

# ANNUAL REPORT, APRIL 2017 TO MARCH 2018

## CARBON MANAGEMENT ENERGY USAGE AND CONSUMPTION PROGRESS

The Estates Department, Environmental and Sustainability Team, have provided the information below.

For this period we bring a full and complete report demonstrating Glyndŵr University's energy progress up to date for the last 12 months, a comparison to our 2009/10 Base Year and the annual impact on our revised Carbon Management Plan containing plans to 2020.

Glyndŵr University is committed in its objective to reduce the Carbon Footprint, implementing energy conservation measures and contributing to a sustainable energy future.

The University's target is to reduce carbon emissions in absolute terms from its scope 1 and scope 2, gas and electricity energy emissions and also including Scope 3 water by 18% by 2020, compared to a 2009/10 baseline.

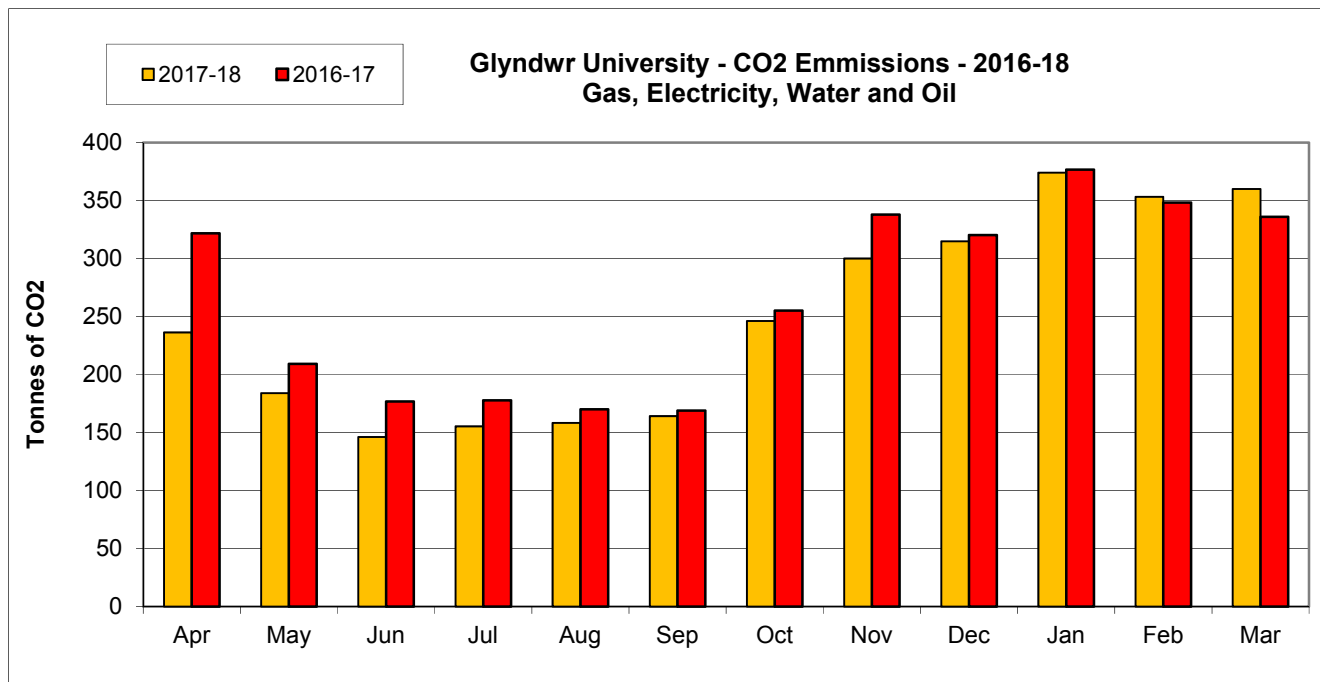
You can view the revised Carbon Management Plan Online;
















<https://www.glyndwr.ac.uk/en/media/Wrexham%20Glyndwr%20University%20Carbon%20Management%20plan.pdf>

### Summary of Annual Carbon Consumption

The University's energy usage over the last financial year, April 2017 to March 2018, is illustrated below, showing how our energy consumption information compares with the previous year's carbon footprint for the same period.

The chart and table below shows our CO<sub>2</sub> (carbon dioxide) emissions, a comparison of the twelve month period of April 2017 to March 2018 with the same period for the previous year, April 2016 to March 2017.



Total CO <sup>2</sup> Emissions for Gas, Electricity & Water	 <b>2017-18 (Tonnes)</b>	<b>Running Year Total Increase/ decrease on previous year period</b>	 <b>2016-17 (Tonnes)</b>
April	236.4	Decrease 26.5% 	321.8
May	184.0	Decrease 12.0% 	209.3
June	146.1	Decrease 17.3% 	176.8
July	155.3	Decrease 12.6% 	177.9
August	158.4	Decrease 6.8% 	170.0
September	164.1	Decrease 2.8% 	169.0
October	246.3	Decrease 3.5% 	255.2
November	300.1	Decrease 11.2% 	337.9
December	314.8	Decrease 1.7% 	320.3
January	374.0	Decrease 0.7% 	376.7
February	353.2	Increase 1.4 % 	348.3
March	359.9	Increase 7.1% 	336.0
Year Total	<b>2992 CO<sup>2</sup> tonnes 2017-18</b>  Total Gas kWhs = 7,511,471 (Increase 7.75%) Total Electricity kWhs = 4,569,616 (Decrease 1.1%) Total Water m3 = 16,895 (Decrease 12.67%)  <b>No Gas Oil used this period</b>	<b>Overall Decrease 6.47%</b>  	<b>3199 CO<sup>2</sup> tonnes 2016-17</b>  Total Gas kWhs = 6,970,736 Total Electricity kWhs = 4,624,103  Total Water m3 = 19,348  Total Gas Oil kWhs= 19,102 NB. Due to Business Changes, up to July 2016 only

Overall, by the end of March 2018, our Carbon Emission year total of 2992 CO<sup>2</sup> tonnes, in comparison to the previous year, decreased by 6.47%, a total of 207 CO<sup>2</sup> tonnes. That's a lot of carbon considering that one CO<sup>2</sup> tonne weighs as much as an adult giraffe and would take up the same amount of space as a 10m wide, 25m long and 2m deep swimming pool!

We also need to bear in mind that weather impacts greatly on our energy usage. The Met office reported that winter 2017/18 generally was rather unsettled, with weather systems coming in from the west for most of the time, allowing only brief settled spells. Temperatures fluctuated either side of average, with some mild spells (especially in southern areas) but also spells with widespread frosts, with the most widespread cold weather coming right at the end of the season. Rainfall has not been far from average overall, though some places were rather wet in the first two months. Sunshine overall has been above average, with few exceptions.

December 2017 saw temperatures close to average in most areas, and slightly above in the south-west and the far north; the UK monthly mean temperature was 0.2 °C above the long-term average. January 2018 was warmer than average across England and Wales, but somewhat colder than average in northern Scotland, and the UK as a whole saw mean temperatures 0.4 °C above average. February was a cold month generally, with a mean temperature 1.3 °C below average.

We can better understand how our gas usage in particular decreases/ increases when we are aware of how the temperatures reported above can impact and dictate our actions in energy consumption.

Our gas usage for 2017/18 accounted for almost 46% of our total carbon tonnes produced. There has been a 7.75% increase in our usage between 2016/17 and 2017/18 however, if we compare this figure against our 2009/10 Carbon Management Plan baseline year we have actually decreased in comparison by a huge 11.1% even though we acquired more sites in 2011/12.

Looking at the same situation for our water usage, this decreased over the last 12 months by a pleasing 12% and in comparison to our baseline year the figure also decreased by a very pleasing 51 %.

In the past year our electricity (renowned for being the most difficult to decrease) accounted for 53% of our total carbon tonnes produced so our overall decrease of 1.1% is a good achievement.

The Environmental and Sustainability Team is consistently monitoring and analysing all of Glyndŵr University's energy usage through our extensive network of numerous meters, software and invoices. We are able to pinpoint issues as they arise and so are able to stop unnecessary energy wastage and resulting impacts on our finances. As reported above, overall our consumption decreased but there were also increases in some of our individual buildings and sites. As each is different in size, business use, maintenance/ plant issues and other contributing factors mean varying results. We are aware of which buildings and sites are our best and poorest performers and prioritise improvement needs and solutions accordingly.

Our top electricity building performer, in comparison to the previous year was Colliers Park, almost 20% decrease on the previous year. Crispin Lane also did well with a 4.55% kWh decrease on the previous year. Although, overall our electric decreased 1% most of our buildings saw a small increase in usage compared to the previous year. Unfortunately alongside this, a 10.4% increase in electricity usage occurred at Regent Street which was disappointing.

With regards to our gas consumption, unfortunately we saw an overall increase of 7.75% kWh. However Northop saw a massive 21.7% decrease from the previous year which is very encouraging to see such results, especially since the installation of a more energy efficient boiler.

If we look at our water consumption and the main increases and decreases at sites individually the most impressive decrease of almost 27.68%, compared to the previous year was in the Student Accommodation. Alongside this we saw a 2% decrease at Plas Coch. Both of which contributed to a 12% decrease across the original sites. Unfortunately, in the same period we also saw an increase of 14% at Optic Glyndwr and a 10% increase at Regent St.

Contributing factors to the consumption savings where achieved can be credited to previous carbon reduction projects such as Salix Funded heating (Insulation of Heating and Hot Water Pipework & Fittings Plas Coch Site) and lighting refurbishment projects (Edward Llwyd Building, Plas Coch Site). Other factors include educating staff and students in best practise, 'switch off' campaigns, good housekeeping, continuously monitoring timetables, optimization settings and heating set points, careful monitoring of our metering, monitoring and targeting systems, utility audits, best value renewals of utility contracts just to name a few. All of the above play an important part in our Carbon Management Plan

which includes a comprehensive list of current and potential future projects, subject to change dependant on the business needs.

### Summary of progress from 2009/10 Base Year

If we look at the charts below we can monitor our progress against our carbon emissions baseline targets, calculated using data from 2009/10.

The first chart includes all sites at Glyndŵr University acquired since 2011/12. Comparing our progress over the last 12 months 2017/18 to 2009/10, our emissions decreased by 22.26% and calculated to 2992 CO<sup>2</sup>. If we compare this figure to our baseline year of 2009/10 and include our 2017/18 waste (7 CO<sup>2</sup>) and business travel figures (25 CO<sup>2</sup>), which are not shown below, our overall total is 3025 CO<sup>2</sup> which is a substantial 22.07% decrease.

Based on the above, our annual Carbon Management Plan 3% decrease target figure of 3416 CO<sup>2</sup> for 2017/18 has been exceeded by 8.44 %. We achieved an 11.44 % decrease and we have excelled in our performance. This is excellent news and even better than the previous year 2016/17 where we also exceeded our set 3% target by 5.51%.

This achievement is to be praised, especially when we are reminded of the underlying facts; namely our emissions sources increased between 2009/10 and 2012/13, substantially due to the acquisitions of Wrexham Football Stadium, Colliers Park Training Ground and an additional two new builds at Plas Coch Campus, Centre for the Child, Family and Society and Centre for the Creative Industries. Our results can also be accredited to the business change that happened during the last reporting period. I.e. the University handed Wrexham Football Stadium back to Wrexham Football Club for a 99-year lease.

<b>Glyndŵr - Consumption Analysis</b>					
Total CO <sup>2</sup> Emissions- Gas, Electricity & Water					
Comparison including newly acquired sites post 2011/12					
	<b>2017-18</b>	<b>2017-18 Rolling</b>	<b>17-18 Against 09-10</b>	<b>2009-10</b>	<b>2009-10 Rolling</b>
Apr	236.4	236.4	-19.5%	293.6	293.6
May	184.0	420.4	-24.1%	260.6	554.2
Jun	146.1	566.5	-27.0%	221.4	775.6
Jul	155.3	721.8	-26.5%	206.0	981.6
Aug	158.4	880.2	-24.5%	183.6	1,165.2
Sep	164.1	1044.3	-23.9%	207.5	1,372.8
Oct	246.3	1290.6	-25.0%	347.2	1,719.9
Nov	300.1	1590.7	-24.2%	377.9	2,097.8
Dec	314.8	1905.5	-24.8%	436.1	2,533.9
Jan	374.0	2279.4	-23.8%	459.3	2,993.2
Feb	353.2	2632.6	-23.1%	428.8	3,422.0
Mar	359.9	2992.6	-22.3%	427.1	3,849.1
<b>TOTAL</b>	<b>2992</b>			<b>3,849</b>	

The second chart below illustrates a 'like for like' comparison, i.e. our consumption comparison for the last 12 months minus our additional acquired buildings. Comparing our progress over the last 12 months 2017/18 to 2009/10 on this

basis, our emissions ( not including waste and business travel) decreased by 22.5%, totaling 2984 CO<sup>2</sup>, ( 3017.2 CO<sup>2</sup> including waste and business travel ) which means our Carbon Management annual target figure of 3% was exceeded by 19.28%. Fantastic!

<b>Glyndŵr - Consumption Analysis</b>					
<b>Total CO<sup>2</sup> Emissions- Gas, Electricity &amp; Water</b>					
<b>Original Sites Comparison</b>					
	<b>2017-18</b>	<b>2017-18 Rolling</b>	<b>17-18 Against 09-10</b>	<b>2009-10</b>	<b>2009-10 Rolling</b>
Apr	235.8	235.8	-19.7%	293.6	293.6
May	183.7	419.5	-24.3%	260.6	554.2
Jun	145.6	565.1	-27.1%	221.4	775.6
Jul	155.0	720.1	-26.6%	206.0	981.6
Aug	158.0	878.1	-24.6%	183.6	1,165.2
Sep	163.5	1041.6	-24.1%	207.5	1,372.8
Oct	245.3	1286.8	-25.2%	347.2	1,719.9
Nov	298.8	1585.7	-24.4%	377.9	2,097.8
Dec	314.1	1899.8	-25.0%	436.1	2,533.9
Jan	373.2	2273.0	-24.1%	459.3	2,993.2
Feb	352.2	2625.2	-23.3%	428.8	3,422.0
Mar	359.0	2984.3	-22.5%	427.1	3,849.1
<b>TOTAL</b>	<u>2984</u>			<u>3,849</u>	

The chart below shows us an up to date eight year snap shot of our carbon emissions progress since our base year of 2009/10, figures, and showing with and without the additional acquired sites. NB. The figures also take into account our waste and travel figures. To summarise our emission progression effect from our base line figure 2009/10 over eight years to 2018, the below chart illustrates the actual % increase / decrease.

(Calendar Date; 1st April to 31st March)	C02	% Against 09-10			C02	% Against 09-10	

2009/10	3,882	BASE YR					
2010/11	4,008	3.24%	increase				
2011/12	3,697	4.76%	decrease				
2012/13 NOT INCLUDING ADDITIONAL SITES	3,808	1.90%	decrease	2012/13 INCLUDING ADDITIONAL SITES	4,035	3.94%	increase
2013/14 NOT INCLUDING ADDITIONAL SITES	3,651	5.95%	decrease	2013/14 INCLUDING ADDITIONAL SITES	3,882	0.00%	same
2014/15 NOT INCLUDING ADDITIONAL SITES	3,633	6.4%	decrease	2014/15 INCLUDING ADDITIONAL SITES	3,874	0.2%	decrease
2015/16 NOT INCLUDING ADDITIONAL SITES	3,420	12%	decrease	2015/16 INCLUDING ADDITIONAL SITES	3638	6.3%	decrease
2016/17 NOT INCLUDING ADDITIONAL SITES	3168	18.4%	decrease	2016/17 INCLUDING ADDITIONAL SITES	3232	16.7%	decrease
2017/18 NOT INCLUDING ADDITIONAL SITES	3017	22.28% **	decrease	2017/18 INCLUDING ADDITIONAL SITES	3025	22.07% *	decrease

This demonstrates that up to the most recent data of 2017/18, including the additional sites acquired from 2012 our emissions decreased by 22.07% from our baseline figure. \* If we look at the same period not including the acquired additional sites we would have decreased our baseline figure by 22.28%, \*\* as per the Consumption Analysis charts displayed earlier in this report.

### **Financial Annual Energy Spending Progress**

Overall, by the end of March 2018, our financial Running Year Total increased by 10.92% in comparison to the previous year. Financially, the utility cost decreases saw electricity decrease by 10.47% (see business change reported previously) however there was a huge increase to gas by 20.32% and water by 10.73%.

This has been a disappointment for the Environmental and Sustainability Team as the utility prices continue to steadily rise and despite the huge push to reduce our overall usage the prices outweigh the efforts. The team has ensured proven measures have been put into place and as a result a variety of differing factors have worked hard towards trying to reduce these costs. Examples of this can be found by the renewal of our largest utility contracts, remaining in consortium with Wrexham County Council, to enable greater buying power for all of the group.

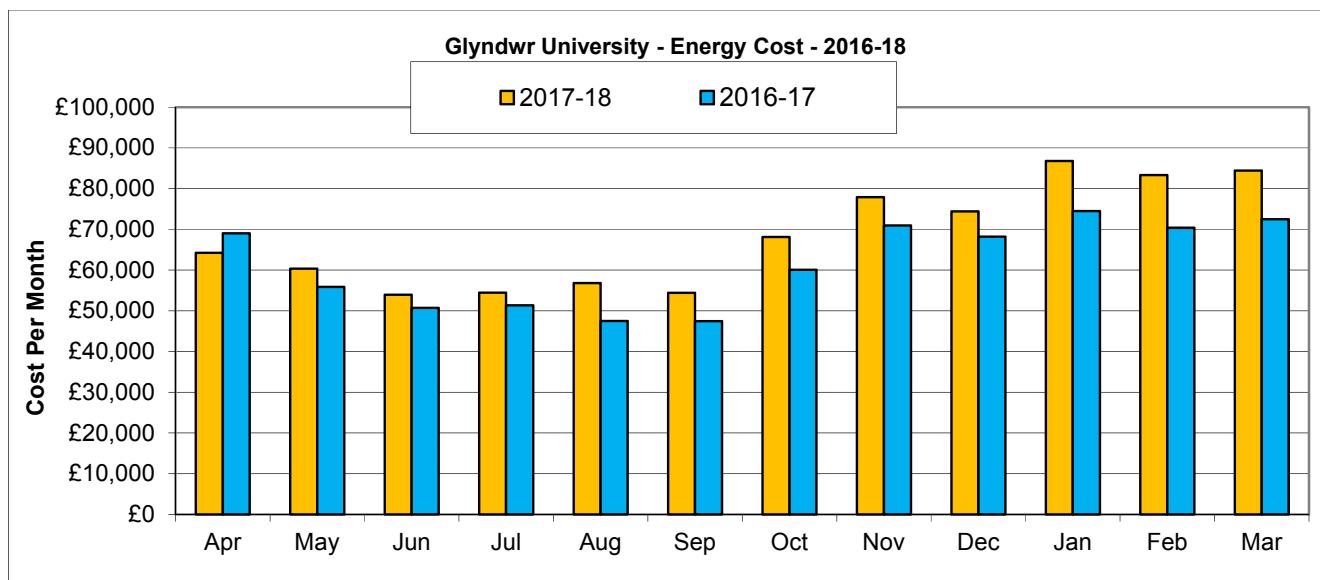
In addition to the contributing factors for results achieved, additional savings have been made from carefully analysing best options for our contract renewals and extra vigilant care when checking all invoices received have been correctly













charged and challenging in discrepancies where necessary. The Environmental and Sustainability Team is experienced in spotting invoicing utility errors and will always ensure charges are fairly and correctly input or escalate matters through the correct channels.

Other savings that have contributed to the below table include;

- Renewal of contracts not in the above council consortium, researching and obtaining best rates for next 12 month period or longer if more beneficial.
- Obtaining and investigating VAT reductions as per Inland Revenue specified exemptions, i.e. student accommodation, research for both gas and electricity consumption.
- Routine Maintenance replacement / changing of equipment for energy efficient equipment / products as and when needed.
- Energy Utility Audits – investigating utility meter and billing charges.
- Switch Off Campaigns – energy awareness / education.
- Previous Carbon Reduction Projects/ measures implemented continuously making excellent carbon and financial reductions.

The below chart and table illustrates the 10.92% annual increase to the end of March 2018.



Total Energy Cost (Excluding VAT)	2017-18 (£)	Running Year Total Increase/ decrease on previous year period	2016-2017 (£)
April	£ 64,243	Decrease 7.0 % 	£ 69,035
May	£ 60,333	Increase 8.0 % 	£ 55,879
June	£ 53,956	Increase 6.4 % 	£ 50,728
July	£ 54,446	Increase 6.0 % 	£ 51,339
August	£ 56,816	Increase 19.6 % 	£ 47,515
September	£ 54,427	Increase 14.6 % 	£ 47,460
October	£ 68,136	Increase 13.4 % 	£ 60,064
November	£ 77,928	Increase 9.8 % 	£ 70,945
December	£ 74,410	Increase 9.0 % 	£ 68,210
January	£ 86,811	Increase 16.6 % 	£ 74,479
February	£ 83,305	Increase 18.3% 	£ 70,393
March	£ 84,431	Increase 16.4 % 	£ 72,505
Year Total	<b>Total £ 819,243</b>	<b>Overall Increase 10.92%</b> <b>Total Gas = £212,719 Increase 20.32%</b> <b>Total Electricity = £551,479 Increase 10.47%</b> <b>Total Water = £55,045 Decrease 10.73 %</b> <b>Not used in this reporting period</b>	<b>Total £ 738,553</b> <b>Total Gas = £176,794</b> <b>Total Electricity = £499,172</b> <b>Total Water = £61,667</b> <b>Total Gas Oil = £920</b>



<p><b>Summary</b>  <b>Annual Energy</b>  <b>Update</b>  <b>April - March 2017/</b>  <b>18</b></p>	<p>Previous Year Consumption  Comparison  <b>2017/ 18 Consumption against</b>  <b>2016/ 17</b></p>	<p>Baseline Year Comparison  (Carbon Management Plan)  <b>2009/10 Consumption against</b>  <b>2017/ 18</b></p>	<p>Previous Year Cost Comparison  £ 2017/ 18 Costs exc. VAT  against 2016/ 17</p>
<p><b>Overall</b></p>	<p>2992 CO2  6.47 % decrease</p>	<p>3849 CO2  22.26 % decrease</p>	<p>£819,243  10.9 % increase</p>
<p><b>Gas</b></p>	<p>7,511,471 KWH  7.75 % increase</p>	<p>8,461,513 KWH  11.22 % decrease</p>	<p>£212,719  20.3 % increase</p>
<p><b>Elec</b></p>	<p>4,569,616 KWH  1.1 % decrease</p>	<p>5,105,105 KWH  10.48 % decrease</p>	<p>£551,479  10.47 % increase</p>
<p><b>Water</b></p>	<p>16,895 M3  12.67 % decrease</p>	<p>34,863 M3  51.49 % decrease</p>	<p>£55,045  10.73 % increase</p>
<p><b>Gas Oil</b></p>	<p>N/A</p>	<p>N/A ( As wef. 2012)</p>	<p>N/A</p>

**... And to complete, an update on Glyndŵr University's Energy Plans / Projects for the next 12 months.**

The Environmental and Sustainability Team hold a register of projects, devised in conjunction with the online Carbon Management Plan (revised 21.11.14) to ensure energy conservation practices and measures will be implemented to reduce our Carbon Footprint and conserve environmental resources. Please refer to Appendix C - Project Briefs & Appendix - Projects Analysis for details and comprehensive illustrating plans to 2020.

Along with the above, Carbon Management Progress Quarterly Reports are published online listing our current carbon activities and plans. Further details of our annual activities are contained within the actual quarter reports, a snapshot summary is listed below:

**Period Apr – Jul 2017**

- Carbon Trust Energy Efficiency Survey
- Photo Voltaic Panels
- Water flow testing taps
- Heat Network Regs
- Internal lighting Survey

**Period Aug– Oct 2017**

- New lighting installation trial
- External lighting project
- People and Planet appeals
- Student Union shower timers
- Student Research Sustainability

**Period Nov – Jan 2018**

- Working with Refit – resource efficiency wales – heating options
- Meetings with the Carbon trust
- Working with student dissertations
- Collecting and analyzing data for HESA
- Preparation for DEC's
- SAWG Sustainable Action Working Group
- Environmental Sustainability Strategy 2018 -20125

**Period Feb - March 2018**

- Go Green week
- Fairtrade Fortnight
- Green Champions
- Waste with Veolia
- Energy Data
- Green Impact

## Current/ Pending Projects

- Carbon Management Plan - Adding and reviewing future planned projects. Priority to be given to electricity carbon reduction projects and concentration on exceeding 3% annual carbon tonnes reduction target to ensure 2020 target met. A list of potential energy projects is referenced in the final sections of the plan, totalling almost £200k
- Investigation into best funding options for potential projects
- Good House Keeping - Currently continuously monitoring timetables, optimization settings and heating set points
- LED replacement of existing lamps / upgrade / installation of PIR (sensors) where feasible. Internal & External.
- Electronic Thermostatic Radiator Valves (ETRV) with Remote Control. Potential installation of ETRV's within Plas Coch Student Accommodation
- Solar PV (photovoltaic) Panels – Investigation into installation of solar panels at Plas Coch
- Hand dryers - Investigation into installation of energy saving dryers at Plas Coch & Crispin Lane
- Stand-alone Heating - Investigation into a stand- alone heating facility- William Aston Hall
- Switch Off Campaigns – encouraging staff and students to save energy
- Other Pending projects: Boiler Replacements/ Full Heating System Replacements/ Loft Insulation/ Flat Roof Replacement – energy efficiency upgrades

### Additional Opportunities include;

- Improvements to metering system
- Improved control of fume cupboards
- Upgrade of single glazed windows on non-listed buildings
- Review of BMS and improved zoning control and installation / upgrade of TRVs in certain areas
- Refurbishment / upgrade of air handling plant (in certain areas)
- Consideration of low carbon heat supply options such as biomass and CHP
- Pump / motor upgrade and VSD installation (in certain instances)
- Astro pitches LED Flood lighting
- Stage lighting LED
- Upgrade and rationalisation of chiller plant

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As always, the Carbon Management Projects will change accordingly to the business needs. Updates will be published as they occur. We remain confident that we will continue to make further savings.



**For All Energy Related Matters,  
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