



CTS001

Good Practice
Case Study

Energy efficient lighting and controls
at North Lanarkshire Council



Making business sense
of climate change

The Business Case

Introduction

The Sir Matt Busby Sports Complex is an important local facility for the people of Bellshill, North Lanarkshire.

The sports and leisure complex, a North Lanarkshire Council property, offers a combination of indoor and outdoor sporting facilities including a floodlit synthetic football pitch and a comprehensive mix of swimming, sauna, gym and sports hall facilities.

The complex achieved QUEST¹ quality accreditation in January 2005. Having worked hard to achieve this quality standard, the Complex Manager is committed to maintaining and improving quality. Energy efficiency offers an opportunity to derive both cost and quality benefits.

The electrical demand imposed by lighting for any business can be very significant, constituting up to 30% of the electrical power consumption. At the Sir Matt Busby Sports Complex a combination of new efficient light fittings and controls has improved lighting levels, reduced overall energy consumption by nearly 10% and provided substantial cost savings.

The Carbon Trust has assisted the Council by identifying and prioritising energy saving opportunities and providing a prioritised implementation plan. This partnership arrangement and the Council's access to £930,000 of 'spend to save' funding, provided by the Scottish Executive, has allowed the rapid implementation of energy efficiency measures.

North Lanarkshire Council social and environmental responsibility

North Lanarkshire Council is responsible for the management of over 900 properties, with an associated energy spend of over £6.4million. The Council is committed at both corporate and personal levels to reducing its environmental impact, through its Social and Environmental Responsibility policy. This recognises the environmental and cost benefits to be derived from energy management.

The Council has embarked on a comprehensive programme of energy efficiency improvements across all managed properties and purchases green energy.

The Housing and Property Services department of North Lanarkshire Council provides energy efficiency advice and technical services to all Council departments and supports the Corporate Energy Group through its dedicated Energy Unit.

- Annual energy savings of 10% worth more than £10,000
- Annual energy savings of 219,000 kWh
- Annual CO₂ savings of over 94 tonnes

The Sir Matt Busby Sports Complex is one of several facilities being refurbished to improve quality and reduce costs. Improvements to lighting and associated controls is a vital component of the Council's energy efficiency plans and in most cases there is the added bonus that lighting installations can be completed without major service disruption.

The business benefits

These improvements have:

- reduced energy consumption and cost
- enhanced the quality and ambience of the sports centre
- reduced the demands on staff through improved controls.

¹ The UK national standard for excellence in sports and leisure management.



The Technical Case

Energy efficient lighting

Lighting is often not regarded as being a major energy cost and the opportunity for saving is often overlooked. Although a single light fitting may consume only a few hundred Watts, the cumulative effect of many lights left switched on unnecessarily for extended periods results in a significant cost for many businesses.

There are three principal improvements that can be made to lighting systems:

- High efficiency lamps or tubes - offering a greater light output for each Watt of power input.
- Modern, reflector and diffuser designs that collect and direct light output effectively to where it is needed.
- Modern control gear that enables light output to be varied automatically by switching off or dimming the lighting.

In terms of efficiency, the light output, in lumens per unit of power input produced by the lamp, is clearly an important factor. Modern fluorescent slim line tubes with improved coatings allow higher light outputs than older fluorescent types offering immediate energy savings of at least 8%.

However, this is only part of the story, for the light produced by a lamp must be transmitted efficiently from the light fitting. Modern fittings with efficient mirror reflectors offer improved light output ratios (LOR).

Colour rendition is important to the way in which we perceive our surroundings. Modern lighting is manufactured with various coating combinations to provide different perceived conditions for specific applications or tasks e.g. close work or 'mood' lighting.

Other improvements have reduced the power consumed by the control gear (ballast) which conditions the mains electricity to the voltage and frequency required by fluorescent and discharge lamp types. Modern lamp and control combinations allow dimming, which may be used to control light outputs in response to available natural lighting.

Modern fluorescent designs also offer virtually instantaneous switching and therefore offer a major advantage over older discharge lighting types that may have re-strike times of several minutes. Lighting systems may be switched off and on, or dimmed in response to occupancy or daylight, without compromising safety, quality or comfort. Switching off lighting for even a short period each day adds up over the year, to provide a sizeable cost saving. The combination of improved efficiency and control can typically offer savings of 30% or more.

At the Sir Matt Busby Sports Complex, the Council replaced the older, high pressure SON discharge lighting with modern high bay fluorescent systems, incorporating electronic ballast and microwave occupancy detection.

The complete refurbishment provides annual electrical savings of approximately 219,000kWh, worth nearly £10,500, as shown in the table below.

Note: SON (high pressure sodium) and MBI (metal halide) lighting can be relatively efficient. However, older equipment cannot be switched quickly in response to occupancy.

| Area | Original equipment | New equipment and controls | Reduction of power consumption | operating hours | Savings (kWh) |
|----------------------|---|---|--------------------------------|-----------------|----------------|
| Sports hall | 20 x 400W SON, low colour temperature | 20 x 220W SR455 (4X55W) high bay fluorescent fittings with occupancy sensing | ✓ | ✓ | 34,760 |
| Pool | 42 x 400W SON, low colour temperature | 42 x 220W SR455 (4X55W) high bay fluorescent fittings | ✓ | | 52,927 |
| Pool viewing gallery | 24 x 400W SON, low colour temperature | 24 x 220W SR455 (4X55W) high bay fluorescent fittings with occupancy sensing and a 'constant lux' system that varies levels of artificial lighting to supplement natural daylight | ✓ | ✓ | 53,624 |
| Gym 1 and 3 | 18 x (3x36W) switch start fluorescent fittings | 18 x (2x36W) fluorescent with electronic ballast and occupancy sensing | ✓ | ✓ | 8,460 |
| Spin room | 10 x (4x20W) switch start fluorescent fittings | 10 x (2x18W) fluorescent with electronic ballast and occupancy sensing | ✓ | ✓ | 4,070 |
| Corridors | 18 x (4x20W) switch start fluorescent fittings | 18 x (2x18W) fluorescent with electronic ballast and occupancy sensing | ✓ | ✓ | 5,544 |
| Changing areas | 34 x (3x36W) switch start fluorescent fittings | 34 x (2x36W) fluorescent with electronic ballast and occupancy sensing | ✓ | ✓ | 23,427 |
| Plant | 31 x older fluorescent battens and SON fittings | Replaced with 16 modern high efficiency battens and wide angle reflectors, and 6 x (2x55W) high bay fluorescent fittings | ✓ | ✓ | 35,910 |
| Totals | | | | | 218,722 |

The Financial Case

The Council has embarked on a comprehensive range of energy management projects at its managed properties, employing the 'spend to save' fund. Tackling the hidden and often underestimated costs of lighting forms an important part of the Council's strategy.



"North Lanarkshire Council has assumed a lead role in Energy Efficiency for many years. Using a combination of internal and external funding the Council has exploited opportunities for energy efficiency whenever possible. This project is typical of the improvements we have made in North Lanarkshire and demonstrates the Council's continued commitment to energy and environmental responsibility."

Ron Hill, North Lanarkshire Council

Savings potential

The Sir Matt Busby refurbishment has reduced both base and peak electrical loads. It is anticipated that the council will save up to up to £10,500 per year at this site.

Costs

The final costs for the complete refurbishment were £37,885.

Return on Investment

Quality benefits include improved lighting levels, better colour rendition and generally improved environment. The simple payback was 3.6 years.

Expert advice

The Carbon Trust provides **free** expert energy efficiency advice.

Energy surveys

Your company may qualify for a **free** energy efficiency survey from one of the Carbon Trust's qualified consultants.

Energy efficiency loans

The Carbon Trust can provide an interest free loan to SMEs in England, Wales and Northern Ireland of up to £50,000, repayable over up to five years for investment in energy efficiency measures. In Scotland the Scottish Executive offer a similar scheme called 'Loan Action Scotland'.

Publications

A range of free publications is available including:

Focus: Energy Saving Guide for Small Business

ECCG051 Energy efficiency in sports and recreation buildings - a guide for owners and energy managers

GPG160 Electric lighting controls - a guide for designers, installers and users

GPG300 The installer's guide to lighting design

For details of any of these services or free publications, contact the Carbon Trust Energy Helpline on 0800 085 2005 or visit the Carbon Trust website at www.thecarbontrust.co.uk/energy/pages/home.asp. For Loan Action Scotland contact www.energy-efficiency.org/howto/help/loan/.

Tax incentives

The whole capital value of energy efficient technologies which qualify under the Enhanced Capital Allowances scheme may be written down in the year of purchase. For further information go to www.eca.gov.uk.

Sources of further information

For further information on lighting design contact de Society of Light and Lighting via:

The Chartered Institution of Building Services
www.cibse.org

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