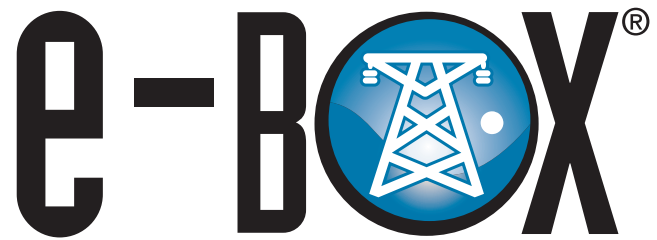


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**energy systems**

“After trialing and confirming the performance of E-box, Green King Brewery are now keen to build a partnership with e-box energy systems to make economic and environmental savings.” *Keith Ogden*

## Case Study



‘Blue Sky Thinking’



## Case Study: Greene King Brewing Company

Abbott House, Westgate Brewery  
Bury St Edmunds, Suffolk, IP33 1QT

6th February 2009

### How to organise a saving in a brewery

**Greene King Brewery Company:** 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 Greene King Brewery Ltd Engineering Department.

This document specifies the energy saving made by the e-box installation on the 2nd December 08 the e-box assembly being connecting to the appointed warehouse distribution board.

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	£16,840.99
Annual Saving Forecast	£7,813.93
Internal Rate of Return on the investment (ROI)	47%
Time to Recoup (in months)	26
Monthly positive cash flow after recouping investment	£651.16

#### Financing Structure

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

#### Electricity Bill Saving

Kilowatt hours	27%	112,897.75
Cash Value		£6,209.38

#### Additional Savings

Bulb replacement and Disposal savings	£1604.55
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#### Carbon Trading and Environmental Issues

CO2 SAVING PER YEAR (Kg)	56,326.00
Petrol Equivalent in metric tons	24.8

#### Annual Running Costs Changes

Present Day Running Costs	£25,810.88
Forecast Running Costs with e-Box	£17,996.95
Percentage Saving	<b>30.3%</b>



## 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 electricity 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.

For the calculation of the saving percentage we proceed as follows:

$$\text{energy saving\%} = (1 - (\text{Power in saving mode L1L2L3} / \text{Power in no-saving-mode L1L2L3})) * 100 \\ = (1 - (16,7 / 22,39)) * 100 = (1 - 0,745) * 100 = \mathbf{25,5 \%}$$

$$\text{Power in saving mode L1L2L3} = (5,11+6,05+5,54) \text{ kW} = 16,7 \text{ kW}$$

$$\text{Power in no-saving mode L1L2L3} = (6,99+8,05+7,35) \text{ kW} = 22,39 \text{ kW}$$

The total obtained saving is 25,5%. This parameter can be extended without problem on all the light loads of the Greene King Brewery building.

## Conclusions

The lamps submitted to energy saving are:

- 400W Mercury Vapour lamps;
- 58 W Florescent standard lamps.

During the test we checked that there are about 7– 8% of passed usage life or non-operational lamps, these lamps should be replaced in order to have maximum efficiency of the e-box system.

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 56,326.00 Kg of CO2 emissions will be annually saved.**

Garziera Mattia  
(Energia Europa Srl)

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## System description

- Machine code **CI\_150\_150\_150\_IP54**
- Load power **103,50 kVA**
- Metallic case protection classification **IP54 (IEC – 539)**
- Supply Voltage **230 V 50 Hz 3 x single phase**
- Output Voltage **12 selectable levels per phase**
- Supply Voltage Waveform **Sinusoidal**
- Output Voltage Waveform **Sinusoidal**
- **No Harmonic Distortion**
- 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 **forced**
- Work Area Temperature **-15 °C +50 °C**
- Humidity **0 – 97 %**
- Weight total system **250 Kg**
- Colour **RAL. 7035**
- Dimension Cabinet **height 1800, width 1200, depth 500**

