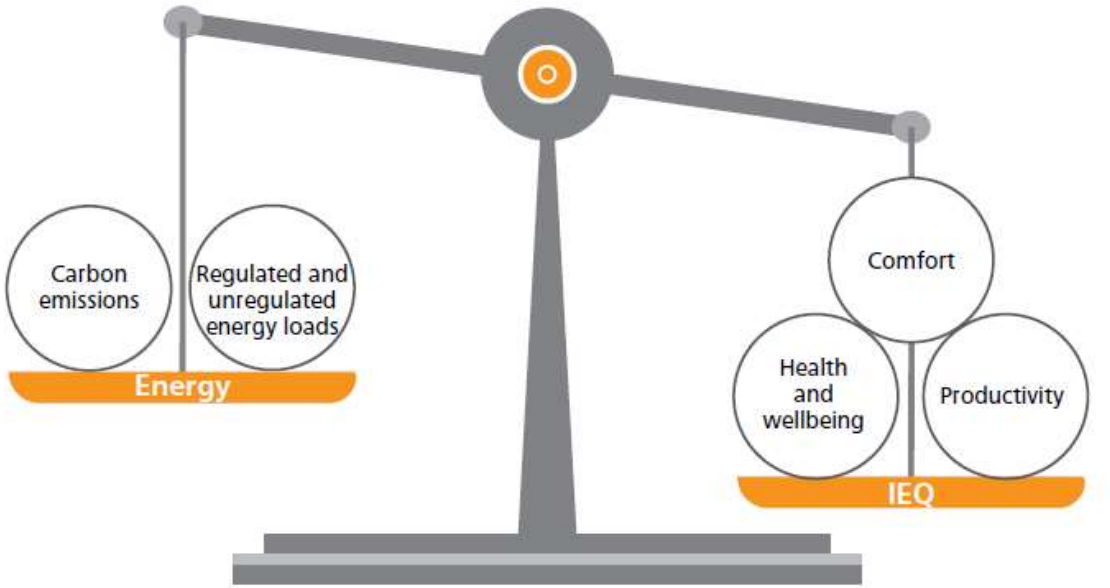


Figure 1.2 Delivering energy efficient buildings conducive to health, productivity and comfort

Lighting Quality
Design Creativity

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Questions?

T5/T8

Refurbishment – Energy Savings and New Legislation

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THANK YOU

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