

Public Buildings

Bristol Waste Depot LED Retro-fit



Purchasing body:	Bristol Waste Company
Contract:	Retro-fit of LED lighting at Waste Depot Awarded: August 2017
Savings:	<ul style="list-style-type: none"> • 112 tons of CO₂ emissions saved per annum • Primary Energy saving of 0.558 GWh per annum • Forecast financial saving of €530,554 over ten years

SUMMARY

- Retro-fit of LED lighting in a waste depot with five discrete areas
- Five discrete (internal and external) areas with differing requirements
- Request for quote: publication date 15 June 2017; award August 2017
- Bristol Waste LED; tender value: €47,772; contract for the installation was completed in two weeks.
- Awarded to: ESL (energy saving lighting) using FLUX products

Procurement Approach

Bristol Waste is a waste company wholly owned by Bristol City Council (BCC). The waste service had previously been outsourced but was brought back in-house and subsequently delivered by Bristol Waste, which was set up for this purpose, in 2016. Bristol Waste operates out of a waste depot owned by BCC. The depot consists of five separate areas including waste transfer, waste separation, offices and canteen, reception, and a car park.

Lighting at the site was dilapidated, highly inefficient and required replacement. In one area the current spread of light from existing fittings was poor. All areas presented different challenges and required an individual solution. For example, different areas require varying light activation requirements and there is a discrepancy in the heights of buildings.

Through a feasibility study undertaken by BCC's Energy Service Team it was identified that significant cost savings and improvements to the lighting arrangements could be achieved through installing LED lighting tailored to the requirements for each area.

The contract was procured through a request for quote process as the potential value was below the EU threshold.

Market engagement

Market engagement was undertaken with three organisations through meetings, email and verbal communication. Whilst all three organisations agreed that retro-fitting LED would be possible, they came up with different options. The main difference between the options was that two companies proposed the installation of new fittings, rather than utilising the existing fittings. The three companies responded to the subsequent request for quote.

PROCUREMENT INNOVATION

The decision was taken to retro-fit the whole site, including exterior and interior lighting. This covered five separate areas with different functions, from waste sorting through to office and staff welfare facilities. Existing fittings were re-used, substantially reducing the installation costs and waste.

Life cycle costing

Life Cycle Costing has been taken into account in this project see Annex 1. In addition to potential energy savings (including CO₂ savings and financial savings from energy reductions), the savings on the maintenance of the fittings were also calculated to provide a whole life cost of the project. What is not clear, however, is the cost of disposal at the end of the lifetime of each fitting. The LED lamps are predicted to last ten years and with costs for waste disposal, recycling and/or reuse likely to significantly change within that time period, it is difficult to take this end of life cost into account.

Tender specifications and Verification

TECHNICAL SPECIFICATIONS

- Delivery of the lux output recommended by CIBSE for each specific type of space at the site; each area has a different minimum/maximum lux requirement - see below Passive infrared (PIR) motion sensors and Lux sensors are required; the type of control is dependent on the area in question
- All replacement luminaires are to be fixed to the positions of the existing luminaires

AWARD CRITERIA

The contract was awarded on

- 60% price, taking into account the LCC analysis; and
- 40% quality which included scheduling of works to take into account the uninterrupted operation of the site; appropriate resources; and health and safety plans to work in what is a potentially dangerous site.

VERIFICATION

- Pricing schedule and details of lighting to be installed in accordance with the requirements.
- Relevant programme of works, personnel and details of health and safety compliance.

CIBSE recommended lux output

Area	Minimum lux	Maximum lux	Minimum LED standard Lumens per watt - Min of 110 LOR - Minimum of 90% CRI - Minimum of 80 LM80 >70,000 Colour Stability - 3 Macadams PF >0.95 CE,RoH 5 year warranty
Office	500	600	
Toilet	150	250	
Changing room	200	250	
Walkways – exterior	10	30	
Car park	20	40	
Waste separation	200	250	
Warehouse open space	150	200	
Warehouse workshop	150	200	
Warehouse waste separation	200	250	

A regional approach to SPP

Bristol City Council’s Energy Service let the contract and managed the installation on Bristol Waste’s behalf. The Energy Service work closely with other authorities in the PIP network and lessons learned from this project can be shared with other network members who are in a similar situation. For example, the lessons learned in respect of retrofitting assessed against new fittings will be relevant to any of the [PIPEN](#) members who are thinking of installing LED lighting across a range of sites. These lessons will be presented at PIPEN meetings, through the Energy Service when liaising with other public sector bodies.

This project is a flagship project for the region in terms of LED lighting in an industrial setting and one which the rest of the region can learn from. This develops a pool of learning across a range of diverse locations and situations.

Results

The solution was selected on a ratio of 40% quality and 60% price. The successful bid was significantly lower than the two other bidders as ESL planned to use existing fittings rather than install completely new fittings.

Environmental impacts

When measuring against the previous contract as a benchmark, the tender will save **112 tons of CO₂** per annum, which is a reduction of 78%.

Table 1: Environmental savings

Tender	Consumption (GWh)	CO ₂ emissions (tonnes/year)	Primary Energy consumption (GWh)
Benchmark (previous contract)	0.286	143.81	0.714
Low carbon solution (2017 tender)	0.063	31.53	0.157
Savings		112.29 (78.08%)	0.558 (78.08%)

CALCULATION BASIS

- CO₂ emissions for conventional electricity set at 0,503 kgCO₂/kWh
- For primary energy consumption a PEF (Primary Energy Factor) of 2.5 was assumed for electricity produced from fossil fuels, and 1.1 for RES¹
- Calculation made using the tool developed within the GPP 2020 project (www.gpp2020.eu), and refined within the SPP Regions project. Available on the SPP Regions website.

Financial impacts

Over a ten year period the cost savings are projected to be approximately €530,553. This takes into account costs savings from reduced energy consumption of €198,753 and maintenance savings of €331,800.

Social impacts

The lighting on the site was dilapidated and, in some areas, not fit for purpose. This site handles and sorts a wide range of waste from around the City; there are also a lot of heavy waste collection vehicles constantly moving in, out of and around the site. Improved lighting through the installation of LED lamps will improve the safety of the site and, therefore, the welfare of the staff working on the site. This is particularly important when the site is operational in winter, as daylight hours are from 08:00 until 16:00.

Contract management

Contract management was carried out by Bristol City Council on behalf of the Bristol Waste Company. The contract management covers not only the installation but also the ongoing operation, including maintenance and service.

Lessons learned and future challenges

There were challenges with this installation due to the range of lighting requirements across different areas of the site. The buildings were a mix of indoor and outdoor spaces, such as offices, open areas and warehouses, with heights of fittings varying from area to area, and each with its own levels of activity. For example, the office and canteen area differ significantly from the waste sorting area.

Whilst this installation was successful, although not without its challenges, it is not always easy to understand when a LED retro-fit using existing fittings is the right course of action particularly when

¹ Source: Ecofys, Development of the Primary Energy Factor of Electricity generation in the EU-28 from 2010-2013, 2015

there are other options available. A longer period of time to assess the different options would have been useful. The cost savings by using existing fittings are greater than changing all the fittings, but it can make installation less straightforward.

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Annex 1 – Life cycle costs

YEARLY SAVINGS CALCULATION FOR ELECTRICITY USAGE					
Outputs	Total Watts Used per Year	Carbon KG per Year	KW's used per Year	Cost per KW £	Cost per Year £
Current Installation Yearly Outputs	116,674,560	630,043	116,675	0.100000	11,667.46
Proposed Installation Yearly Outputs	19,828,800	107,076	19,829	0.100000	1,982.88
YEARLY SAVINGS TOTALS	96,845,760	522,967	96,846	-	9,684.58
Outputs	Total Watts Used per Year	Carbon KG per Year	KW's used per Year	Cost per KW £	Cost per Year £
Current Installation Yearly Outputs	38,050,560	205,473	38,051	0.100000	3,805.06
Proposed Installation Yearly Outputs	15,184,800	81,998	15,185	0.100000	1,518.48
YEARLY SAVINGS TOTALS	22,865,760	123,475	22,866	-	2,286.58
Outputs	Total Watts Used per Year	Carbon KG per Year	KW's used per Year	Cost per KW £	Cost per Year £
Current Installation Yearly Outputs	63,763,200	344,321	63,763	0.100000	6,376.32
Proposed Installation Yearly Outputs	13,284,000	71,734	13,284	0.100000	1,328.40
YEARLY SAVINGS TOTALS	50,479,200	272,588	50,479	-	5,047.92
Outputs	Total Watts Used per Year	Carbon KG per Year	KW's used per Year	Cost per KW £	Cost per Year £
Current Installation Yearly Outputs	55,987,200	302,331	55,987	0.100000	5,598.72
Proposed Installation Yearly Outputs	11,664,000	62,986	11,664	0.100000	1,166.40
YEARLY SAVINGS TOTALS	44,323,200	239,345	44,323	-	4,432.32
Outputs	Total Watts Used per Year	Carbon KG per Year	KW's used per Year	Cost per KW £	Cost per Year £
Current Installation Yearly Outputs	11,197,440	60,466	11,197	0.100000	1,119.74
Proposed Installation Yearly Outputs	2,661,120	14,370	2,661	0.100000	266.11
YEARLY SAVINGS TOTALS	8,536,320	46,096	8,536	-	853.63

Key:	Site Area
	Waste transfer and fleet
	Office, canteen, toilets, store
	Car park
	Waste separation
	Reception

About SPP Regions

SPP Regions is promoting the creation and expansion of 7 European regional networks of municipalities working together on sustainable public procurement (SPP) and public procurement of innovation (PPI).

The regional networks are collaborating directly on tendering for eco-innovative solutions, whilst building capacities and transferring skills and knowledge through their SPP and PPI activities. The 42 tenders within the project will achieve 54.3 GWh/year primary energy savings and trigger 45 GWh/year renewable energy.

SPP REGIONS PARTNERS



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