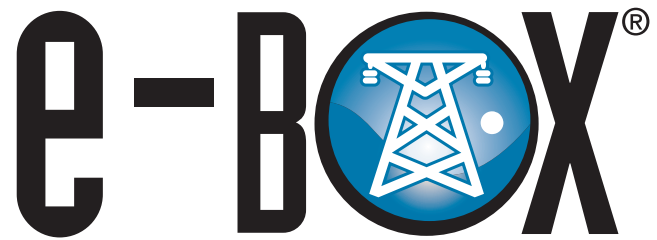


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energy systems

“Ebox@Norwich Airport exceed expectations”

## Case Study



‘Blue Sky Thinking’



## Case Study: Norwich International Airport

Old Norwich Road, Horsham St Faith  
Norwich, NR10 3JF

6th February 2009

### Introduction

**Norwich International Airport:** e-box energy systems installed on the 29th November 2008.

**The purpose:** To reduce energy consumption of illumination/light sources in areas as specified by Norwich International Airport.

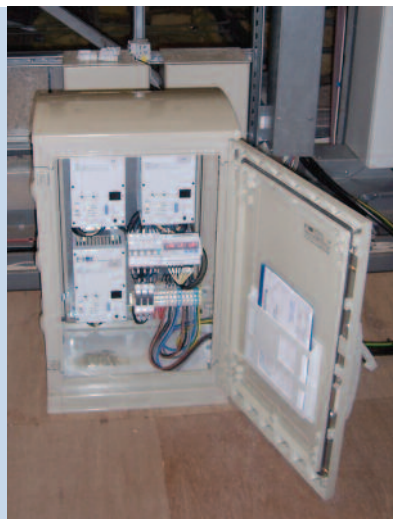
This document specifies the energy saving made by the e-box installation on the 1st December 08 the site of connection being the distribution board of the lighting tower number 2.

The survey of parameter readings are made by the power analyser 'Carlo Gavazzi', model WM14 installed inside the equipment. The analyser makes a continuous reading of the electrical consumption.

#### Photographs of the system:



left side view



frontal view



right side view



## Business Case

### Benefits from installing the e-Box

#### Investment Required

Capital Outlay	£1950.00
Annual Saving Forecast	£838.18
Internal Rate of Return on the investment (ROI)	43%
Time to Recoup (in months)	28
Monthly positive cash flow after recouping investment	£69.85

#### Financing Structure

Structure	N/A
Cash Requirement	N/A
P & L implication	N/A

#### Electricity Bill Saving

Kilowatt hours	28%	8381.8
Cash Value		£838.18

#### Carbon Trading and Environmental Issues

CO2 SAVING PER YEAR (Kg)	4181.77
Petrol Equivalent in metric tons	1.84

#### Annual Running Costs Changes

Present Day Running Costs	£2993.50
Forecast Running Costs with e-Box	£2155.32
Percentage Saving	28%



## Electric Parameters Readings

**By-Pass – No Saving Mode:** The following are the measurements taken as voltage (V) current (AMPS) and active power (Kw). These measurements refer to the status and therefore to the real consumption of the electric system before the e-box installation.



voltage



current



active power

**By Pass Off – Saving Mode:** The following show the measurements taken as voltage (V), current (AMPS) and active power (Kw) with the e-box system fully operational.



voltage



current



active power

Please allow a tolerance differential to the readings of  $\pm 1\%$



## Calculation of the financial saving obtained

This calculation has been made on each of the three phases to be measured.

The energy saving results are calculated by a proportion of the electric parameters in saving mode and no-saving mode.

The calculation of the saving percentage is:

$$\begin{aligned}\text{energy saving\%} &= (1 - (\text{Power in saving-mode L1L2L3} / \text{Power in no-saving-mode L1L2L3})) * 100 \\ &= (1 - (3,71 / 5,02)) * 100 = (1 - 0,739) * 100 = \mathbf{26,1\%}\end{aligned}$$

The total obtained saving is 26,1%.

## Conclusions

The types of lamps here are:

- 400W Sodium vapour lamps;

The e-box technology, apart from reducing drastically the energy consumption of the light sources, gives benefits for:

- Reduction of the maintenance costs by 30/40%;
- Reduction of the CO2 emission in the atmosphere, helping the preservation of the environment.

By this project 6215,00 Kg of CO2 emissions will be annually saved

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## System description

- Machine code **CE\_CL\_9\_9\_9\_IP44**
- Load power **6,21 kVA**
- Fibreglass case protection classification **IP44 (IEC – 539)**
- Supply Voltage **230 V 50 Hz 3\* single phase**
- Output Voltage **8 electable levels per phase**
- Supply Voltage Waveform **Sinusoidal**
- Output Voltage Waveform **Sinusoidal**
- **No Harmonic Distorsion**
- Power Factor **> 0,5**
- Load Variance **100%**
- Manual by-pass **standard**
- Automatic Forced by-pass **standard**
- Warm Up **16 levels selectable**
- Under Supply Voltage **5 levels selectable**
- Under Supply Voltage Areas **3 levels selectable**
- Under Supply Voltage Exclusion **standard**
- Working Indicator **LED**
- Thermic Protection **Automatic**
- Galvanic Insulation from the net
- Testing of the Supply Power Parameters
- Line Protection **fuse**
- Cooling System **natural**
- Work Area Temperature **-15 °C +50 °C**
- Humidity **0 – 97 %**
- Weight total system **50 Kg**
- Color **RAL. 7035**
- Dimension Cabinet **height 750, width 750, depth 320**

