PRIFYSGOL BANGOR UNIVERSITY

Environmental Management System Annual Report

October 2019
(for the Academic Year 2018/19)

Bangor University's Campus
Environmental Performance Team

bangor.ac.uk/sustainability

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1. Introduction

Welcome to Bangor University's 2019 Annual Environment Report.

The University produces an Environmental Report every year as requirement of its Environmental Management System and ISO14001:2015 accreditation.

This report presents a review of the University's environmental performance over the course of the 2018/19 academic year ("the reporting period").

Bangor University is committed to being *the* Sustainable University and integrating all aspects of sustainability into daily operations – as detailed in the 2015-2020 Strategic Plan.

During the 2018/19 academic year Bangor was placed 8th in the University of Indonesia GreenMetric, out of 719 Universities from around the world, and 20th of 154 UK institutions in the People & Planet league. More details in Section 5.

The University is also a finalist in the Environmental Association for Universities and Colleges (EAUC) Green Gown Awards 2019, for the "Think Before you Drink" campaign. More details about the campaign in section 7.9

1.1 Acronyms and Abbreviations

CEPT – Campus Environmental Performance Team

DECs – Display Energy Certificates

EAUC – Environmental Association of Universities and Colleges

EMS – Environmental Management System

EnCo – Environmental Collaboration Group (collaborative group bringing together members of CEPT and PaCS)

FTE – Full-time Equivalent

GHGs – Greenhouse Gases

HESA – Higher Education Statistics Agency

$kgCO_2e$ – kilograms of Carbon Dioxide equivalent (a standard measure of greenhouse gas emissions)

PaCS – Property and Campus Services

STG – Sustainability Task Group

1.2 The Management Review

The compilation of this report, and its presentation to the Sustainability Task Group (STG) as part of the Management Review Meeting, are undertaken as requirements of the ISO14011:2015 standard for Environmental Management Systems.

The purpose of the Management Review is to review the Environmental Management System (EMS) to ensure it remains suitable, adequate and effective, and to evaluate the University's environmental performance.

Bangor University has determined that a Management Review Meeting will be held annually in October, to review the University's environmental performance over the previous academic year.

During the Annual Management Review Meeting, the Campus Environmental Performance Team (CEPT) will present information relevant to the University's overall environmental performance, the functioning of the EMS and recommendations for any changes required to ensure continual improvement. The role of the Sustainability Task Group is to;

- consider the recommendations of CEPT
- provide their approval for the report and to
- ensure the Annual Report and outcomes of the Management Review meeting are communicated to the University Executive
- ensure feedback from the University Executive is communicated back to STG and CEPT

The meeting will be conducted in accordance with the following format:

- Status of Actions from previous Management Review
- Environmental Policy
- Compliance
    - ISO14001:2015 Certification Status
    - Legal Compliance Status
    - Environmental Incidents
    - Internal Audits
- Changes in circumstances relating to the EMS
    - Environmental Aspects & Impacts
    - Risks & Opportunities
    - Needs & Expectations of interested parties
    - Documentation changes
- Environmental Performance
    - Awards & League rankings
    - Performance against Objectives & Targets

    - Review of Objectives & Targets
- Communications, including complaints, from interested parties
- Adequacy of resources
- Opportunities for Continual Improvement
-

2. Environmental Policy

The University's Environmental Policy is reviewed annually by the Campus Environmental Performance Team as part of their schedule of EMS documentation audits.

The current version of the Policy (Appendix 1) was presented to the STG at the last Management Review Meeting and was signed by the Vice-Chancellor in April 2019. As such, the current policy is still valid and CEPT have no changes to propose at this time.

3. Compliance

3.1 ISO14001:2015 Accreditation

In order to gain and retain ISO14001 accredited status, the University's EMS is subject to external audits by a UKAS accredited external auditing body.

In August 2017 the University's EMS was audited against the new ISO14001:2015 standard and was successfully reaccredited.

Whilst certification is valid for 3 years, the EMS is subject to annual "surveillance audits". The most recent two-day surveillance audit was conducted in October/November 2018, during which the auditor found no non-conformities and recommended continued certification. The auditor highlighted two opportunities for improvement;

- Disposal of empty acetone bottles in general recycling which, while not posing any particular risk, was not in line with University policy for the disposal of such bottles
- Storage of two 25 litre drums of ethylene glycol on an open drainage channel, posing a potential pollution risk

A three-day recertification audit is scheduled for 4th-6th December 2019.

3.2 Compliance Status

Ensuring understanding of and compliance with legal and other relevant obligations is one of the central principles of an Environmental Management System.

In order to manage its environmental obligations, the University has developed and maintains a "Register of Legal Requirements and Other Compliance Obligations" as part of its EMS documentation. The up-keep of this document and oversight of compliance with legal and other relevant obligations is the responsibility of CEPT, led by the CEPT Compliance Coordinators, who sit within the University's Health & Safety team. This includes ensuring the relevant environmental permits, licences, registrations and authorisations are in place, up-to-date and accurate.

3.3 Environmental Incidents

An environmental incident is an event that causes, or has the potential to cause harm to any aspect of the environment (air, water, land, wildlife). This can include, but is not limited to; fly-tipping, oil or chemical spill, escape of waste, sewage leak, air pollution.

The University has an official procedure, and associated report form, for the reporting of Environmental Incidents – available online to all staff and students via the University website.

During the 2018/19 academic year, three environmental incidents were recorded.

Two incidents related to the disposal of waste; one case of fly-tipping of domestic-type waste in the Dean Street car park and one case of the improper disposal of a freezer in a University waste compound by staff. In both cases the waste was removed and properly disposed of by PaCS staff. In the case of the freezer improperly disposed of by a member of staff, the PaCS Safety & Compliance Manager took steps to ensure the relevant staff were reminded of the proper way of disposing of electrical items such as freezers.

The third incident relates to the escape of rubber crumb from the new Treborth 3G pitch into the surrounding woodland. The incident was observed and reported by a student. The escape of the rubber crumb was determined to be due to lack of care taken by contractors during installation. Grounds staff for the pitch have been asked to undertake ongoing observation to ensure no further escape of material occurs.
There remain some outstanding queries with regard to the incident and, as such, the paperwork has not yet been finalised and the case remains open.

The procedure for reporting Environmental Incidents is due to be updated to reflect decisions taken to move responsibility for investigating incidents and the setting and monitoring implementation of corrective actions from PaCS to CEPT.

3.4 Internal audits

A new system for undertaking internal audits has been developed by CEPT to make the process less onerous for both the auditors and those being audited. The changes are intended to make auditing smoother, ensure consistency between auditors and to help encourage more people to get involved in the auditing process.

All internal audits required during the 2018/19 academic year by the audit schedule have been successfully completed. No non-conformances were found.

4. Changes relating to the EMS

4.1 Aspects & Impacts

Environmental aspects are ways in which the operations of an organisation interact with and impact upon the environment. The identification and evaluation of all the University's environmental aspects is a key undertaking of the Environmental Management System.
The University maintains a "Register of Environmental Aspects" detailing all identified aspects, their potential impacts, control measures and associated risks and opportunities.

The ISO14001:2015 standard requires organisations to take actions to address their most significant environmental aspects. As such, all identified environmental aspects are evaluated to determine their overall significance; the most significant aspects are those which pose the greatest environmental risk. Significance is determined by a combination of the severity of the consequences brought about by the aspect (on a 12 point scale) combined with the likelihood of the consequences occurring (on a 9 point scale). The most significant aspects were determined to be those receiving more than 50 points in the evaluation of consequence and likelihood (out of a possible total of 108). The EMS document "Evaluation of Environmental Aspects" includes details of this assessment and of those aspects deemed to be most significant. For further details of the assessment please refer to the "Evaluation of Environmental Aspects" document.

Both the Register and Evaluation of environmental aspects were reviewed by CEPT in 2018.
In total, 42 environmental aspects were identified and evaluated as part of this review. Of these, 13 were identified as being significant (further details in Appendix 2);

- Use of air-conditioning
- Use of chemical materials
- Use of biological materials
- Use of refrigerators, freezers and cold stores
- Storage of chemicals and disposal of chemical waste
- Storage of biological materials and disposal of biological waste
- Fuel oil
- Procurement of construction works and materials
- Procurement of goods
- Business travel by bike, car, minibus or van
- Business travel by airplane
- Commuter travel by staff and students
- Student travel to and from the University from their original home address

In order to ensure the University is taking action to address these significant, objectives and targets have been set in relation to energy use, waste, procurement, construction, travel.

Procedures are in place for ensuring the proper management of chemical and biological materials and for preventing pollution. These are monitored and managed through the internal auditing process.

4.2 Risks & Opportunities

The Risks and Opportunities associated with the EMS are detailed within the "Register of Environmental Aspects" document. The document is due to be reviewed in 2020.

There are no changes in Risks and Opportunities to be presented at this time.

4.3 Needs & Expectations of interested parties

Information pertaining to the needs and expectations of interested parties can be found in EMS Document "Context of the Organisation", last updated in March 2019.

4.4 Documentation changes

There are no documentation changes in requiring approval from STG or the University Executive at this time.

5. People & Planet University League 2019

The results of the 2018/19 People and Planet University League were announced on 16th July 2019. Bangor University again received a "1st Class" award and were ranked 20th of the 154 UK institutions assessed. In the previous assessment, completed in 2017, Bangor were placed 29th.

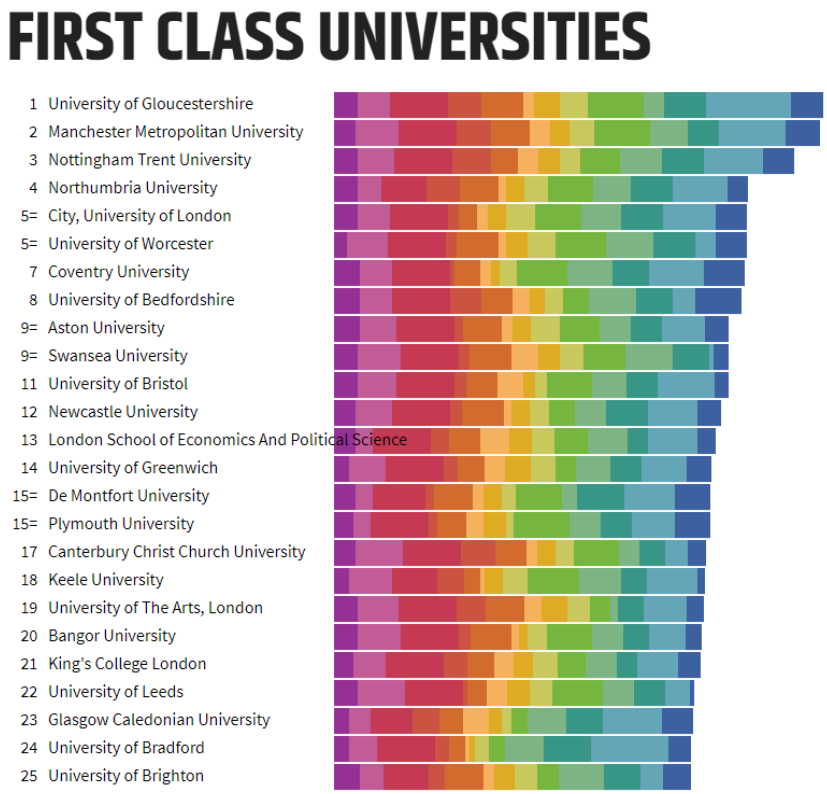

Figure 1. People & Planet League First Class Institutions

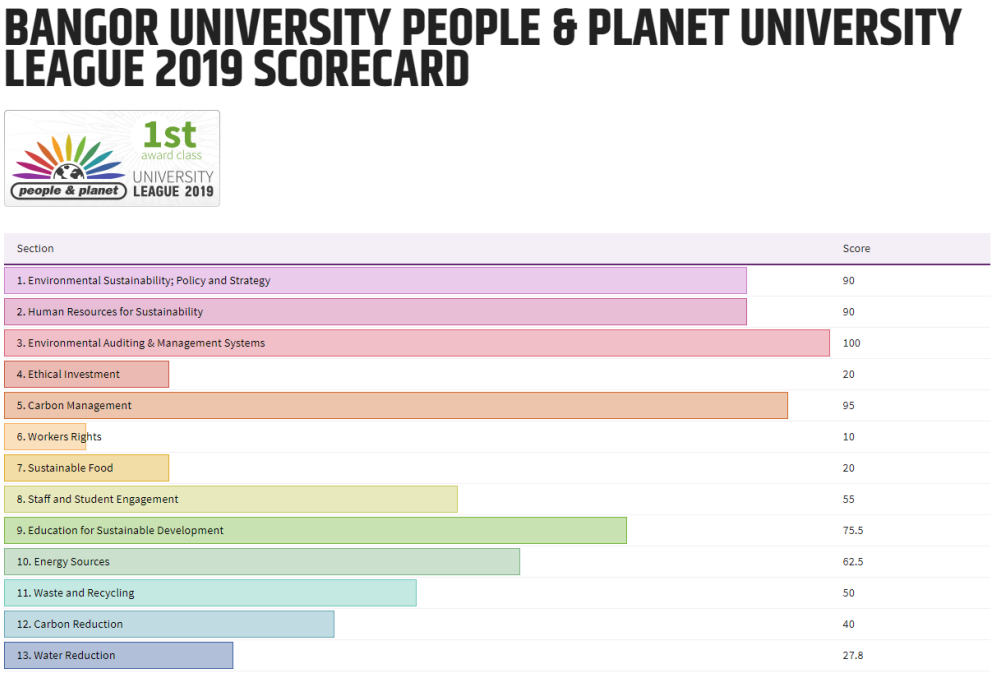

Figure 2. Bangor University People & Planet League Scorecard

Bangor's improved position in this year's league must be set in the context of generally poor performance across the sector; despite climbing 9 places, Bangor's overall score was actually lower than in the previous assessment. Equally, it should be noted that the assessment itself is not perfect and marking can be overly rigid in some areas.

2017: 57.6% Placed 29th (of 154), 1st Class	2019: 56.6% Placed 20th (of 154), 1st Class

Most Significant Gains:	**Most Significant Losses:**
- Waste & Recycling, +12.5 marks (37.5 to 50) - Education for Sustainable Development, +10.5 marks (65 to 75.5) - Workers' Rights, +10 marks (0 to 10)	- Sustainable Food, -35 marks (55 to 20) - Policy & Strategy, - 10 marks (100 to 90) - Human Resources for Sustainability -10 marks (100 to 90)

5.1 Continual Improvement

Analysis of the results and feedback has highlighted areas in need of development in order to further improvement performance in the next assessment. Additionally, there are areas in which efforts are needed to ensure current levels of performance are maintained in order to avoid loss of marks next time.

- Sustainability Budget
    - Bangor received zero marks out of ten for no published budget for sustainability
- Supporting staff engagement
    - Full marks were received this year but this is based on outdated information about Departmental Sustainability Champions.
      Not only is the information no longer accurate but it will not be available online in future due to the transfer of the Sustainability Lab website.
- Ethical Investment
    - Received 20/100 marks.
      Marks were lost in this section as People & Planet are seeking institutions to state explicitly that they do not, and will never, invest in certain sectors, including fossil fuel companies, companies complicit in the violation of international law, and arms companies. The University has very stringent criteria which investments need to satisfy, these currently mean that the University has no investments in organisations such as those which People & Planet wish to exclude. However, as there is no explicit statement ruling out any future investment in such sectors, People & Planet have not awarded marks.
- Sustainable Food
    - Received 20/100 marks.
      Most marks were lost as the Sustainable Food Policy was out-of-date and not renewed/updated within the timeframe of the assessment. A new Sustainable Food Policy and supporting framework which includes topics relevant to People & Planet should result in full marks for this section.
- FairTrade
    - FairTrade accreditation for Colleges and Universities is changing in 2020, it is not clear how this will affect consideration of FairTrade within the People & Planet assessment.

The new system is no longer free of charge and requires much more evidence of planning and action around promotion of FairTrade and ethical consumption.
The management of the University's FairTrade accreditation currently sits within Commercial Services. No decision has yet been made on whether Bangor intends to pursue the new accreditation.

- Staff & Student Engagement
    - Loss of marks for lack of evidence of commitment to involving students in carbon management planning or in development and monitoring of the environment/sustainability policy and strategy.
      Students are involved in these activities, but documenting/ evidencing of this has been lacking.

As People & Planet is a wide ranging assessment of the University's sustainability, many of the areas in need of attention and action fall within the remits of other departments or services. As such, the authority and support of STG and/or relevant members of senior management is required to ensure necessary actions are implemented.

6. Objectives & Targets 2018/19

In 2018, the University's Objectives and Targets relating to environmental performance were reviewed and updated. The revised Objectives & Targets document was approved by STG during the 2018 Annual Management Review.

The table below provides a summary of the 2018/19 Objectives and Targets and the University's progress against each

Objective	Target	Status
Remain compliant with relevant legislation and other obligations	T1. Ensure compliance with all relevant legislation and obligations associated with our activities and prevent the pollution of the natural environment and demonstrate compliance	**Achieved**
Manage waste through reduction, re-use, energy recovery and the promotion of recycling	T2. Achieve 54% reuse and recycling by July 2019	**Achieved**
Minimise resource consumption	T3 a) Reduce energy use by 3% compared to the previous year, as a function of i) m^2 useful floor area and ii) FTE students & staff	**Achieved**
	T3 b) Reduce water consumption by 2% compared to the previous year, as a function of i) m^2 useful floor area and ii) FTE students & staff	**Not Achieved**
Reduce the contribution of University business travel on the environment	T4 a) Update the Sustainable Travel & Transport Plan	**Progress Made**
	T4 b) Achieve and annual reduction in vehicular business travel CO_2 emissions	**Unable to Report**
Reduce the University's contribution to global climate change	T5. Achieve year-on-year reductions in greenhouse gas emissions (Scope 1, 2 & 3) associated with University operations as a function of i) m^2 useful floor area and ii) FTE students & staff	**Achieved**
Enhance biodiversity of the University estate	T6 a) Promote biodiversity conservation & improvement across the University estate	**Achieved**
	T6 b) Increase unimproved grassland/wildflower meadow area across the University estate	**Progress Made**
Embed sustainability within the procurement process	T7 a) Conduct Sustainability Risk Assessments for all contracts over the value of £25,000 and use Community Benefit Measurement Tool data for all contracts over the value of £1 million	**Not Achieved**
	T7. b) Where appropriate, ensure contracted suppliers have their own EMS	**Partially Achieved**
Raise environmental awareness and awareness of the UN Sustainable Development Goals amongst students and staff through improved communication and involvement	T8. Establish a baseline of engagement with University environmental and sustainability actions & activities during 2018/19	**Achieved**
Embed the environment and sustainability in the curriculum across the University	T9. Establish the number of courses and modules validated which refer to the environment to obtain a baseline for 2018/19	**Partially Achieved**
Minimise the impact of the University estate, and any development activities, on the environment	T10. Set environmental objectives for all major construction projects (those over the value of £100,000) and evaluate the effectiveness of these following completion	**No relevant projects undertaken**

Table 1. Environmental Performance Summary

7. Performance against Targets (2018/19)

7.1 Compliance

Objective: Remain compliant with relevant legislation and other obligations

Target 1. Ensure compliance with all relevant legislation and obligations associated with our activities and prevent the pollution of the natural environment and demonstrate compliance

Compliance Headlines 2018/19

- ISO14001:2015 accreditation retained in 2018
- The University remains compliant with relevant environmental legislation and obligations
- No non-conformances found during internal audits

7.1.1 Performance against Target 1

Performance against Target 1	**Achieved**

The University remains compliant with all relevant legislation and obligations. Related documents including the "Register of Legal and Other Obligations" is accurate, up-to-date and monitored regularly as part of the schedule of internal EMS documentation audits.

- Radiation audits and inspections have been undertaken with no significant adverse findings.
- EMS auditing and reviews include evaluation of seawater discharge consent and composting, with no significant adverse findings.
- One major construction project's waste stream was audited, with no significant adverse findings.
- The University's radiation control measures are robust and tightly controlled and is overseen by both an external specialist and a Sub-Committee. Level of awareness amongst radiation workers is high.
- The schedule of auditing and the local controls offers reassurance that license requirements are being met and are understood.

A more systematic approach to Contractor evaluations and monitoring of contract waste streams would improve robustness.

7.1.2 Continual Improvement

CEPT and the trained internal auditors will continue to work to promote continual improvement in environmental performance through the programme of scheduled audits and document reviews.

7.2 Waste

Objective: Manage waste through reduction, re-use, energy recovery and the promotion of recycling

Target 2. 54% reuse and recycling target July 2019

60% reuse and recycling target July 2020

Waste Headlines 2018/19

- Zero Waste to Landfill
- 2.12% decrease in total waste
- 13.81% increase in material recycled
- 47.46% increase in donations to British Heart Foundation
- 60% of students aware of Waste Awareness Week

7.2.1 Performance against Target 2

	2018/19	Compared to 2017/18	Compared to 2006/07*
Total Waste Generated during 2018/19	812.61 tonnes**	-2.12%	-2.68%
Total Reused or Recycled during 2018/19	58.27%	+16.28%	+133.08%
Total Sent to Energy Recovery during 2018	41.73%	+163.28%	No waste to energy recovery
Total Sent to Landfill during 2018/19	0.00%	-100%	-100%
Progress against Target 2	**Achieved**		

* The baseline year for waste reporting is 2006/07 as this is the earliest date for which data is available

**An additional 3.5 tonnes of mussel rope was disposed of during the 2018/19 academic year. As this occurred as a one-off incident, the weight has not been included in the overall waste figures reported here but is mentioned in the interest of transparency

As stated in the 2017/18 report, the data reported here does not include waste generated on the St Mary's Student Village site. In part this is due to the fact that the site is managed by a third party, but is also influenced by the lack of data available for the site.

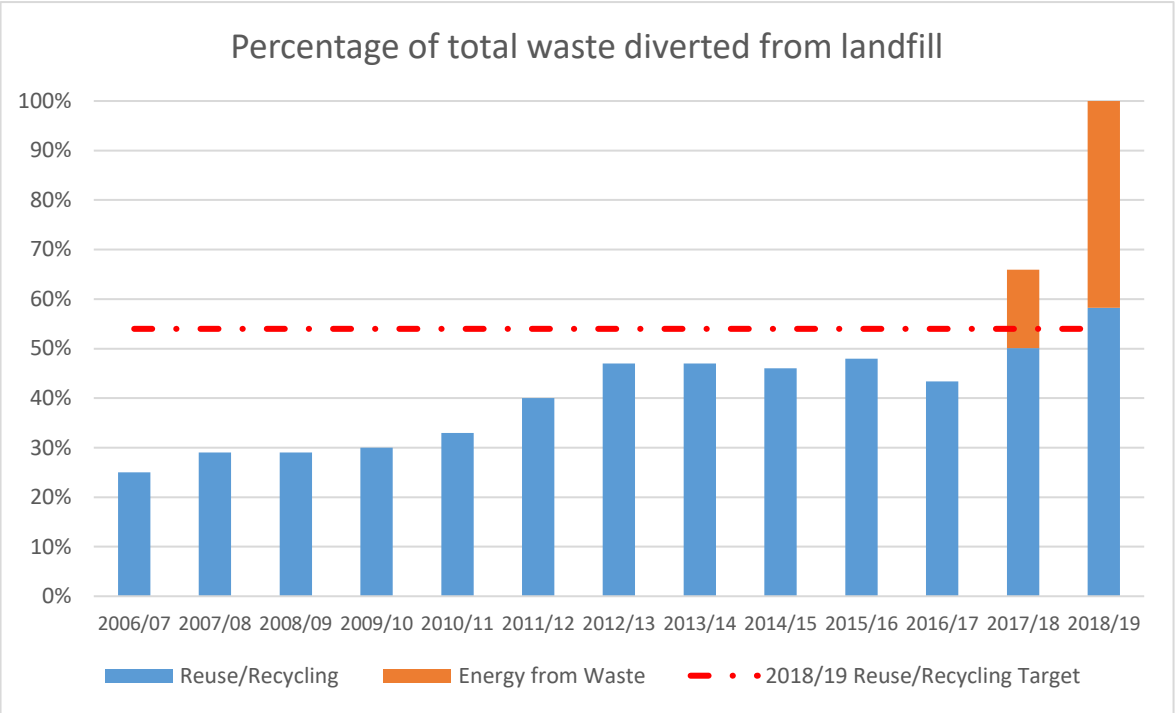

Figure 3. Percentage of total waste diverted from landfill

During the 2017/18 academic year, Gwynedd Council (the University's primary waste contractors) undertook a trial programme, sending general waste for energy recovery rather than disposal in landfill. Since the initial trial the scheme has been extended and all University general waste is now being sent to an Energy from Waste plant. As such, the University sent zero waste to landfill during the 2018/19 academic year.

Rates of reuse improved significantly during the 2018/19 academic year, with an increase of 47.46% in donations to British Heart Foundation Cymru from Bangor University sites (11.8 tonnes in 2017/18 to 17.4 tonnes in 2018/19).
BHF have a number of "Donation Stations" on both the Ffriddoedd and St Mary's halls sites, where students (and staff) can drop off bags on good-quality, unwanted items for the charity to sell on. Donations are also heavily promoted at the end of semester 2 to encourage students to donate to BHF rather than sending items to landfill or leaving them in halls, private housing or local streets.

Disposal of duvets and bedding remains an issue for Halls of Residence. At the end of the 2018/19 academic year 82 duvets and 48 pillows were left behind by students. Although efforts have been made to reuse or recycle duvets this has proven problematic. Historically, the University had a waste contractor who would handle old duvets but this company is no longer in business and no suitable alternative has been found. This year the duvets were offered to both homeless and animal shelters, but fire regulations mean they were not able to accept them. In previous years Conferencing Services have taken a small number of duvets, laundered them and put them into use, however this is labour intensive and their need for additional duvets is limited. As a result, the duvets have ended up having to be disposed of with general waste this year.

There are on-going efforts to improve signage, labelling and information associated with waste disposal around the University. New signage and labelling for general waste and recycling bins has been created and rolled-out across campus. The new signs and labels are intended to help staff, students & visitors dispose of their waste properly, ensuring all recyclable materials are recycled and that recycling is not contaminated by non-recyclable items.
New waste legislation in Wales will require a move to a semi-segregated collection system in 2020, as opposed to the mixed recycling collections currently in place. The University currently collects all dry recyclable materials (other than glass) together in a single bin. A semi-segregated system will require additional bins to allow for materials to be separated at the point of disposal (paper & card; plastic, cans & tetra-pak; glass) in addition to general waste and food waste. This change in intended to improve recycling rates by decreasing the amount of contamination of recycling.

Action Point

Investment will be needed to ensure there are enough suitable bins in place and that the process is supported by communications to help users understand what the changes are any why they are being implemented.

Waste management remains a significant focus for CEPT, steered by the Campus Waste Coordinator, and interest in the matter from students, staff and other interested parties remains high. The issue of single-use plastics has received a lot of attention as a result of high levels of media coverage. The Campus Waste Coordinator has advised a measured approach to single-use plastics, hoping to avoid a knee-jerk reaction with potential unintended knock-on effects. At present, alternatives to many common single-use plastic items (straws, cups etc.) are not recyclable and must be disposed of through the general waste stream. At present, the University is continuing to use such plastic items as it is felt that recyclable materials are preferable, but is also promoting reusable items and waste prevention (see Section 7.9, Awareness & Communication).

7.2.2 Case Study: Waste Awareness Week 2018

The second annual Waste Awareness Week campaign was held at the start of the 2018/19 academic year. The campaign aims to promote idea sharing and raise awareness about the importance of

resource efficiency both in the University and in Bangor City, to reduce environmental impacts both locally and nationally and to encourage students to become responsible global citizens.

The Sustainability Lab worked in partnership with Campus Life, Halls of Residence, Student Housing, Catering, the International Office, Gwynedd Council, the Chartered Institution of Wastes Management (CIWM) and British Heart Foundation Cymru (BHF) to run a range of activities and events during the week. These included a beach clean, waste awareness visits in student halls and private accommodation, waste career talks, a campus cleaning event, an information sharing day, recycling quizzes, a debate night, a film night and an eco-craft night, along with other smaller idea-sharing events.

On Saturday the 29th September, the Students' Union and the Sustainability Lab organised a beach clean, to kick-start this year's WAW. Around 50 students went to Dinas Dinlle beach, collecting approximately 30 bags of litter.

The Sustainability Lab and Halls of Residence team, along with student volunteers, also visited 349 flats/kitchens in student halls, looking at recycling behaviours, answering questions and providing recycling advice to over 200 students. Gwynedd Council, Student Housing and the Student Union visited students in private accommodation, visiting 336 properties, providing advice and support to 147 students on their doorstep, and subsequently delivering 46 recycling containers.

Results of the 2018/19 Undeb Student Survey showed that 60% of respondents were aware of the Waste Awareness Week campaign.

Waste Awareness Week 2019, to be held between 28th September and 6th October 2019, aims to build on this success.

7.2.3 Continual Improvement

The existing target already includes a requirement to further increase the rate of reuse and recycling at the University to 60% by July 2020. Having achieved 58.27% reuse and recycling in 2018/19, the 2019/20 target should be achievable.

Arrangements for recycling additional waste streams and further engagement campaigns are already in progress.

- A contract for the recycling of Lab-plastics commenced in September 2019, in time for the beginning of teaching. As a result of a pilot programme run during the 2018/19 academic year, it is anticipated that this scheme will lead to the recycling of 2.67 tonnes of plastic that was previously being sent to landfill/energy recovery.
  Roll-out of the scheme was hampered by delays in the distribution of internal collection bins by PaCS. Whilst external bins provided by the collection company were in place for the beginning of teaching in September, the internal bins were not in place in the labs for the actual collection of materials during practical classes. This was a cause of concern and confusion for both students and lab staff who have been very supportive of the scheme.

- A new campaign to encourage the recycling of aluminium drinks cans launched at the beginning of WAW 19, with 8 on-the-go can recycling bins being installed across the University. These bins aim to improve recycling by providing opportunity for people to recycle whilst moving around campus and away from the internal recycling hubs. The campaign is being run in collaboration

with “Every Can Counts”, a partnership of drink can manufacturers, who have also provided financial assistance for the installation of the bins.

- The potential for introducing a scheme for the collection and recycling of takeaway coffee cups is currently being investigated. It is hoped that this can be developed to the stage of implementation during the 2019/20 academic year.

- Collaborations with other departments and engagement and awareness campaigns will be ongoing in 2019/20, including the third annual Waste Awareness Week from 30th September – 4th October 2019.

7.3 Energy Consumption

Objective: Minimise resource consumption

Target 3 a: Minimise consumption of Energy – reduce consumption of energy by 3% compared to the previous year as a function of a) m^2 useable floor area and b) FTE students & staff

Energy Headlines 2018/19

- 5.5% decrease in total energy consumption
- 8.9% decrease in energy consumption per m^2
- 9.3% decrease in energy consumption per FTE (students & staff)
- More than 100,000kWh electricity generated by solar panels

In the context of this report, "Total Energy Consumption" refers to the total combined consumption of electricity, gas, heating oil and LPG, as reported below.

During the reporting period, consumption of all four energy sources was lower than during the previous year, in absolute terms. As a result, total energy consumption was also lower than during 2017/18 in absolute terms (-5.5%), per m^2 floor area (-8.9%) and per FTE (-9.3%).

7.3.1 Electricity

Adjustment: During the academic year, issues were identified with reports provided to the University by edf. Detailed analysis of those reports, cross-referenced with bills, identified that consumption for the academic year 2017/18 was under-reported. Additionally, consumption by the Management Centre was not added into the 2017/18 calculations. This was due to confusion related to the fact that, as a subsidiary, the Management Centre has its own separate energy supply contracts and bills are not received centrally.
As such, the figure for electricity consumption reported in the 2017/18 environment report was incomplete. Corrected data shows that during the academic year 2017/18, the University used 17,860,305.92 kWh of mains electricity. The corrected figure is being used to allow accurate and meaningful comparison between the current and previous year.
See Appendix 3 for further details of the adjustments. Records of electricity consumption by year since 2005/06 can be seen in Appendix 4.

Total Electricity Consumption 2018/19	16,566,376.73 kWh
Change in total electricity consumption compared to 2017/18	-7.24%
Change in total electricity consumption compared to 2005/06	+7.24%

7.3.2 Gas

Adjustments: As with electricity consumption, issues were identified with data for gas consumption during 2017/18. Consumption by The Management Centre was omitted from calculations of gas

consumption for 2017/18. As such, the figure for electricity consumption reported in the 2017/18 environment report was incorrect.
Adjusted data shows that during the academic year 2017/18, the University used 20,871,523.23 kWh of gas. The adjusted figure is being used in this report to allow for accurate and meaningful comparison between the current and previous years.

See Appendix 3 for further details of the adjustments. Records of gas consumption by year since 2005/06 can be seen in Appendix 4.

Total Gas Consumption 2018/19	20,509,594.074 kWh
Change in total gas consumption compared to 2017/18	-1.73%
Change in total gas consumption compared to 2005/06	-28.99%

7.3.3 Heating Oil & LPG

Adjustment: Due to an error in reported data for the academic year 2017/18, total consumption of LPG was over-reported by 6000 litres, equivalent to 65,400kWh. The corrected figure is being used in this report for the purposes of accurate and meaningful comparison.

A review of the system has revealed that maintenance of records relating to purchases of Heating Oil and LPG has been inconsistent in recent years.

The Campus Energy Coordinator reports that the data provided here is the best that is currently available, but may not capture all consumption and findings suggest that consumption reported in past years may also not be as accurate as it should be.

Heating Oil & LPG are delivered fuels and quantities purchased/used are only reported via delivery notes which are often left at the location of the delivery and not centrally recorded.

Action Point

The Campus Energy Coordinator is working with staff in PaCS to develop a better process for recording deliveries centrally to improve future reporting.

Total Heating Oil consumption 2018/19	392,977.7 kWh
Change in total Heating Oil consumption compared to 2017/18	-55.42%
Change in total Heating Oil consumption compared to 2005/06	-81.39%

Total LPG Consumption 2018/19	76,486.09 kWh
Change in total LPG consumption compared to 2017/18	-28.57%
Change in total LPG consumption compared to 2011/12*	-14.04%

*The baseline year for use of LPG is set as 2011/12 as the University did not use LPG before this year

7.3.4 Performance against Target 3a

	2018/19	Compared to 2017/18	Compared to 2005/06
Total Energy Consumption	37,545,435.59 kWh	-5.5%	-15.5%
a) Energy consumption **per m²**	163.7 kWh/m²	-8.9%	-36.8%
Progress against Target 3a		**Achieved**	
b) Energy consumption **per FTE**	3,199.9 kWh/FTE	-9.3%	-36.0%
Progress against Target 3a		**Achieved**	

As illustrated in the table above, total energy consumption during the reporting period, was lower than during the previous year (when the adjusted data is used) in absolute terms and as functions of floor area and FTEs. Consumption was also lower than during the baseline year. This is likely due, at least in part, to the efficiency works undertaken as part of the ReFit scheme (see 7.3.1 Case Study, below).

7.3.5 Performance within the sector

The Higher Education Statistics Agency (HESA) collects data on environmental performance of Higher Education Institutions in the UK, including energy consumption. Data for the 2018/19 academic year is not yet available, but based on the 2017/18 data set, Bangor was the 13th lowest user of water per m2 floor area and was also below the sector average. This is illustrated in the graph below.

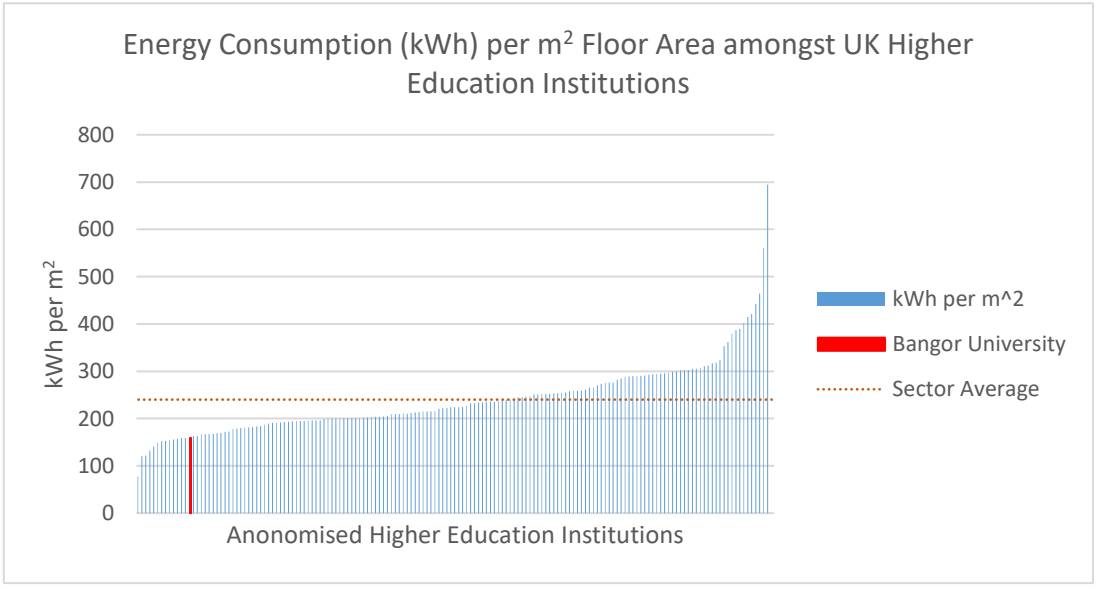

Figure 4. Energy Consumption per unit floor area across UK Higher Education Institutions

*One institution was excluded from the graph and the calculation of the sector average due to reporting zero energy consumption, which is felt to be an error in reporting that would unduly skew results presented here

For energy consumption per FTE, Bangor University was the 75th highest energy user but still used less energy per FTE than the sector average. This is illustrated in the graph below.

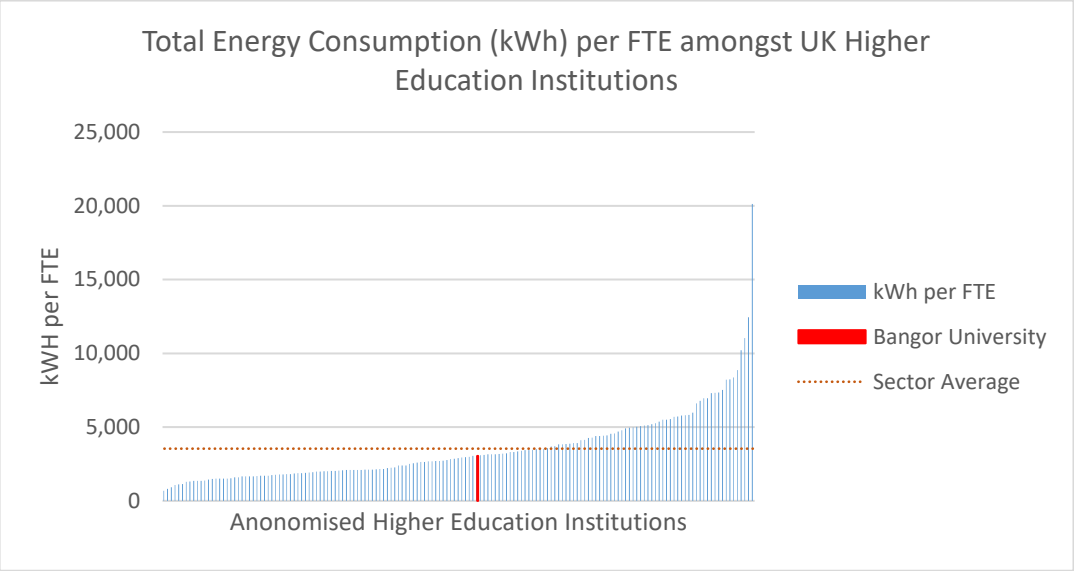

Figure 5. Total Energy consumption per FTE amongst UK Higher Education Institutions

*Two institutions were excluded from the graph and the calculation of the sector average due to one reporting zero energy consumption and one reporting zero staff, both were felt to be errors in reporting that would unduly skew results presented here

7.3.6 On-site Generation

Solar Photovoltaics

The amount of energy generated on-site by renewable energy technologies has not been reported as part of the environment report previously. It is being included this year for the first time as it is an increasingly relevant measure of the University's environmental performance.

During the 2018/19 academic year the University significantly increased its Solar PV capacity with the installation of solar panels on four buildings across the estate with a combined generation capacity of more than 102,000kWh per year. The generation capacity of these panels has not been fully realised this academic year as the installation and commissioning of the panels was only completed between November 2018 and February 2019.

Over the course of the reporting period, the University generated 87,221.26kWh of electricity from on-sire Solar Photovoltaic panels. This is equivalent to roughly 0.5% of the University's total electricity consumption for the year.

Combined Heat and Power (CHP)

The University also has three gas-fired Combined Heat and Power units (CHPs). CHPs burn gas to generate electricity but also use the heat created by this process to provide heating and hot water in connected buildings. This is much more efficient than a standard gas boiler which just generates heat for hot water and heating.

The University's three CHPs are located in ECW, Pontio and St Mary's Student Village. Currently, only the unit in St Mary's is in operation. The CHP in ECW was formerly in use but was switched off as it

was deemed to be uneconomical for the amount of hot water and heat required in the building. The unit in Pontio has never been used as no service contract was set up for its operation.

The University's ability to monitor the performance of the St Mary's CHP system is limited. The AMMT system provides details of how much gas the unit has used, but the amount of electricity and heat produced is not monitored and can only be calculated based on the designed efficiency of the system, which assumes the system is functioning at its optimal efficiency.

7.3.7 Case Study: ReFit

During the 2018/19 academic year, the University undertook a major energy efficiency improvement programme across a number of University buildings, funded through the Welsh Government ReFit Cymru scheme. ReFit Cymru provides interest free loans to public sector and Higher Education bodies in Wales for the purposes of improving energy efficiency and reducing energy costs.

The buildings were selected for improvement works based on assessments of energy and cost savings, conducted by consultants Asset Plus Energy Performance. In addition to 12 academic buildings, works were also conducted to upgrade lighting and heating controls in the Pobl Halls and heating controls within the 1990's Halls of Residence on the Ffriddoedd student village site.

In total, the programme of improvement works is set to reduce electricity consumption by more than 1.68 million kWh and gas consumption by nearly 2.60 million kWh. This would reduce annual energy bills by more than £400,000 and cut carbon emissions by more than 1168 tonnes.

Lighting upgrades were conducted across all 12 academic buildings plus the Pobl halls, replacing old, inefficient lighting with high efficiency LED bulbs. In total, the lighting upgrades are projected to reduce energy consumption by more than 970,000kWh per year, reducing annual energy bills by around £144,000 and reducing carbon emissions by more than 372 tonnes CO_2e.

Heating and Cooling System management controls were also improved across all twelve buildings and new intelligent heating controls were also installed in the Pobl and 1990s Halls of Residence blocks. These changes are anticipated to reduce annual electricity consumption by more than 430,000kWh and annual gas consumption by more than 530,000kWH, delivering financial savings of over £159,000 and reducing carbon emissions by more than 260 tonnes CO_2e.

Solar Photovoltaic panels were installed on four buildings – Wheldon, Thoday, Brambell and Canolfan Brailsford – which are projected to generate more than 100,00kWh of electricity every year.

Solar Panels are also due to be installed on the New Arts Library however this has been delayed pending the outcome of a planning application – this is the only installation requiring planning permission due to the building being listed. Planning permission was previously granted earlier in 2019, however changes to Health & Safety arrangements, including the addition of a safety railing, required the application to be resubmitted. This installation should generate a further 41,000kWh of electricity per year. It is anticipated that the panels will be installed during October 2019.

The full range of measures installed, included projected savings, can be seen in Appendix 5.

The projected savings are guaranteed under the terms of the contract with the appointed consultants – if any improvement measure does not deliver the expected savings, it is the responsibility of the consultants to take further steps to ensure savings are realised.

Action Point

The verification of savings achieved by the programme is reliant upon the functionality of the University's AMMT system. Failure of sub-meters could result in the University being unable to fully benefit from the improvement works and lack of evidence relating to under-performance will mean the consultants will not be bound to make reparations. Investment in the maintenance of the AMMT system needs to be prioritised (further discussion of this below, "Data Issues").

7.3.8 Energy Performance of Buildings

Display Energy Certificates (DECs) present an assessment of the energy performance of public buildings. It is a legal requirement to have DECs and accompanying advisory reports produced for all buildings over 250m^2 and accessible to the public. For buildings with a useful floor area of more than 1000m^2, each DEC is valid for a period of 12 months, with advisory reports being valid for 7 years. For buildings between 250m^2 and 1000m^2, DECs and advisory reports are both valid for 10 years.

Valid DECs must be displayed in a prominent place within the relevant building while advisory reports must be kept on file.

Summary of 2018/19 DEC performance

DECs rate the energy performance of buildings on an A-G scale, with A being the most efficient and G being the least efficient.

Overall, the University's buildings performed slightly better in 2018/19 compared to the previous year.

- Eleven buildings improved their banding with the Dean Street Building improving from a band E to a band C.
- Five buildings received a lower banding, with Thoday being downgraded from a band B to a band D.
- The average rating across all relevant University buildings has remained a Band C, although the average score has improved by 5.19 points.

Rating	Number of buildings in 2017/18	Percentage of buildings in 2017/18	Number of buildings in 2018/19	Percentage of buildings in 2018/19	Change in number of buildings between
A	0	0%	2	3.64%	+2
B	16	29.09%	13	23.64%	-3
C	18	32.73%	26	47.27%	+8
D	16	29.09%	11	20.00%	-5
E	2	3.64%	1	1.82%	-1
F	2	3.64%	1	1.82%	-1
G	1	1.82%	1	1.82%	0

Table 2. Energy ratings for Bangor University buildings

	2017/18		2018/19		Change
Average Rating	C	70.24	C	65.05	+5.19 points

Buildings of most concern

Environment Centre Wales and Marine Centre Wales were both built to BREEAM Excellent standards, however they are the University's worst buildings in terms of energy performance.

	2017/18 Band	2017/18 Score	2018/19 Band	2018/19 Score
Environment Centre Wales	F	128	E	119
Marine Centre Wales	G	151	G	152

The DEC process does slightly disadvantage scientific buildings such as these, as their efficiency is judged in the same way as buildings such as Halls of Residence, despite the equipment contained and activities undertaken therein. There has not been any investigation into the cause of this poor performance in order to determine whether it is caused by the nature of the building or if there are improvements that can be made.

Action Point

Efforts to determine whether the poor performance is solely attributable to the specific purposes of the buildings or if there are other issues need to be prioritised. Technical staff should determine whether the building is performing as designed and what changes could be made to improve performance, including adjustments within the Building Management System.

7.3.9 Data Issues

Decreasing reliability of the AMMT sub-metering system has made the process of collecting data for the DECs much harder with the potential to impact on the reliability of the final results.

The buildings on the science site were particularly badly affected. ECW, Wheldon and Alun Roberts are all served by a single gas meter. Sub-meters were installed on the supplies to the individual buildings for the purposes of providing accurate information on the gas consumption of each building.

The sub-meter serving the Alun Roberts Tower has been non-functional since January 2018.

The sub-meter serving the Wheldon Building has been non-functional since October 2017.

Without information from the sub-meters, data for the DECs would need to be calculated from bill data apportioned by floor area. There are issues with this approach as floor-area is not necessarily an accurate reflection of gas consumption. The issue was compounded by a fault found with the billing meter. Due to this fault the billing meter had reported only 2,592kWh of consumption compared to 215,603kWh the previous year. This error is still being investigated by the meter operator.

As a result, the DECs for Alun Roberts and Wheldon buildings this year are based on manual meter readings taken from the main multi-building billing meter, less the AMMT records for ECW (where the sub-meter is still working) apportioned by floor area of the buildings. As such, the reported

consumptions are not necessarily reflective of the actual consumption in each building. The Alun Roberts Tower has improved its efficiency rating this year based on this data, however it is not possible to say that this is an accurate reflection of any improved performance of the building.

7.3.10 Continual Improvement

As the ReFit energy efficiency improvement programme was conducted over the course of the 2018/19 academic year, the energy saving potential of the improvements will not yet have been fully realised. As such, a further fall in energy consumption should be seen over the 2019/20 academic year as a result of works undertaken as part of ReFit. There will be extensive monitoring of the improvements made to ensure savings are delivered. Should any measures be found to be falling short of their projected savings additional works will be required, at the consultant's expense, to ensure the promised levels of savings are realised.

A ReFit phase two has been proposed, however, development of a second scheme has been halted pending the finalisation of an Estates Strategy. Once an Estates Strategy is in place it may be possible to begin to explore further improvement works with ReFit.

As the works that can be carried out under ReFit are limited by requirements to deliver a specified level of carbon saving per pound spent and be able to deliver sufficient savings to repay the loan within eight years, there may be buildings in need of specific improvements that cannot be funded through ReFit. For example, replacement of single-glazed windows with more energy efficient windows is unlikely to meet the criteria of ReFit funding. As such, it may be necessary for the University to find other means of funding some improvement works.

The Energy & Water Management Policy is due to be updated during the 2019/20 academic year. The extant Policy is out-dated and has not been updated since 2014. Equally, the terms of the Policy are no-longer being followed including the commitment to allocate 5% of annual energy expenditure towards efficiency works, and the requirement for Heads of Department to ensure energy and water costs are considered by staff both as part of daily operation and in the consideration of new equipment purchases.

A new Energy and Water Management Policy and associated action plan set out necessary actions and responsibilities to help drive the reduction of energy and water use across the University.

Data issues need to be tackled to ensure that existing problems are rectified and that further problems don't develop in future. A dedicated fund is needed for the maintenance and replacement of elements of the AMMT system, as the University's ability to report on energy consumption is heavily reliant on this system. Equally, an energy data management software platform would also provide benefits in terms of ensuring all energy data is available centrally and is easily verifiable to pick up data issues more immediately than current systems allow for.

7.4 Water

Objective: Minimise resource consumption

Target 3 b: Minimise the consumption of Water – reduce consumption of Water by 2% compared to the previous year as a function of a) m^2 useable floor area and b) FTE students & staff

Water Headlines 2018/19

- 7.76% increase in total water consumption
- 3.82% increase in water consumption per m^2
- 3.44% increase in water use per FTE (students & staff)
- Associated increase in costs of nearly £35,000
- Targets not achieved

7.4.1 Performance against target 3b

	2018/19	Compared to 2017/18	Compared to 2005/06
Total Water Consumption	152,154 m^3	+7.76%	-6.25%
a) Water consumption **per m^2** useful floor area	663.36 litres	+3.82%	-26.53%
Performance against Target 3b		**Not Achieved**	
b) Water consumption **per FTE** (students & staff)	12,967.6 litres	+3.44%	-25.58%
Performance against Target 3b		**Not Achieved**	

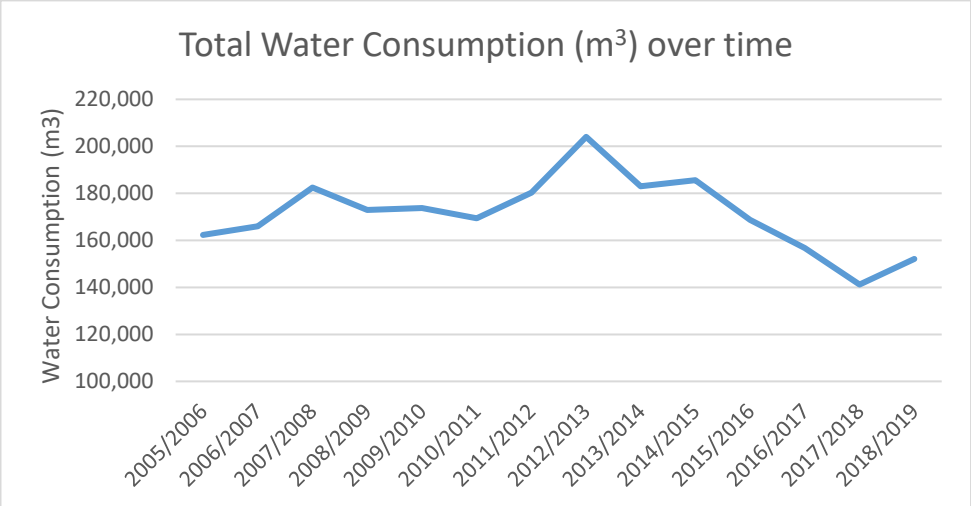

Figure 6. Total water consumption over time, in cubic meters

More detail of water consumption by year can be found in Appendix 6.

As the table above illustrates, water consumption has increased during the 2018/19 academic year, in absolute terms and when measured against floor area and FTEs. This also translates to an increase in costs. In 2018/19, water bills were £34,683 than during the previous year, despite a decrease in the unit cost (amount paid per m^3) and standing charges for some sites during the 2018/19 academic year.

The ability to monitor water consumption at the University is limited. The primary sources of data are bills/summary reports received from Welsh Water which do not provide a great deal of granularity – i.e. one billing meter may cover a number of buildings and so it is not possible to pinpoint the exact location of water use. While there are a small number of water meters on the AMMT system, the location of these is not always optimal and their reliability is very poor.

In the past, water saving initiatives such as water-less urinals and more efficient shower heads have been successful in reducing water consumption. There is clearly need for renewed focus on water saving and funding and support for water saving initiatives to combat this increase in consumption.

> There are conflicting priorities in relation to water use on campus. The conservation and efficient use of water is an important target. However, there are other sustainability issues that may drive increased water use; primarily the increased demand for water refill stations to tackle the use of single use plastic bottles, and the demand for greater provision of shower facilities as part of encouraging active-travel.

7.4.2 Performance within the sector

The Higher Education Statistics Agency (HESA) collects data on environmental performance of Higher Education Institutions in the UK, including water consumption. Data for the 2018/19 academic year is not yet available, but based on the 2017/18 data set, Bangor was the 60th lowest user of water per m^2 floor area (of 160 institutions*) and was also below the sector average. This is illustrated in the graph below.

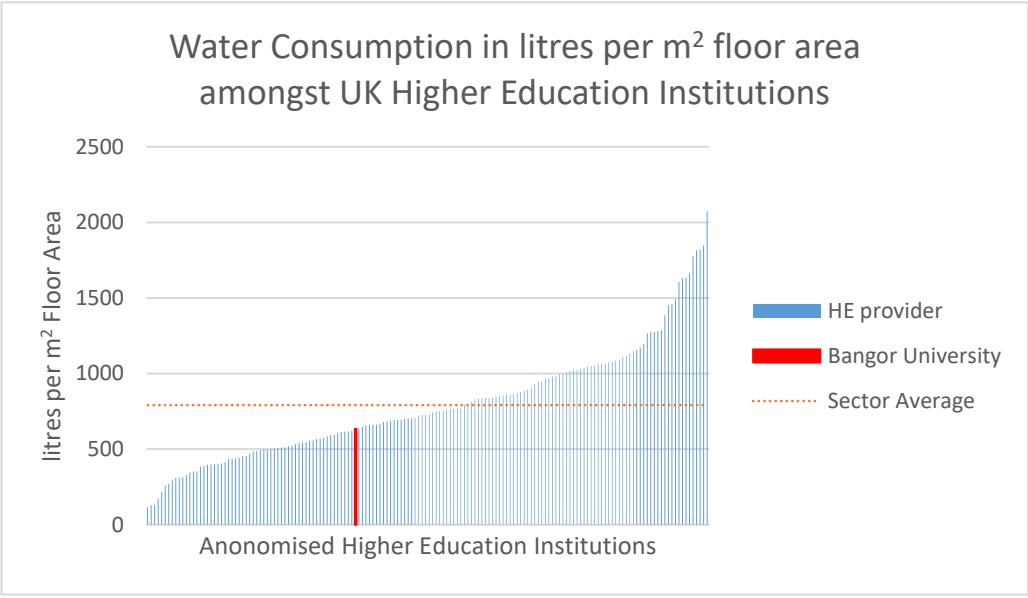

Figure 7. Water consumption (litres) per unit floor area for UK Higher Education Institutions

*One institution was excluded from the graph and the calculation of the sector average due to reporting zero water consumption, which is felt to be an error in reporting that would unduly skew results presented here

For water consumption per FTE, Bangor University was the 57th highest water user (of 159 institutions*) and used more water per FTE than the sector average. This is illustrated in the graph

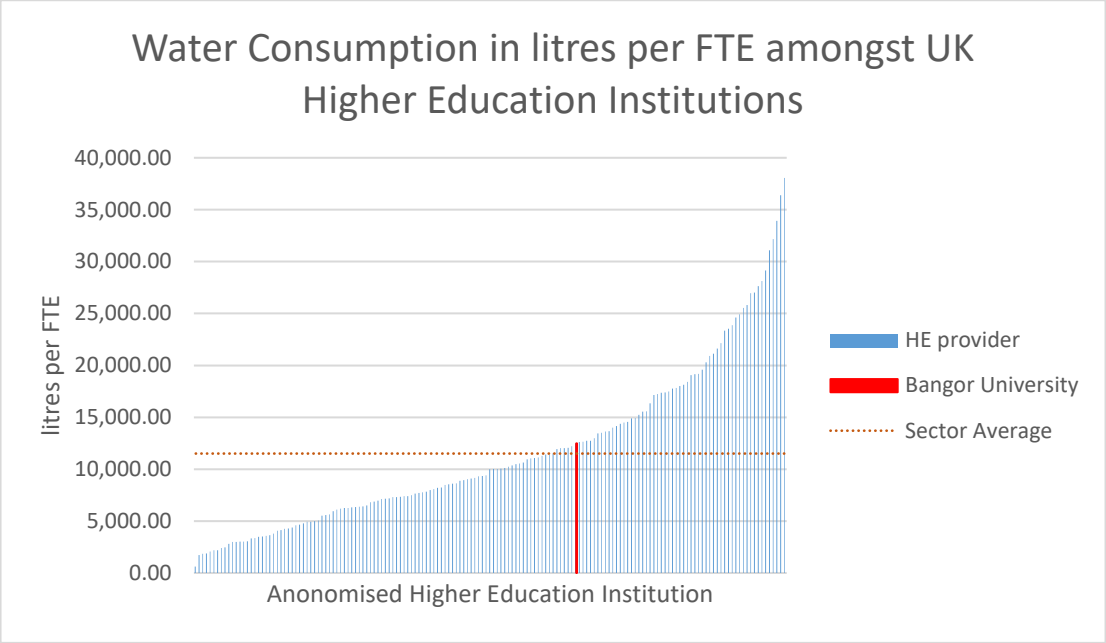

Figure 8. Water consumption (litres) per FTE for UK Higher Education Institutions

below.

*Two institutions were excluded from the graph and the calculation of the sector average due to one reporting zero water consumption and one reporting zero staff, both were felt to be errors in reporting that would unduly skew results presented here

7.4.3 Rainwater harvesting

The ECW building has a rainwater harvesting system which provides water for flushing toilets within the building. Use of rainwater (also known as grey water) for purposes that do not require water cleaned to drinkable quality, such as flushing toilets, delivers multiple benefits;

- Conservation of clean water
- Reduced water bills
- Reduced carbon emissions

During the 2018/19 academic year the system collected 42,956.5 litres of water, an increase of 18% compared to the previous year.

However, calculations undertaken as part of the design of the building projected the system would collect up to 351,000 litres of water per year, based on the roof area and average annual rainfall. It is possible that the shortfall is actually cause by an error with the meter set-up to monitor the system, but this should be investigated to ensure the University is getting the most out of such systems.

Treborth Botanic Garden also make use of rainwater harvesting for watering plants, reducing the total volume of clean mains water required. The total capacity of the rainwater butts on the site is not currently known.

7.4.4 Continual Improvement

The Energy and Water Management Policy is due to be updated during the 2019/20 academic year. A new Energy and Water Management Policy will set out necessary actions and responsibilities to help drive the reduction of energy and water use across the University. The extant policy, though old, includes a commitment to allocate 5% of annual energy expenditure towards efficiency works - this funding is something CEPT would like to see re-established during 2019/20 to help deliver savings across energy and water use.

CEPT hopes to be able to develop an engagement campaign around water use that combines the current staff & student demand for refill stations for reusable bottles with messages related to water conservation.

The University's ability to monitor water consumption is limited by poor monitoring infrastructure. As such, it is not easy to identify buildings with unexpectedly high water consumption or investigate possible causes. It is still possible to install water efficient appliances, but determining need and reporting on impact would be difficult. Improved monitoring infrastructure would be beneficial.

All refurbishment and construction projects should include water conservation measures including waterless and/or low-flow fittings and rainwater harvesting as standard.

7.5 Travel & Transport

Objective: Reduce the contribution of University business travel on the environment

Target 4 a. Update the Sustainable Travel & Transport Policy and Plan

Target 4 b. Achieve an annual reduction on vehicular business travel CO_2 emissions

Travel & Transport Headlines 2018/19

- Reporting not possible, due to lack of good quality data
- Being unable to report on travel emissions is a significant failing
- A new institution-wide travel plan needed to support estate development
- Sustainability must be at the heart of this

7.5.1 Performance against target 4a

Update the Sustainable Travel & Transport Policy and Plan

Performance against Target 4a	**Partial Progress**

A new Sustainable Travel & Transport Policy and Plan was started but has not been completed during the 2018/19 academic year.
Progress towards the creation of a new Sustainable Travel & Transport Policy and Plan was put on hold pending decisions related to the development and implementation of a new Estate Strategy. Current proposals for changes to the estate will have significant implications for travel related to University operations that will need to be fully considered within any policies or plan(s) related to travel and transport.

The previous Sustainable Travel Plan was focussed on increasing the sustainability of travel to and around Bangor University sites; decreasing single-occupancy cars and transitioning to greater use of less carbon-intensive travel. Planned changes to the estate will require a broader Travel & Transport plan to support any planning applications and facilitate conversations with the local authority. This is a perfect opportunity to ensure that sustainability is a central theme of the University's Travel & Transport Strategy/Policy/Plan going forward, rather than having a separate "Sustainable Travel" document.

A large amount of data collection will be required in order to produce an informed and relevant Travel & Transport Strategy/Policy/Plan, including a Travel Survey of students & staff. The Campus Environmental Performance Team will require support from University senior management and Undeb in order to ensure we achieve a useful level of response to this survey – the last survey in 2015 only received a response rate of 3.34% of which only 13.58% were students.
Other data required includes an accurate and up-to-date accounting of car and bicycle parking provision.

7.5.2 Performance against target 4b

Achieve an annual reduction on vehicular business travel CO_2 emissions

Performance against Target 4b	**Not Possible to Report against**

For previous reports, carbon emissions for business travel were calculated from data obtained from a number of sources; mileage reports from Aberconwy Hire, staff mileage expense claims, petrol purchase records and diesel purchase records.
This method has not been without its issues, not least of which being the need to calculate an approximate volume of petrol and diesel purchased based on the financial information recorded by the Agresso/U4BW system.
Further concerns were raised regarding the potential for double-counting emissions when a hire car was used and fuel was claimed.

Additional issues have come to light this year regarding the expenses data extracted from Agresso/U4BW that jeopardises the validity of any reporting of emissions based on the information.

- **Incorrectly coded claims**
  In some instances it is clear that claims are being made against the wrong cost code. This includes items that are not Petrol or Diesel being charged against the petrol & diesel codes. In some cases these erroneous claims are found and corrected, but not always.
  Where these claims are not found and corrected, the calculation process means the value of these non-fuel items is converted into litres of fuel and added to total emissions in error.
- **Fuel for non-road vehicles and machinery**
  Claims for Petrol & Diesel for machinery and non-road vehicles are not differentiated from fuel for road vehicles. This includes red diesel for farm machinery which, in addition to being a largely non-road fuel, is priced differently to standard road fuel and so literage, and associated emissions, would be misrepresented by the calculations used.
- **Use of other Hire Companies**
  Some claims indicate they are for fuel for hired vehicles from companies other than Aberconwy. This suggests we may be under-reporting mileage in hire vehicles if we are only receiving reports on mileage from Aberconwy.

Whilst it was hoped that it would still be possible to report on miles driven in hired vehicles, Aberconwy Hire changed their computer system in April 2019 and so are unable to provide data on the University's use of their vehicles prior to that date.

Due to these issues, it is not possible to present data on business mileage or related emissions with any confidence at this time.

For the purposes of comparison, the emissions attributed to business mileage will be deducted from previous total carbon emissions when they are presented within this report.

7.5.2 Continual Improvement

In relation to the development of a Travel Plan for the University, it will be necessary to undertake further research into the current travel situation prior to any plan or strategy being developed. A

Travel Survey is an essential part of this but will require significant high-level support to help deliver a useful level of response from staff and students.

In order to be able to properly account for business related travel emissions, it is imperative that the University develops a robust and reliable system for the collection of useful data. This would ideally be a system that records number of miles travelled, rather than the financial value of the expenses claim, and also covers other modes of transport such as trains, boats and aeroplanes.

The system for recording fuel purchases could also be improved, both to ensure that it only covers petrol and diesel, and to make it clear what the purpose of the fuel was (i.e. Farm machinery, gardening equipment, boats, hired vehicles etc.). Ideally this system would again specifically record the number of litres purchased rather than just the financial value of the purchase.

Due to issues with relying on third-parties for retaining data on use of hired vehicles, the University should develop a means for recording miles travelled in all vehicle hired for University business.

There are currently no centralised record of the use of departmental vehicles. This is potentially a significant gap in the University's data and reporting.

As a longer term goal, it would be beneficial to develop a means of reporting "miles not travelled", that is instances where video-conferencing etc. were used instead of travel. This would be useful as both a means of promoting "non-travel" as well as demonstrating how Bangor University staff are contributing to reducing travel related emissions. This could include promoting sophisticated 'webinar' style conferencing, which would reduce the need for travel.

7.6 Emissions

Objective: Reduce the University's contribution to global climate change

Emissions Headlines 2018/19

- 8.09% decrease in reportable emissions
- 11.42% decrease in reportable emissions per m^2
- 11.77% decrease in reportable emissions per FTE (students & staff)
- Climate Emergency Action Plan needed

Target 5. Achieve year-on-year reductions in greenhouse gas emissions (Scope 1, 2 & 3) associated with University operations as a function of i) m^2 useful floor area and ii) FTE students & staff

7.6.1 Performance against target 5

Adjustments: As previously discussed, adjustments have been made to the energy data included in the 2017/18 environment report (Section 7.3), these changes also have implications for the carbon emissions reported. Adjusted data shows carbon emissions for the 2017/18 academic year were 9,535,617.27 $kgCO_2e$ (9,535.62 tonnes CO_2e). Further details can be found in Appendix 3.
The adjusted figure is being used in this report to allow accurate and meaningful comparison between the current and previous years.

As discussed in Section 7.5 (Travel & Transport), it has not been possible to calculate any travel related emissions due to both the lack of some essential data and the very poor quality of the data that has been obtained. For the purposes of accurate comparison and analysis, total emissions from previous years discussed within this report have had travel-related emissions removed.

	2018/19	Compared to 2017/18	Compared to 2010/11*
Total Reported Greenhouse Gas emissions 2018/19 (travel related emissions excluded)	8,532.33 tonnes CO_2e	-8.09%	-48.36%
a) Greenhouse gas emissions **per m^2** useable floor area (travel related emissions excluded)	37.2 $kgCO_2e$	-11.46%	-55.01%
Progress against Target		**Achieved**	
b) Greenhouse gas emissions **per FTE** (students & staff) (travel related emissions excluded)	727.18 $kgCO_2e$	-11.77%	-49.76%
Progress against Target 5		**Achieved**	

*2010/11 is the baseline for total greenhouse gas emissions as this is the earliest date for which sufficient data is available

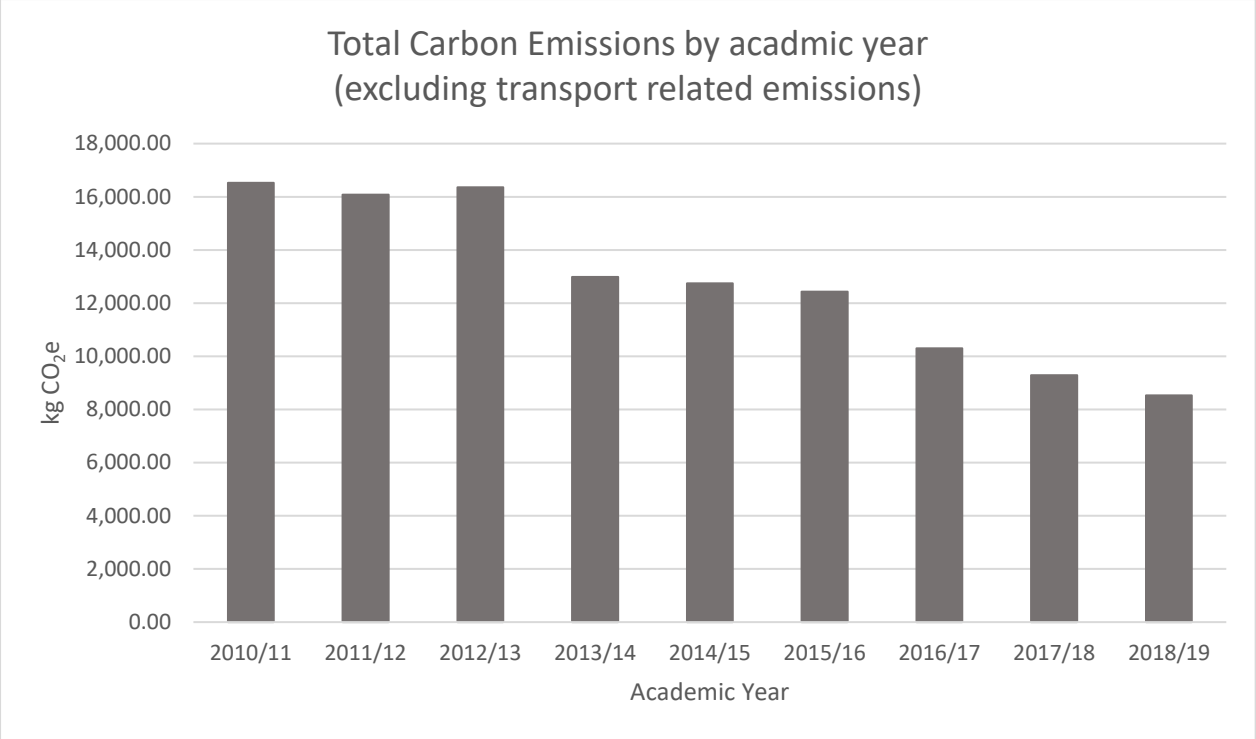

Figure 9. Total carbon emissions over time

As can be seen in both the table and graph above, total carbon emissions (excluding travel related emissions) have fallen for the sixth year in a row. In part this is due to decreased consumption but is also impacted by decreasing carbon intensity of electricity in the UK, driven by increased use of renewable electricity sources feeding into the electricity grid.

The table below provides details of emissions by Scope.

- **Scope 1 emissions** are those generated directly from sources in the control of the reporting organisation. This includes combustion of fuel such as gas, oil and LPG and would include the use of petrol and diesel if the data was available for inclusion.
- **Scope 2 emissions** are those generated indirectly from energy generation, primarily from the production of electricity.
- **Scope 3 emissions** are those generated indirectly from other activities and includes emissions associated with water treatment and waste disposal. Grey Fleet emissions would be included here if the data was available.
- The table also includes emissions from agricultural activities undertaken by the University, which fall within Scope 1 as being in direct control of the reporting organisation, and carbon sequestered by University land holdings. It is unclear from the records how these figures were derived and they may benefit from reassessment.

Scope 1 emissions	3,887.99 tonnes CO_2e
Scope 1 emission (Agricultural activities)	695.65 tonnes CO_2e
Scope 2 emissions	4,593.86 tonnes CO_2e
Scope 3 emissions (based on available data)	154.83 tonnes CO_2e
Sequestration	-800 tonnes CO_2e
Total	8,532.33 tonnes CO_2e

7.6.2 Procurement-related Emissions

The current accounting of Scope 3 emissions is in need of improvement. It has not been possible to include grey fleet emissions and Bangor University reporting of Scope 3 emissions has not, to date, taken procurement (supply chain) related emissions into account in emissions reporting.

The University is provided with a report each year detailing emissions generated from procurement activities (HESCET - Higher Education Supply Chain Emissions Tool). The report is usually received in December, as such the report for the 2018/19 academic year is not yet available, however, the report for 2017/18 shows procurement related emissions (less energy and construction*) to be 22,512.9 tonnes CO_2e. This puts Bangor University's procurement related emissions at more than 2.6 times more than those otherwise reported above.

*Energy emissions are excluded from procurement emissions as they are already accounted for by the reporting process. Construction emissions are excluded due to the highly variable nature of construction projects undertaken

7.6.3 Climate Emergency

In June 2019, Bangor University followed the UK, Welsh and Scottish Governments, as well as many local authorities and other Higher Education Institutions, in declaring a "Climate Emergency". Understanding of exactly what declaring a "Climate Emergency" means or what action it would require varies. The EAUC, in their call encouraging all Further and Higher Education institutions to declare a Climate Emergency, determined that it means committing to adopting a target of net-zero emissions by 2050 at the latest, in line with the recommendations of the Committee on Climate Change.

In order to make the declaration of "Climate Emergency" meaningful, the University must develop a wide-reaching action plan for delivery of carbon-neutrality, including more stringent targets for reducing carbon emissions from energy and transport combined with the necessary support and resources to ensure success.

7.6.4 Continual Improvement

The University needs the ability to accurately report on emissions from business related travel in order to give a full and proper accounting of the institutions carbon footprint. The failure in reporting procedures, which has led to the exclusion of travel related emissions from this report, needs to be addressed with urgency.

Whilst it is expected that carbon emissions from energy will decrease further over the 2019/20 academic year as the full benefits of the ReFit programme are realised, it is important that the University continues to take further action to reduce emissions. A programme of investment in areas such as energy efficiency in order to deliver savings both in terms of direct energy costs and the associated carbon taxes should be a priority.

Action is needed to address supply chain emissions. Energy use is often the obvious focus when looking to reduce an organisations carbon footprint, however, procurement related emissions are more significant and, as such, need to be recognised and managed in a transparent way.

The University's Carbon Management Plan is already under-review and a new version will be finalised during 2019/20. In addition, a Climate Emergency Action Plan is required in order to turn the Climate Emergency Declaration into meaningful action. There may be scope to combine these two documents.

7.7 Biodiversity

Objective: Enhance biodiversity of the University estate

Target 6 a. Promote biodiversity conservation and improvement across the University estate

Target 6 b. Increase unimproved grassland/wildflower meadow areas across the University estate

Biodiversity Headlines 2018/19

- Bee Orchids discovered on campus
- Biodiversity Action Plan close to finalisation
- Areas identified for new wildflower meadows
- Lack of resources slowing efforts

7.7.1 Performance against target 6a

Performance against Target 6a	**Achieved**

The development of a new Biodiversity Action Plan for the University estate has been a priority for the Biodiversity Coordinator during the 2018/19 academic year. This has been supported by the work of a dedicated Biodiversity Intern, whose time was paid for through the Bangor Undergraduate Internship scheme.

Survey and management activities have been ongoing including the monitoring and recording of all meadow species.

- Bee orchids were found to be present in the grassed area in front of the ECW building. The Biodiversity Coordinator has been working closely with the Grounds & Gardens team to ensure the orchids are protected from trampling and to develop a suitable mowing regime to support the continued growth and presence of the orchids.
- The University Allotment Society received funding from Headway and Grow Wild (Royal Botanic Garden, Kew) that has been used to establish new wildflower areas and pollinator borders.

7.7.2 Performance against target 6b

Performance against Target 6b	**Progress made**

Treborth has established a partnership with trunkroads service to assist with management of meadow areas. In exchange for providing cutting and removal services, Treborth give away a

proportion of their species-rich green-hay to the trunkroads for their own use. This service will be used to create the new meadow outside of the Main Arts building.

Due to ongoing changes and lack of resources within Property & Campus Services, it was not possible to take plans to develop new meadow areas forward during the 2018/19 academic year. It is hoped that it will be possible to undertake the necessary work during the 2019/20 academic year.

7.7.3 Continual Improvement

The new Biodiversity Action Plan is in the process of being finalised – approval, publication and implementation of the Plan is being proposed as a new Biodiversity target for the 2019/20 academic year.

As progress against targets has partially been slowed by lack of resources, the Biodiversity Co-ordinator and CEPT are working to get the University's Grounds and Gardens team more involved in biodiversity improvements. This will ideally include ensuring that Grounds & Gardens have dedicated time for biodiversity improvement works as well as routine grounds maintenance activities.

Plans for the new wildflower meadow will be taken forward during the 2019/20 academic year. If possible, further suitable sites will also be identified for conversion to wildflowers.

7.8 Procurement

Objective: Embed sustainability within the procurement process

Target 7 a. Conduct Sustainability Risk Assessments for all contracts over the value of £25,000 and use Community Benefit Measurement Tool data for all contracts over the value of £1 million

Target 7 b. Where appropriate, ensure contracted suppliers have an Environmental Management System

Procurement Headlines 2018/19

- Targets not achieved
- Lack of resources limiting ability to conduct specified assessments

7.8.1 Performance against target 7a

Conduct Sustainability Risk Assessments for all contracts over the value of £25,000 and use Community Benefit Measurement Tool data for all contracts over the value of £1 million

Performance against Target 7a	**Not Achieved**

Of 26 tenders conducted during the 2018/19 academic year, only one Sustainability Risk Assessment was conducted. The primary reason given for this was lack of time and resources within the Procurement team. Additionally, a new and simplified form for completing SRAs from Welsh Government is still outstanding. In the absence of this, the Procurement team intend to pursue developing their own process for ensuring all procurement requirements, including completion of SRAs, are fulfilled.

No contracts over the value of £1 million were issued, as such, no community benefit measurement tool data was required.

7.8.2 Performance against target 7b

Where appropriate, ensure contracted suppliers have an Environmental Management System

Performance against Target 7b	**Not Achieved**

Of all tenders conducted during the 2018/19 academic year, the Procurement team have determined that requiring an Environmental Management System may have been appropriate in nine cases. However, an EMS was only a stipulated requirement for two tenders (22.22%).

7.8.3 Continual Improvement

Given the significant impact of procurement activities on the environment, as demonstrated by the scale of procurement related emissions (Section 7.6.2), sustainability needs to be a central consideration in all procurement undertaken.

The lack of resources in the Procurement team is recognised but should not be an excuse. The Procurement team must work with CEPT to ensure the appropriate EMS related specification is included in all tenders.

7.9 Awareness & Communication

Objective: Raise environmental awareness and awareness of the UN Sustainable Development Goals amongst students & staff through improved communication and involvement

Target 8: Establish a baseline of engagement with University environmental and sustainability actions & activities during 2018/19

Awareness & Communication Headlines 2018/19

- Increase in undergraduate awareness of sustainability activities
- New Sustainability Lab website
- Finalists at the Green Gown 2019 awards for "Think Before You Drink" campaign

7.9.1 Performance against target 8

'Pageviews' for Sustainability Lab Websites	7,785
"Unique Pageviews" for old Sustainability Lab Website 01.08.2018-31.07.2019	4,955
"Unique Pageviews" for new Sustainability Lab Website 28.04.2019 (launch date) – 31.07.2019	939
Twitter "Impressions"	159,556
Twitter New Followers	127
Twitter Total Followers	756
Facebook "Reach"	12,929
Facebook "Engagement"	1514
Facebook "Engagement Rate"	11.71%
Facebook "Followers"	271
Performance against Target 8	**Achieved**

	2017	2018
I'm aware of the sustainability activities that are available to me during my time at University	34%	54%
I have heard of the Sustainability Lab	34%	38%
I am aware of Waste Awareness Week	N/A	60%

Social media and webpages are important channels of communication for environmental and sustainability issues at the University. The Sustainability Lab operate a website and a range of social media channels including Facebook, Twitter, Instagram and Snapchat. These platforms are used to promote events and messages from the Sustainability Lab and CEPT, as well as relevant messages from across the University. Equally, departments working closely with the Sustainability Lab and CEPT, particularly Campus Life and Undeb, share environmental/sustainability related messages through their platforms.

CEPT also maintain a website for information relevant to the EMS.

During the course of the 2018/19 academic year, the Sustainability Lab changed from an external website (www.planet.cymru) to an internally hosted website (www.bangor.ac.uk/sustainability). A lot of time and effort was put into redesigning the website as part of the switch, to ensuring the new website was user-friendly and easy to navigate.
The "Bounce Rate" (the number of people leaving the website after viewing just the landing page) has decreased from 63.59% on the old site to 29.90% on the new site, which suggests people are exploring more content. The average time spent on the website has decreased since the change, however it is felt this is due to improved navigation.

Undergraduate student awareness of the Sustainability Lab increased slightly between 2017 and 2018, while awareness of sustainability activities increased more significantly.

The Sustainability Lab and CEPT's dedicated Communication and Engagement Coordinator, have worked hard to create engaging marketing campaigns around sustainability events and campaigns around the University throughout the 2018/19 academic year. Equally, increased support from other areas of the University, including Campus Life and Undeb, may be a contributing factor.

7.9.2 Case Study: Think Before You Drink

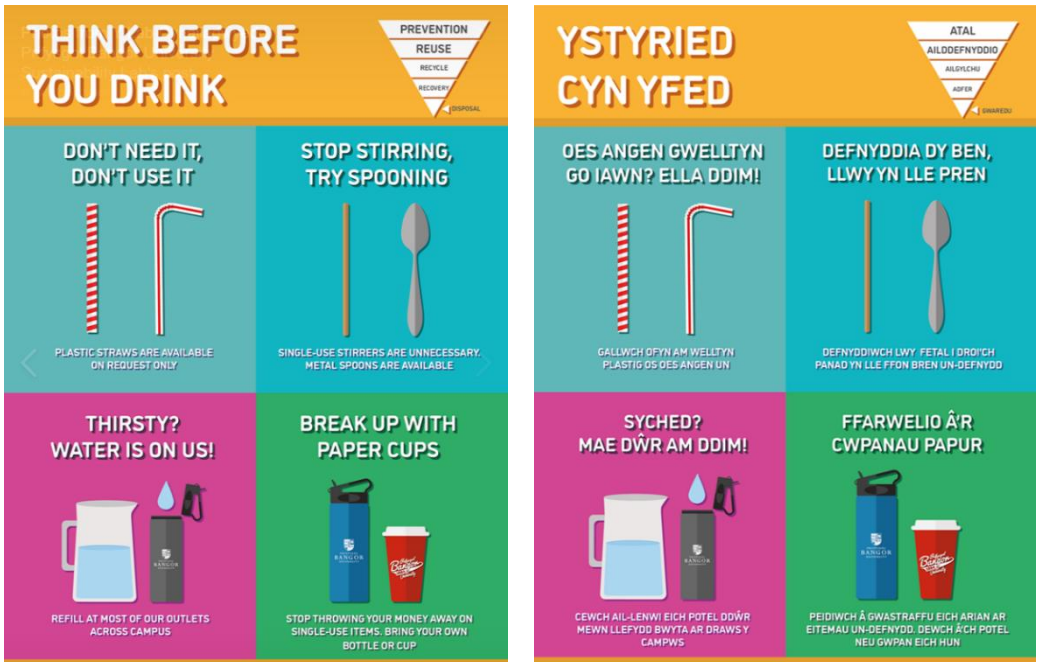

Figure 10. Think Before You Drink campaign posters

In April 2019, the Sustainability Lab and Campus Environmental Performance Team, in collaboration with University Catering and Undeb, launched the Think Before You Drink campaign. The campaign aims to encourage people to choose reusable options instead of single-use disposables when purchasing drinks around campus.

University catering outlets now no longer provide straws by default, only upon request, single use drink stirrers have been replaced with reusable metal spoons, almost all catering outlets are able to refill water bottles free of charge and discounts are offered on hot drinks when using a reusable cup.

The campaign has been promoted through various channels including the Sustainability Lab and Undeb social media profiles, all-staff and all-student emails and posters and signage in catering outlets.

In the first four months of the campaign, catering have reported a 190% increase in the use of reusable cups compared to the same period in 2018, a 46% reduction in straw purchases and a 100% reduction in purchase of stirrers. So far, a total of 9,171 single-use items have been prevented from being used and disposed of. As the campaign was launched late in the academic year, at a time when student numbers were already decreasing prior to the summer holiday period, it is anticipated that even greater benefits will be seen once students have returned for the new semester.

The campaign has reached the final stages of the EAUC Green Gown Awards UK & Ireland 2019. Representatives from the Sustainability Lab, Undeb and Catering will be attending the awards ceremony in Glasgow on Tuesday 26th November 2019 where the winner will be announced.

There have been some barriers encountered as part of the roll-out the scheme. Posters of various sizes were produced based on specifications from Catering, in both Welsh and English, but only a limited number have been displayed in catering outlets and in some instances only English version have been put up. A large number of posters were also misplaced and had to be reproduced.
It has also been observed that implementation of the new measures has not been consistent across outlets or over time; for instance, some outlets have been found to still be providing plastic spoons instead of metal spoon for drinks. CEPT are making every attempt to work with Catering to ensure the campaign is implemented fully and promoted appropriately.

7.9.3 Sustainability Think Tanks

The Sustainability Lab hosts a series of “Think Tanks” every year, open to all students and staff the Think Tanks provide an opportunity to hear from a range of people involved in sustainability activities at the University and to discuss and contribute to sustainability decision making and planning.

Think Tanks are held monthly between October and May, advertised via all-staff and all-student emails and through social media. During the 2018/19 academic year Think Tanks topics included waste, energy, Fairtrade, wellbeing and international collaboration.

Turn out at Think Tanks is variable but usually low (no more than 20). For the 2019/20 academic year the sessions are being rebranded as “Putting the world to rights” as part of plans to generate greater interest and engagement with the sessions.

7.9.4 Continual Improvement

In order to ensure the success of communication and engagement campaigns, it is essential that other departments across the University (especially those directly involved in the conception of the events/campaigns) support the actions, messages and promotional activities involved.

Campaigns that have run to-date have been developed and implemented on a limited budget due to lack of clarity around available funds. A specified budget would enable more thorough and longer-term planning of campaigns and help deliver greater engagement and impact.

Potential marketing, communication & engagement activities that would benefit from having a specified budget;

- Being able to create more robust signage for long-term use, rather than relying on paper posters
- Incentives for attendance/participation, such as refreshments/catering
- Sustainable promotional items

As the 2018/19 target was to establish a baseline for digital engagement and this has been achieved, a new target is needed for the 2019/20 year.

Recommended Awareness & Communication targets for 2019/20:

- Increase level of digital engagement
- Develop a baseline for non-digital/face-to-face engagement
- Increase student awareness of the Sustainability Lab and environmental/sustainability related events & opportunities
- Increase number of departmental/school/service webpages that refer to sustainability and link to the Sustainability Lab and/or CEPT & EMS webpages

7.10 Curriculum

Objective: Embed the environment and sustainability in the curriculum across the University

Target 9. Establish the number of courses and modules validated which refer to the environment to obtain a baseline

Curriculum Headlines 2018/19

- 18 courses that refer to the 'environment', 'sustainable' and 'green'
- 26 modules that refer to the 'environment', 'sustainable' and 'green'
- Commitment to maintain a curriculum that reflects the University's commitment to sustainable development and global citizenship and to wider sustainability goals (Wellbeing goals & UNSDGs) in the Sustainability Statement.

7.10.1 Performance against target 9

Performance against Target 9	**Partial Progress**

Courses and modules at Bangor University	**2018**	**2019**
Courses referring to 'environment'	16	16
Courses referring to 'sustainable'	2	2
Total courses referring to 'sustainable' and 'environment'	**18**	**18**
Modules referring to 'environment'	19	20
Modules referring to 'sustainable'	3	4
Modules referring to 'green'	2	2
Total modules referring to 'sustainable', 'environment' and 'green'	**24**	**26**

In the 2019-2020 academic year, Bangor University offered 18 courses that refer to 'environment', 'sustainable' or 'green' in their titles and 26 modules. Two of these courses and four modules are offered through the medium of Welsh in the School of Natural Sciences. The four schools that run courses and modules that refer to the environment, sustainable and green include:

- Bangor Business School
- Ocean Sciences
- School of Natural Sciences
- Computer Sciences & Electronic Engineering

This provision has increased slightly from the 2018-2019 academic year with an additional two modules now been offered. However, while Bangor University offers over a thousand different courses, currently only 1.7% referring to 'sustainable', 'environment' and 'green' in their title. There are many more courses and modules that offer complimentary courses with similar themes e.g.

conservation, ecology, climate change, that haven't been included in the basic audit of the curriculum above.

A new Sustainability Statement for Bangor University is committed to maintain a curriculum that reflects the University's commitment to sustainable development and global citizenship and to wider sustainability goals (Wellbeing goals & UNSDGs).

Welcome week student presentations

During welcome week the Sustainability Lab offer to deliver an introductory talk to all new students. The talk highlights the activities and forthcoming campaigns that student can engage with and also draw their attention to the Environmental Management System that is in place at Bangor University. The table below summarises the student engagement since 2017. There has been a dramatic drop in the numbers of students engaged with during this week since 2017. More schools have been asking for videos (links below) and for talks to be included in lectures early in the new term rather than during Welcome Week itself.

Welcome week presentations	2017	2018	2019
Student attendance	1,178	N/A	326
Number of talks	19	8	8
Welsh video views		22	1 (published 23/9/19)
English video views		86	6 (published 23/9/19)

Introduction to Sustainability Welcome Week talk 2019 (Welsh)

Introduction to Sustainability Welcome Week talk 2019 (English)

7.10.2 Continual Improvement

The initial search for key words in the present curriculum provision has shown that further, more in depth work needs to be carried out. The actions include:

- Mapping existing provision against well-being goals and UNSDGs
- Encourage 'thinking differently' around curriculum - e.g. cognitive discourse analysis in linguistics ideal for discourse on how to articulate our thoughts/knowledge/opinions on sustainability.
- Promote and include in marketing activities.

There is also work to be done to improve the student engagement numbers during the Welcome Week. Some academic schools automatically include an 'Introduction to Sustainability' talk in their programmes, whilst others do not respond to requests. This will need to be addressed in the coming months requiring high level support.

7.11 Construction & Refurbishment

Objective: Minimise the impact of the University estate, and any development activities, on the environment

Target 10. Set environmental objectives for all major construction projects (over £100k) and evaluate the effectiveness of these following completion of the projects

Construction & Refurbishment Headlines 2018/19

- No major construction projects undertaken
- Incorporating sustainability from the outset of planning refurbishment and construction projects is vital
- Sustainability considerations should not be "value engineered" out of projects

7.11.1 Performance against target 10

Performance against Target 10	**No relevant projects undertaken**

During the 2018/19 academic year, no major construction projects were undertaken to require environmental objectives or evaluation.

CEPT and EnCo have been involved in discussions with Gleeds, the University's appointed programme managers for Capital Projects, to develop a robust "Design Guide" including environmental and sustainability requirements, for use in planning and implementing such projects.

With the ongoing development of an Estates Strategy for the University it is essential that there continues to be close collaboration between CEPT, EnCo, PaCS, Gleeds and any other relevant departments or contractors with regard to the environmental and sustainability aspects of any construction programme. Additionally, sustainability and environmental objectives should be taken into consideration for smaller construction and refurbishment projects, including the repurposing of any furniture and/or equipment removed.

7.11.2 Continual Improvement

CEPT and PaCS need to continue to work closely together to ensure that sustainability and environmental objectives are built-in to construction and refurbishment projects from the outset. CEPT need to be informed of proposed works from the earliest stages of planning.

Sustainability, including consultation with the Sustainability Lab/CEPT, should be an essential part of any proposals brought forwards to the Capital Programmes Board.

There also needs to be close scrutiny and oversight of projects to ensure that sustainability ambitions are not "value engineered" out as projects develop.

8 Communications

Communications relating to environmental management at the University are primarily received via email, either to the environment@bangor.ac.uk or sustainability@bangor.ac.uk email addresses, or directly to specific members of CEPT. Some messages are also received via social media.

During 2018/19, the majority of communications were related to waste management and the use of single-use/disposable plastic items. Many of these were also concerned with the provision of water refill stations to support the use of reusable bottles in favour of plastic bottled water.

A small number of communications were received regarding sustainability and catering provision at the University, including giving greater prominence to vegetarian and vegan foods.

The only complaint received was with regard to the Environmental Incident at the Treborth 3G Pitch, as detailed in Section 3.3.

9 Adequacy of Resources

The collection, retention and provision of data has been a major barrier to the production of this report and, as such, effective environmental management at the University.

With reductions in administrative staff, data related duties have not been passed to remaining staff but have been allowed to “slip through the cracks”. Other data issues, particularly in relation to travel, are symptomatic of long standing inadequacies in the recording process.

Availability of funding for initiatives particularly around the implementation of energy, water and carbon reduction, as well as related promotion, are hindering the ability of CEPT to deliver results.

Time and staff resources have also limited progress in certain areas, and have been specifically highlighted as barriers in relation to Biodiversity and Procurement targets this year.

10 Summary of Action Points

People & Planet

- The authority and support of STG and/or Senior Management are needed to help ensure that actions to improve performance are implemented in the relevant departments
- Develop a replacement 'Staff Sustainability Champions' scheme
- Create a new Sustainable Food Policy as a matter of urgency
- Commitment to and funding for the continuation of FairTrade accreditation needs to be approved to avoid losing the FairTrade University status the University has held for 10 years
- Ensure student and staff engagement activities are documented, recorded and reported
- A dedicated, central sustainability budget would not only gain points in the People & Planet league but would greatly facilitate the work and planning of CEPT

Waste

- Investment will be needed for additional bins, signage and communications to support the move to semi-segregated collections in 2020.

Energy

- Sufficient funds need to be allocated for the repair, maintenance and replacement of the AMMT system
- Further energy efficiency works are required irrespective of the availability or ReFit funding. Particularly poorly performing buildings need urgent attention.
- Records related to Oil and LPG deliveries must be reported, verified and retained centrally and be available for reporting purposes
- The Energy and Water Management Policy needs to be updated, with an associated Action Plan, and actions/responsibilities need to be monitored
- An energy data management software platform would improve the quality of data and make reporting easier and more reliable

Water

- Investment is needed in water efficiency to address rising consumption and rising bills
- The Energy and Water Management Policy needs to be updated, with an associated Action Plan, and actions/responsibilities need to be monitored
- The rainwater harvesting system in ECW needs to be checked to ensure it is delivering maximum benefit
- Water efficiency needs to be a part of all new construction and refurbishment projects

Travel & Transport

- High-level support and, ideally, incentives, are needed to help deliver a high response rate for a Travel Survey
- Means of recording business miles, hire vehicles use and petrol & diesel purchases need urgent attention to ensure the University can resume reporting on travel emissions. Additionally, use of departmental vehicles should be included within the scope of environmental reporting
- Develop a process for recording and reporting "miles not travelled"

Emissions

- Figures used for Agricultural emissions and Land Sequestration need to be re-examined
- Procurement related emissions need to be acknowledged and addressed as energy related emissions are
- A Climate Emergency Action Plan is needed to give meaning to the Climate Emergency declaration

Biodiversity

- The Biodiversity Action Plan needs to be completed, approved and implemented as a new Biodiversity target for 2019/20
- The Grounds and Gardens team need to be able to offer support to biodiversity projects

Procurement

- Sustainability needs to be an essential part of the procurement process rather than an optional extra
-

Awareness & Communication

- It is essential that other departments across the University support the actions, messages and promotional activities involved
- A specified budget would enable more thorough and longer-term planning of campaigns and help deliver greater engagement and impact
- Set new targets for 2019/20
    - Increase level of digital engagement
    - Develop a baseline for non-digital/face-to-face engagement
    - Increase student awareness of the Sustainability Lab and environmental/sustainability related events & opportunities
    - Increase number of departmental/school/service webpages that refer to sustainability and link to the Sustainability Lab and/or CEPT & EMS webpages

Curriculum

- Mapping existing provision against well-being goals and UNSDGs
- Encourage 'thinking differently' around curriculum - e.g. cognitive discourse analysis in linguistics ideal for discourse on how to articulate our thoughts/knowledge/opinions on sustainability.
- Promote and include in marketing activities.
- High level support required to improve the student engagement numbers during the Welcome Week

Construction & Refurbishment

- CEPT to be informed of all planned construction, refurbishment and decant projects prior to the beginning of planning, to ensure sustainability objectives are fully built-in
- Sustainability needs to be a key part of these projects and not an "added extra" that can be value engineered out at a later stage

11 Appendices

Appendix 1. Environmental Policy

Appendix 2. Most Significant Environmental Aspects

Appendix 3. Data relating to the under-reporting of energy consumption in 2017/18

Appendix 4. Electricity and gas consumption over time

Appendix 5. Details of ReFit energy efficiency improvements

Appendix 6. Water consumption over time

Appendix 1. Environmental Policy

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UNIVERSITY

Environmental Policy

Bangor University has around 10,000 students and 2,000 members of staff located within an estate of some 100 buildings across 300+ hectares. Our core business is to provide high quality teaching and research whilst taking good care of our staff, students, community and environment.

We understand that our activities have an impact on the environment, and are committed to continual improvement of our environmental performance and to meeting the requirements of ISO 14001:2015 environmental standard. We will not only seek to protect our natural environment, but also actively pursue opportunities to enhance it, promote a culture of environmental stewardship amongst our staff and students and work towards the goals of sustainable development.

Bangor University will minimise our adverse environmental impacts by:

i. ensuring compliance with all relevant legislation and obligations associated with our activities
ii. managing waste through reduction, re-use, and the promotion of recycling
iii. minimising energy and water consumption
iv. promoting sustainable transport initiatives
v. reducing our contribution to global climate change by making year on year reductions in our greenhouse gas emissions
vi. promoting and increasing biodiversity conservation and improvement across the University estate
vii. embedding sustainability within the procurement procedures
viii. undertaking to prevent the pollution of the natural environment
ix. raising environmental awareness and awareness of the UN Sustainable Development Goals amongst staff and students through improved communication and involvement
x. embedding sustainable development and awareness of environmental issues in our curricula across the University
xi. establishing environmental objectives and targets and report progress on an annual basis

This Environmental Policy will be reviewed annually by the Campus Environmental Performance Team, endorsed by the Sustainability Task Group, and reported to the University Executive. It is also communicated to the wider University population and is publicly available on the University's website.

Signed by: Graham Upton

Date: 30th April 2019

Professor Graham Upton, Vice-Chancellor, Bangor University

Review Date: 2021

Appendix 2. Most Significant Environmental Aspects

Aspects Ref	Aspect/Activity	Environmental Impact	Significance
A26	Use of air-conditioning	Depletion of resources (energy) and emissions (pollutants and contaminants) from operation. Use of hazardous chemicals and contamination into land and watercourses.	**50**
A27	Use of chemical materials	Use of raw materials. Pollution of land, air, watercourses and groundwater.	**77**
A28	Use of biological materials	Generation of hazardous biological material (including non-native species). Use of hazardous chemicals.	**66**
A30	Use of refrigerators, freezers and cold stores	Depletion of resources. Possible accidental release of ozone.	**55**
A31	Storage of chemicals and disposal of chemical waste	Pollution of land, air, watercourses and groundwater.	**60**
A32	Storage of biological materials and disposal of biological waste	Potential uncontrolled releases polluting land, watercourses and groundwater.	**60**
A34	Fuel oil	Potential uncontrolled releases polluting land, watercourses and groundwater.	**60**
A35	Procurement of construction works and materials	Depletion of natural and other resources. Pollution during manufacturing.	**60**
A36	Procurement of goods	Depletion of resources. Depletion of natural resources.	**60**
A38	Business travel by bike, car, minibus or van	Emissions of CO_2. Depletion of natural and finite resources. Noise.	**60**
A40	Business travel by airplane	Emissions of CO_2. Depletion of natural and finite resources. Noise	**70**
A41	Commuter travel by staff and students	Emissions of CO_2. Depletion of natural and finite resources. Noise	**70**
A42	Student travel to and from the University from their original home address	Emissions of CO_2. Depletion of natural and finite resources. Noise	**60**

Appendix 3. **Data relating to the under-reporting of energy consumption in 2017/18**

	Reported	Corrected	Difference
Total Energy Consumption 2017/18	34,529,271.78 kWh	39,720,351.14 kWh	+5,191,079.36 kWh
Change in total energy consumption compared to 2016/17	-7.1%	+6.9%	
Total energy related carbon emissions 2016/17	8,416,444.74 $kgCO_2e$	9,592,914.83 $kgCO_2e$	+1,176,470.09 $kgCO_2e$
Change in total energy related carbon emissions compared to 2016/17	-16.6%	-4.9%	
Change in total energy related carbon emissions compared to 2005/06	-39.2%	-30.6%	
Energy related carbon emissions per m^2	38.1 $kgCO_2e$	43.4 $kgCO_2e$	+1.7 $kgCO_2e$
Change in Energy related carbon emissions per m^2 compared to 2016/17	-16.6%	-4.3%	
Change in Energy related carbon emissions per m^2 compared to 2005/06	-50.6%	-42.7%	
Year-on-Year reduction Target	Achieved	Achieved	
2020 reduction Target	Achieved	Achieved	
Energy related carbon emissions per FTE	747.2 $kgCO_2e$	851.7 $kgCO_2e$	
Change in Energy related carbon emissions per FTE compared to 2016/17	-16.0%	-4.3%	
Change in Energy related carbon emissions per FTE compared to 2005/06	-49.8%	-42.7%	
Year-on-Year reduction Target	Achieved	Achieved	
2020 reduction Target	Achieved	Achieved	

Appendix 4. Electricity and gas consumption over time

Electricity Consumption

	kWh	Change year on year	Change on 2005
2005/06	15,447,781.00		
2006/07	15,613,647.00	+1.07%	+1.07%
2007/08	15,524,732.00	-0.57%	+0.50%
2008/09	16,294,314.00	+4.96%	+5.48%
2009/10	16,510,229.00	+1.33%	+6.88%
2010/11	15,954,994.00	-3.36%	+3.28%
2011/12	16,822,639.00	+5.44%	+8.90%
2012/13	17,596,934.00	+4.60%	+13.91%
2013/14	16,780,122.00	-4.64%	+8.62%
2014/15	17,072,052.00	+1.74%	+10.51%
2015/16	17,727,492.00	+3.84%	+14.76%
2016/17	15,994,102.03	-9.78%	+3.54%
2017/18	17,280,373.02	+8.04%	+11.86%
2018/19	16,082,879.93	-6.93%	+4.11%

Gas Consumption

	kWh	Change Year on Year	Change on 2005
2005/06	28,883,921.00		
2006/07	26,972,176.00	-6.62%	-6.62%
2007/08	25,172,241.00	-6.67%	-12.85%
2008/09	24,509,823.00	-2.63%	-15.14%
2009/10	21,906,655.00	-10.62%	-24.16%
2010/11	22,868,122.00	+4.39%	-20.83%
2011/12	19,244,758.00	-15.84%	-33.37%
2012/13	21,762,870.00	+13.08%	-24.65%
2013/14	18,726,407.00	-13.95%	-35.17%
2014/15	20,955,024.00	+11.90%	-27.45%
2015/16	22,510,382.00	+7.42%	-22.07%
2016/17	20,624,452.46	-8.38%	-28.60%
2017/18	19,495,827.00	-5.47%	-32.50%
2018/19	19,108,930.00	-1.98%	-33.84%

Appendix 5. Details of ReFit energy efficiency improvements

ReFit Energy Conservation Measures

Energy Saving Measure	Buildings	Reduction in Annual Electricity Consumption (kWh)	Reduction in Annual Gas Consumption (kWh)	Electricity Generated	Reduction in Annual Carbon Emissions (tonnes CO_2e)	Reduction in Annual Energy Bills
LED Lighting (~1300 lights)	12 plus Pobl halls	970,758	0	0	372.6	£144,014
Optimisation of Heating & Ventilation	12 plus Pobl & 1990s Halls	431,705	532,797	0	264.6	£159,528
Pipe Insulation	6	0	393,117	0	73.1	£10,810
Solar PV	5	0	0	143,450	56.1	£19,689
Optimisation of Building Management System	12 plus Pobl halls	96,970	394,237	0	109.4	£23,596
"Eco-Pilot" Heating Management	2	32,000	534,000	0	110.7	£18,449
Heating System Pump Upgrades	2	38,140	0	0	14.7	£5,194
Boiler Optimisation	9	68,034	741,735	0	149	£21,424
Chiller Upgrades	1	4,960	0	0	1.9	£685
Convert Air Handling Unit Belt Drives	2	42,705	0	0	16.3	£5,593
Totals		1,685,272	2,595,886	143,450	1,168.4	£408,982

Appendix 6. Water consumption over time

	Water (m3)	Change year on year	Change on 2005
2005/2006	162,297		
2006/2007	166,054	+2.31%	+2.31%
2007/2008	182,437	+9.87%	+12.41%
2008/2009	172,896	-5.23%	+6.53%
2009/2010	173,767	+0.50%	+7.07%
2010/2011	169,450	-2.48%	+4.41%
2011/2012	180,321	+6.42%	+11.11%
2012/2013	204,037	+13.15%	+25.72%
2013/2014	183,028	-10.30%	+12.77%
2014/2015	185,619	+1.42%	+14.37%
2015/2016	168,690	-9.12%	+3.94%
2016/2017	156,763	-7.07%	-3.41%
2017/2018	141,203.00	-9.93%	-13.00%
2018/2019	152,154	+7.76%	-6.25%