

Connect Roads Street Lighting

Green Apple Submission – 31 May 2018

1. **Environmental Improvement** award
2. Green Practices Sector: **Energy Saving**

3. Project Aim:

The introduction of LED street lighting by Connect Roads reduced energy consumption, carbon and costs for our Local Authority clients, helping them to work within financial constraints and reduce carbon, a sustainability aspiration for our company and clients.

LED lanterns reduce maintenance costs as they require fewer lifecycle visits; resulting in fewer vehicle journeys to maintain the asset leading to carbon savings of 291g CO₂ per mile. LED lantern replacements are connected to a Central Management System with Telensa cells, enabling remote dynamic control, dimming and fault detection, giving further performance and sustainability benefits.

The newer LED lanterns meet lighting standards and illuminate a brighter colour temperature (4,300k vs. 2,700k) than traditional lanterns, contributing to improving public safety (15% crime reduction in London boroughs with improved LED lighting) and reducing light spill as LED luminaires have a defined direct light pattern.

The tangible benefit is a more reliable asset which benefits from a 20-year manufacturer warranty, a favourable risk profile which in turn delivers maintenance savings which are shared with clients. The combined maintenance and energy cost savings provided a favourable financial contribution for clients totalling £2.7m per annum (combined), equating to £32m over the remaining life.

4. Project Achievements:

As a responsible portfolio asset holder of circa 267,000 street light units, signs and bollards, and in line with our corporate sustainability ethos, we explored the opportunity to collaborate with our Local Authority clients to deliver both energy and maintenance cost savings and carbon reduction for our clients by way of introducing energy efficient LED lighting. This collaboration also assisted our Local Authority clients with their 'spend to save' initiatives as they were experiencing increased operational budget constraints. The existing non-LED lighting stock was of an already efficient design which was enhanced with a dimming regime. However, the introduction of LED's allowed for a further energy reduction.

To date we have assisted our Local Authority clients with upgrading circa 20% of their lighting stock to LED lanterns.

Research and development of LED's continues to improve, with LED lanterns becoming increasingly efficient and more cost effective, thus allowing a shorter capital payback period for our clients who benefit from reduced energy costs. The LED project has delivered energy savings of up to 80% with an average energy cost reduction of 72% across our portfolio. The project also delivers on carbon reduction.

Written submission

WHAT DID THE PROJECT INVOLVE DOING?

Connect Roads operates six street lighting PFI contracts with Local Authority clients (two endorsement letters attached from Sunderland City Council and Northamptonshire County Council), identifying routes within each contract which could benefit the client by changing the existing traditional lanterns to LED lanterns. Clients achieved energy reduction (kWh), carbon saving and financial savings within a feasible capital expenditure payback period. The LED schemes implemented have provided a combined energy saving in the range of 65% - 80%.

WHY DID YOU DO IT?

With Local Authorities financial constraints, we were approached to consider how we could utilise our operational and design expertise to generate efficiencies. The quality, performance and technology of LED lanterns have improved over recent years. As demand for these units increased, the average price has decreased by 50% over the last five years, making the switch to LED more desirable, particularly with an average payback of circa eight years. With improving technology and confidence in the long-term performance of LED products, we were able to secure a 20-year warranty on LED products (usually 5-10 years but increased due to large scale order). The warranty covers the duration of the PFI contracts thus eliminating lifecycle risk and contributing to the savings shared with clients.

WHAT DID IT COST AND WHERE DID THE MONEY COME FROM?

The schemes have been funded via a combination of Salix and Local Authority funding, each secured as a result of the relatively short pay-back period for the capital investment required. Connect Roads has shared operational and maintenance savings with clients, which has further contributed towards the environmental and financial sustainability of the solution.

IF QUANTIFIABLE, WHAT DID THE PROJECT ACHIEVE IN TERMS OF SUSTAINABLE DEVELOPMENT, ECONOMY, ENVIRONMENT AND/OR EQUITY?

Sustainable Development

We sourced the product from a local supplier, helping to sustain local workforce. Resources employed to install the LED lanterns were also based locally, living within an hour's commute of each project.

Economy

The maintenance savings generated as a result of the LED introduction have been passed or shared with the Local Authorities, further assisting Local Authorities to meet their operational expenditure reduction targets.

Environment

LED upgrades have resulted in total energy savings of 321,000,000 kWh, and carbon savings of 175,016 tonnes CO₂. This is equivalent to the annual CO₂ generated from electricity usage of 13,463 average homes. Greater directional control of the LED light source minimises light spillage, benefiting the environment, people and wildlife.

Compared to traditional lanterns (replaced every 3-4 years), LEDs require less maintenance, have a longer lifespan and are less prone to faults. We have implemented integrated remote monitoring via a Central Management System to LED lanterns, thus reducing maintenance and inspection visits, reduced vehicle mileage, reduced CO₂ air pollution and reduced land fill for non-recyclable failed parts.

All replaced luminaires not suitable for re-use or refurbishment are disposed of in accordance with the Waste Electrical and Electronic Equipment Directive (WEEE) by separating the lanterns components for recycling to reduce landfill waste, minimise lanterns degrading and eliminating any sodium or mercury hazardous toxins leaking into our ecosystem. Any toxins are contained within sealed units and these waste parts are collected by Recolight Recycling; a specialist in hazardous lantern recycling.

Ward Recycling are used to recycle the remaining components to help ensure we meet our responsibilities to dispose of residual commercial waste with minimal impact on the environment. Recolight, Ward and the Balfour Beatty Living Places (our maintenance contractor) operate to the highest quality standards and are certified ISO 14001.

Partnering with Derby City Council and Foston Hall Women's Prison, we provided the opportunity for inmates to '*earn and learn*', by deconstructing 13,000 lanterns. The project enables the lanterns to be fully recycled with no landfill requirements. The partnership generated a client saving of over £50,000 and provided work experience to aid employment for inmates upon release. The project is supported by Recolight and Ward.

WEEE regulations target 80% for reuse of materials recovered during lamp recycling; we exceeded this and achieved 95%. Components recycled are plastics, glass and circuitry aluminium.

Hazardous toxins (Sodium, Mercury and any Phosphor powder) are recycled by Recolight, which is then re-used to manufacture new lamps.

WHO AND WHAT BENEFITED including LONGER TERM BENEFITS?

The Local Authority and the public are beneficiaries of enhanced LED street lighting. The LED lanterns are provided with a 20-year manufacturer warranty resulting in significantly reduced maintenance visits and carbon usage.

As part of our sustainable development of sourcing within the UK, local suppliers have benefitted from our large scale order of circa 45,000 LED units.

As LED lanterns efficiency continues to improve and we roll out further schemes, the energy and carbon savings are expected to significantly increase.

WAS THERE ANYTHING INNOVATIVE ABOUT THE PROJECT?

The project required a collaborative approach between all stakeholders - clients, shareholders, funders, legal experts and technical advisors. All parties needed to accept a Deed of Variation to change the asset inventory. Parties are located throughout the UK and as a responsible business, mitigated our carbon footprint by utilising Video Conferencing facilities installed throughout our 11 project offices, resulting in significant travel reduction (75%) for management staff.

The asset was initially installed with energy and maintenance efficient lighting during the Core Investment Period; we were able to generate significant further energy, carbon and maintenance savings for the benefit of each client with no additional risks being borne.

CAN OTHER ORGANISATIONS/COMMUNITIES BENEFIT FROM IMPLEMENTING YOUR METHODS?

Our methods have been implemented by other Balfour Beatty operating companies and co-shareholder companies. Our innovative approach to standardising contract variations for LED upgrades has been beneficial in engaging funders, technical and legal advisors from across our street lighting portfolio; to the benefit of the clients. Our approach has reduced contract variation cost by c.£15k and also reduced the time taken to implement a contract change which has further benefitted the Local Authorities as LED lanterns are installed quicker thus realising the benefit of reduced energy consumption earlier.

WHAT DID YOU LEARN FROM THE PROJECT AND ARE YOU PLANNING ANY FURTHER DEVELOPMENT?

Collaboration with all relevant stakeholders is the key to delivering a solution that meets our clients' requirements. We constantly review LED technology with the view to deploy on the remainder of the network particularly on traffic routes which require a more technical lighting solution. We liaise with suppliers and attend Research and Development events.

Northants and Sunderland accreditation letter is attached to covering email addressed to Karl.