



## Report on the savings achieved for a University in Glasgow, over the course of a year

### Introduction

A study of the mains voltage profile at the University Building identified that the site was being supplied with excess voltage. Calculations based on the type and number of electrical loads of the site, together with an understanding of the existing voltage profile, revealed that the site would benefit significantly from Voltage Optimisation.

A Voltage Optimiser system was installed at the site on September 4<sup>th</sup>.

This report contains an analysis of the savings which have been achieved as a result of the installation.

### Analysis Method

It is often difficult to quantify the actual energy savings achieved through the use of 'Voltage Optimisation' from simple analysis of monthly electricity usage. Many factors can influence the amount of electricity a particular site uses and often the magnitude of these variations in demand can overshadow the comparatively minor change in consumption brought about through Voltage Optimisation.

To gain an insight into the benefit attained from installing 'Voltage Optimisation' at the Building the electricity consumption for the month's following installation have been compared with an identical period from the previous year. Although this does not provide an exact comparison it does take account of seasonal variation.

## **Comparative Analysis**

### September

In September (6th–29<sup>th</sup>) the site consumed a total of 69,642 kWh.

The following September (6th–29<sup>th</sup>) the site consumed a total of 59,363 kWh.

The savings on consumption since VO installation are **17.3%**.

### October

In October the site consumed a total of 87,090 kWh.

The following October the site consumed a total of 76,764 kWh.

The savings on consumption since VO installation are **13.4%**.

### November

In November the site consumed a total of 88,041 kWh.

The following November the site consumed a total of 78,598 kWh.

The savings on consumption since VO installation are **12.0%**.

### December

In December the site consumed a total of 76,677 kWh.

The following December the site consumed a total of 71,865 kWh.

The savings on consumption since VO installation are **6.7%**.

### January

In January the site consumed a total of 85,687 kWh.

The following January the site consumed a total of 82,542 kWh.

The savings on consumption since VO installation are **3.8%**.

### February

In February the site consumed a total of 81,798 kWh.

The following February the site consumed a total of 80,076 kWh (corrected for leap year).

The savings on consumption since VO installation are **2.2%**.

### March

In March the site consumed a total of 86,747 kWh.

The following March the site consumed a total of 79,148 kWh.

The savings on consumption since VO installation are **9.6%**.

### April

In April the site consumed a total of 64,695 kWh.

The following April the site consumed a total of 69,659 kWh.

There was an increase on consumption of **(7.7%)**.

### May

In May the site consumed a total of 69,506 kWh.

The following May the site consumed a total of 73,271 kWh.

There was an increase on consumption of **(5.4%)**.

### June

In June the site consumed a total of 65,274 kWh.

The following June the site consumed a total of 60,256 kWh.

The savings on consumption since VO installation are **7.2%**.

## July

In July the site consumed a total of 62,141 kWh.

The following July the site consumed a total of 54,378 kWh.

The savings on consumption since VO installation are **12.5%**.

## August

In August the site consumed a total of 61,636 kWh.

The following August the site consumed a total of 58,794 kWh.

The savings on consumption since VO installation are **4.6%**.

## Conclusion

This analysis highlights the common pitfall of trying to compare electricity consumption before and after fitting an energy saving device without taking into account significant variations in demand created by external influences.

Savings levels were well above 10% until December, when they continually fell month on month, until February, where they nearly reached 10% again. There was an increase on consumption in April & May which signifies other variables at play. Experience would suggest the change is most likely down to a change in building use or an increase in consumption from the HVAC, due to a warmer winter period than previous year. Perhaps some additional plant has been introduced in order to cope with higher student numbers. One thing is for sure, and that is that Voltage Optimisation certainly will not increase consumption.

I would suggest July would be a good month for comparing, as it is out with term time and also that the degree day date is very similar for both periods. This takes out the external influences of HVAC working less/more and varying student numbers. You could almost call it a base load, and on that the savings year on year were 12.5%.

**On the whole unfactored savings after 12 months average over 6.4% comparing year on year.**