



## Carbon Emissions Reduction: Staff Engagement

### The Ley Lab Emissions Story - October 2013

“Comparison between July 2012 with July 2013 - emissions are down 30%”

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17 October 2013

The Ley Group specialise in developing new synthesis methods and applying them to the construction of biologically important molecules. Over the last 4 years they have completed the total synthesis of 38 natural products using conventional round bottom flask batch-type methods and newly established continuous flow synthesis reactors.

Prof Ley's Whiffen Lab is made up of an area 388 m<sup>2</sup> and is located on the first floor of the South West Wing of the Department of Chemistry, University of Cambridge on Lensfield Road. This lab supports the work of 30 scientists.

The University's Energy and Carbon Reduction Project (ECRP) appointed BSL to engage with Prof Ley research group and introduce to them the University's CO<sub>2</sub> reduction goals. In addition, BSL was contracted to provide a smart meter in the Whiffen Lab and provide a dashboard for the researchers to visualise their carbon emissions.

The culture within the group is one of consultation and collaboration and, at the weekly meetings, they feedback to Professor Ley and the Chief Research Laboratory Technician Dr Richard Turner their research needs and report on any issues they are experiencing with their reactors and other synthesis equipment. In a team meeting held in May 2013 Prof Ley committed his support to achieving the ECRP goal of a 34% reduction by 2020 based on the 2005 figure.

Following the team meeting, ideas were collected on what could be changed in the lab. The lab supports organic chemistry and comprises obligatory fume cupboards and a mixture of new and legacy associated equipment including vacuum pumps, drying ovens, refrigerators, freezers and rotary evaporators. One of the highest yielding ideas was to consolidate the use of drying ovens. These ovens are used for drying glassware and it was discovered that three of the ovens were poorly insulated and had door seals that were not effectively retaining

heat. It was agreed, with some trepidation, that the three poorly performing ovens would be decommissioned and a single energy efficient unit would be introduced.

Following an energy efficiency campaign that was held in February, there has been a consistent improvement in the energy efficiency in the Whiffen Lab from 1<sup>st</sup> March with the greatest gains following the team meeting in May. The data collected is presented below Figure 1 & 2 along with a summary of the achievement.

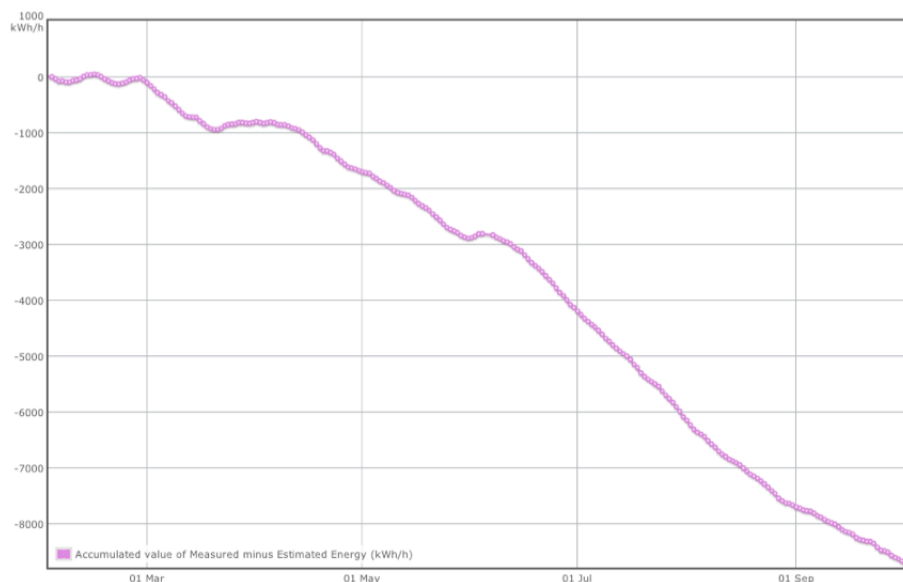


Figure 1 CUSUM chart showing 8,500kWh-accumulated savings



### Workplace Footprint Tracker

Energy used by *Department of Chemistry, 1st Floor*

01/07/2013 ~ 31/07/2013 compared with same month previous year

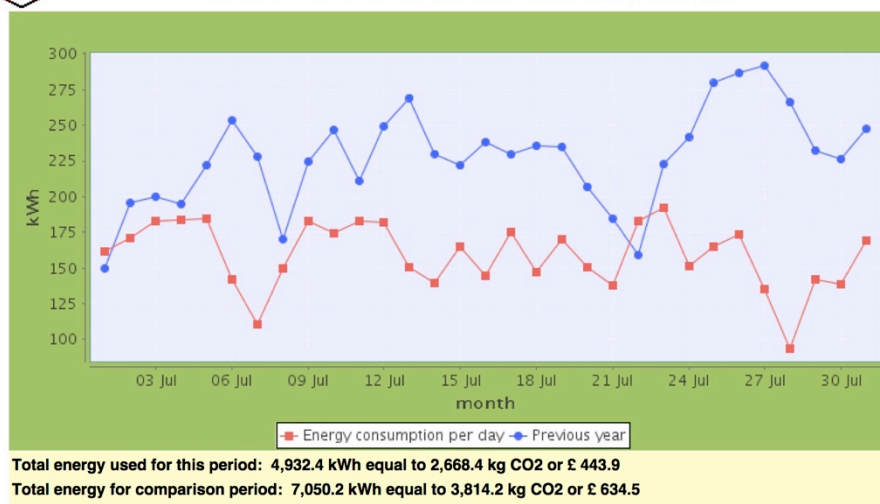


Figure 2 On track to reduce emissions by 12 tonnes per year

Dr Turner is leading further research efforts directed at devising additional methods for reducing emissions. One of these is to initiate a scientifically rigorous protocol for drying Pyrex glassware. Through developing a better understanding of retained moisture and drying times it may be possible to adjust all oven drying cycles from the current 24/7 cycle to possibly a 14/6 cycle resulting in substantial further emissions reduction. In addition, work is

being undertaken to evaluate the risk of decomposition or degradation to chemical samples stored in  $-80\text{ }^{\circ}\text{C}$  freezers possibly enabling the storage temperature to be raised to  $-70\text{ }^{\circ}\text{C}$ , and assessing the application of smart power socket technology that turn off PC peripherals when the computer is not drawing much power.

The Ley Group members understand that it is their responsibility to make changes now and in the future. They understand that resources are precious and through their behaviour they can make a difference. Better use of today's technology, combined with a driven desire to invent less wasteful and more intelligent processes is key to achieving and exceeding the ECRP goal.

The end