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Environmental Management System Annual Report 2018 (for the academic year 2016/17)

Bangor University's Campus Environmental Performance Team

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Vice Chancellor's Statement

Once again I am pleased to present Bangor University's Annual Environmental Management Report. It is nine years since we first embarked upon our Environmental Management System, and I am delighted with the progress that we continue to make in preserving and enhancing the quality of our environment. In the last year we have again achieved some remarkable successes in our journey to become ***the*** Sustainable University. We retained our ISO 14001 certification, becoming the first University in the UK to achieve the ISO14001:2015 standard. Subsequently, we climbed 8 places in the only Green Metric Ranking of World Universities, and are now placed at 8th position, which, in a table of 619 participating Universities from across the world, is a tremendous achievement; putting us in the top 3% of participating Universities. Our Sustainability Lab continues to be the focal point for sustainable development, facilitating our effective management of the wider sustainability agenda. Our Students' Union continues to win awards for their sustainability work. Having achieved the Gold Award three times in 2011 and 2013 and 2016, Undeb Bangor won the highest accreditation for the newly re-vamped Green Impact Students' Unions Award. The award challenges Students' Unions to follow sustainability best practice and keep sustainability in mind whilst achieving results for students. The Green Impact Award also seeks to capture the positive sustainability innovations in students' unions and promote them to the public

Our accomplishments are a clear demonstration that our University is taking its environmental responsibilities very seriously indeed, and are a tribute to the commitment of our staff and students who are working together to manage, protect and enhance the natural environment in, around, and beyond Bangor University.

Professor John G. Hughes, Vice-Chancellor Bangor University

Executive Summary

This report is a review of our environmental performance during the 2016/17 academic year (the "reporting period") and a summary of the actions currently being undertaken by Bangor University to achieve continual environmental improvement. This report describes our environmental monitoring data and key performance indicators in those areas where we have the greatest potential to impact upon on the environment. Our energy usage, water consumption, waste generation, and transport emissions are summarised, and performance is assessed in terms of compliance with the objectives and targets we had established for the reporting period.

Key Findings

During the 2016/17 Academic Year, Bangor University:

Consumed:

- **15,994,102.03 kWh** of mains electricity
- **20,624,452.46 kWh** of natural gas
- **434,531.65 kWh** (40,049 litres) of heating oil
- **67,503 litres** of transport fuel
- **156,762.63 cubic metres** of mains water
- **100,386.90 kWh** of LPG

Generated:

- **144,285.74 cubic metres** of sewage
- **690,650 tonnes** CO_2e from our agricultural activities

Sent to Landfill:

- **475 tonnes** of mixed municipal / commercial waste

Recycled:

- **397 tonnes** of waste (48% of total)

Travelled:

- **1,591,219 miles** on business travel by road

Sequestered:

- **800 tonnes** CO_2e at our landholdings at Henfaes Farm

These activities generated a total of **10,594 tonnes of $CO_{2\,(e)}$** from our activities as a University, which represents a **17.19% decrease** on the previous academic year.

1. Introduction

Bangor University is committed to excellence. Our mission statement describes our overarching aim to be a "*strong, confident institution recognised regionally, nationally and internationally as a centre of excellence for its varied portfolio of teaching and research, and for the unique, multicultural, inclusive experience it provides for its staff and students".*

Within our Sustainability Policy, the University's Vice Chancellor, Professor John G Hughes describes our sustainability vision: *"At Bangor University, sustainability is not a matter of procedures or processes. At Bangor University sustainability is part of everything we do. Sustainability is how we function and sustainability is why we function."*

Our Environmental Policy states that: *"we will not only protect our natural environment at a local level, but will actively seek opportunities to enhance it"*.

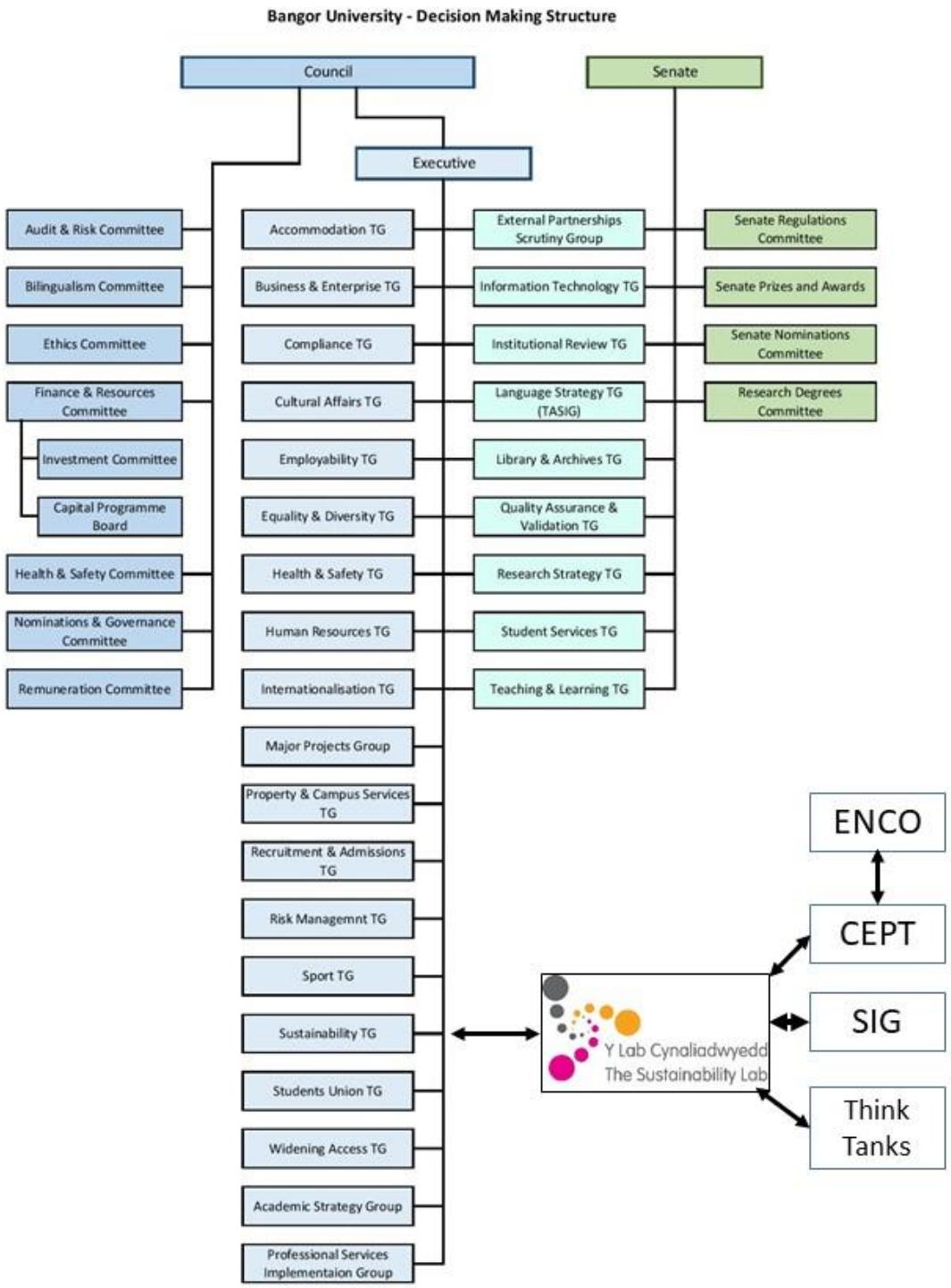
These publicly stated aims reflect the minimum expectations of our stakeholders, notably our staff, students and alumni; employers, funders, partners, suppliers, regulators and the wider community. In this respect we have established the following structure for implementing our sustainability agenda:

The Sustainability Lab has been established as a high-profile focal-point to lead on sustainability within the University. During the recent restructuring of the University the Lab has been incorporated into Corporate Services alongside the Planning, Governance and HR teams, to reflect the importance of sustainability in terms of strategic planning, business intelligence, compliance issues, policy development and partnerships. The Director of Sustainability reports to the Director of Corporate Services who also holds the role of University Secretary. The Campus Environmental Performance Team is co-ordinated by the Sustainability Lab.

The Sustainability Task Group is tasked with overseeing the evolution and implementation of a sustainability agenda for the University and for reporting to the University Executive Committee. Specific actions are developed through the multifunctional Sustainability Implementation Group, supported by the Sustainability Lab, with input from the Sustainability Think Tanks which are open to all staff and Students.

The University's Environmental Management System (EMS) is an integral component of our sustainability agenda, through which we will demonstrate our commitment to achieving continual environmental improvement.

Box 1



2. Senior Management Review

In May each year, the suitability of the University's Environmental Management System is discussed at an Annual Environmental Management Review meeting of the Sustainability Task Group. The review meeting is undertaken to the requirements of the ISO 14001:2015 environmental standard, and is used as the pivotal means of ensuring that the Environmental Management System is fully implemented and effective. The meeting is structured in accordance with the following agenda for this year; the CEPT intends to review this and amend as necessary :

- Introduction
- Actions from Previous Meeting
- Environmental Policy
- Significant Environmental Aspects
- Objectives and Targets
- Current Performance
- Improvement Opportunities / Invest to Save Initiatives
- Environmental Incidents /Corrective and Preventative Action
- Internal Audits
- Legal Compliance
- Communications (Internal / External)
- Training and Awareness
- Recommendations

Until this year the University's Environmental Manager was responsible for providing the Task Group with a comprehensive report to enable an effective review of the EMS to be undertaken. In October 2017 the Environment Manager retired and a Campus Environmental Performance Team (CEPT) was established, comprised of the Director of Sustainability, the Campus Waste Co-ordinator, Campus Energy, Water and Travel Co-ordinator, Biodiversity Co-ordinator, Legal Compliance Co-ordinator and Digital Community communications co-ordinator. This is the first year of reporting and the report is of data gathered prior to the establishment of the team.

The Sustainability Task Group will address any issues arising from the report, and determine whether there is a need for any changes to the environmental policy, the objectives and targets, or any other element of the EMS. The minutes of the review are maintained as an EMS record and are available from the CEPT internal drive and can be provided on request from the Legal

Compliance Co-ordinator. The most recent Annual Management Review was undertaken on 17th May 2018.

3. Environmental Policy

The University's Environmental Policy (below) is reviewed annually by the Sustainability Task Group. This is the most recent iteration and when signed, will be valid until 31st July 2018.

Environmental Policy

Bangor University has over 11,000 students and 2,000 members of staff located within an estate of 120 buildings across 365 hectares. This includes significant activities undertaken outside the city of Bangor, particularly in Menai Bridge and in Wrexham. We are committed to providing teaching and conducting research of the highest quality whilst simultaneously taking good care of our staff and students. We aim not only to protect our natural environment locally, but to actively seek opportunities to enhance it.

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 adopt the following key principles within our approach to:

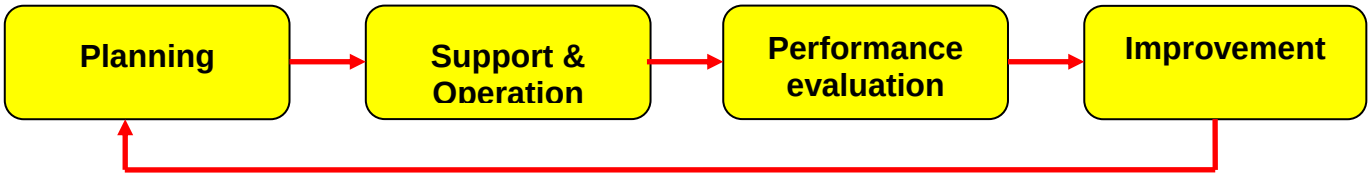
- minimise our environmental impacts and work towards the goals of sustainable development as outlined in the Well-being of Future Generations (Wales) Act 2015
- ensure compliance with all relevant legislation and regulations associated with our activities
- manage waste through reduction, re-use, and the promotion of recycling
- reduce energy and water consumption, and promote green transport initiatives
- reduce our contribution to global climate change by making year on year reductions in our greenhouse gas emissions
- promote and increase biodiversity conservation and improvement across the University Estate
- expect similar environmental standards from our suppliers and contractors
- undertake to prevent the pollution of the natural environment
- raise environmental awareness amongst staff and students through improved communication and involvement
- embed sustainable development and awareness of environmental issues in our curricula across the University
- establish environmental objectives and targets and report progress on an annual basis

This Environmental Policy will be reviewed annually by the Sustainability Implementation Group, 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.

Approved by: (Professor John Hughes, Vice-Chancellor, Bangor University)

4. Environmental Management System

Our EMS has been designed in accordance with the criteria set out in the ISO14001:2004, and Green Dragon Environmental Standards. The structure of the EMS follows the Plan-Do-Check-Act model, which provides the basis of an iterative approach to achieve continual improvement:



to achieve the key principles of:

- **Continual environmental performance**
- **Compliance with legal and other requirements**
- **Achieving environmental objectives**
- **Communicating with all stakeholders**

The ISO 14001 Certificates is verified by an externally appointed UKAS accredited body. Certification was successfully audited to the new 14001:2015 criteria in August 2017, with the latest certificate valid for 3 years and subject to annual “surveillance audits”.

A decision was taken in 2017 to no longer maintain our Green Dragon certification, following a successful period of use leading up to our eventual accreditation to ISO14001. Green Dragon achieved its objectives of taking the University forward, establishing robust environmental management systems and performance improvements that were eventually approved to ISO14001. Running both Green Dragon and 14001 side-by-side for over three years helped cement these robust systems and the principles of good management and continual improvement.

Bangor was the first University in Wales to achieve the new ISO14001:2015 standard.

Our EMS currently applies across the entire University estate in the north of Wales, with the exception of the Prince Madog Research Vessel (a joint venture with P&O which has separate environmental auditing arrangements).

In addition to the formal “Annual Review” referred to above, the Environmental Management System is subject to ongoing monitoring and improvement by both the Sustainability Implementation Group, and the Sustainability Task Group throughout the year.

5. Legislation

The foundation of any Environmental Management System is an understanding of, and compliance with, relevant environmental legislation and other compliance obligations. As such, we have developed a "Register of Legal Requirements and Other Compliance Obligations" applicable to the University's activities (EMS Document BUEMS 2A).

Environmental Legislative compliance are overseen by the University's Health and Safety team, part of Governance & Compliance, with the Register kept up to date by the Campus Environmental Performance Team.

Responsibility for ensuring relevant environmental licences, registrations and authorisations are in place and for evaluating compliance with relevant legislation. Other requirements are delegated across the risk-owners, with the Health and Safety team overseeing delivery and performance. The majority of the University's formal authorisations currently relate to the Environmental Permitting Regulations and the Energy Performance of Buildings Regulations.

The University has recorded no contravention of environmental legislation, and has not been responsible for any pollution incidents during the reporting period.

6. Aspects and Impacts

Our EMS incorporates an assessment of all aspects of the University's activities that have the potential to impact upon the environment. A total of 41 discrete aspects have been identified and have been evaluated in terms of their potential environmental impact (which may be positive or negative). The criteria used for evaluation are described within the EMS and relate to the potential consequences associated with each aspect, and the likelihood of such an occurrence. This includes a consideration of relevant legislation, potential environmental damage, current controls, and risk of emergency situations. From this exercise, those aspects that have the greatest potential to adversely impact upon the environment have been identified, and appropriate objectives and targets developed to minimise those impacts.

Our "Significant Aspects" have been determined as our:

- Energy consumption and associated carbon emissions
- Water Consumption
- Oil and Chemical storage and use
- Waste generation
- Travel and Transport

The impacts associated with these aspects relate to the use of natural resources, greenhouse gas emissions, pollution risk, and the decreasing availability of landfill sites.

The Aspects and Impacts register and evaluation process is reviewed annually by the Sustainability Implementation Group, and reported to the Sustainability Task Group.

7. Objectives and Targets (no change)

From the Aspects and Impacts assessment, we have derived the following objectives and targets for the current academic year (ending 31st July 2017):

Objective	Target
T1) Maximise efficient use of energy, and reduce greenhouse gas emissions.	**T1 A)** Reduce annual energy associated greenhouse gas emissions (CO_2e) by 3% each year (*)
	T1 B) Achieve a 40% reduction in energy associated greenhouse gas emissions (CO_2e) by 2020, (based on 2005/06 base year) (*)
	T1 C) Reduce overall Scope 1, 2 and 3 greenhouse gas emissions (CO_2e), by 3% each year (*)
T2) Maximise efficient use of water	**T2 A)** Reduce total annual water use by 2% per year (*)
T3) Prevent pollution from University activities	**T3 A)** Zero pollution incidents recorded
T4) Minimise waste to landfill.	**T4 A)** Recycle / divert from landfill 50% of all municipal waste generated by the University
T5) Reduce business mileage	**T5 A)** Achieve an annual reduction in vehicular business travel CO2 emissions
T6) Embed a process for consideration of Sustainable Procurement issues within the wider procurement process.	**T6 A)** Reduce procurement related GHG emissions (excluding construction related emissions) annually **T6 B)** Undertake annual Procurement Fitness Checks. Achieve Level 2 of the Welsh Procurement Maturity Model by 2020. **T6 C)** – Monitor progress against sustainability performance indicators and targets set within the Procurement Strategy.
T7) Enhance Awareness and Communication	**T7 A)** Implement programmes and schemes to raise awareness of the wider sustainability agenda amongst staff, students, visitors and contractors
T8) Promote Biodiversity	**T8 A)** Ensure that biodiversity considerations are wherever practicable, incorporated in University activities

(*) these are "intensity targets" and performance will be assessed against the following normalising factors:

a) total operational floor area of the University's estate, and

b) total staff and student FTEs

The University will continue to monitor absolute variances on an annual basis

These Objectives and Targets were approved by the Sustainability Task Group at its Annual Review Meeting on 17th May 2018, and a report of performance against the targets will be incorporated in the 2018 Annual Environmental Report.

8. Annual Performance: Objectives and Targets 2016/17 Review

Performance in terms of our objectives and targets for the reporting period are as follows, and summarised in Table 3.

Objective T1: Energy and Greenhouse Gas Emissions

Target T1 A)	**Reduce annual energy associated greenhouse gas emissions (CO_2e) by 3% each year (*)**
Target T1 B)	**Achieve a 40% reduction in energy associated greenhouse gas emissions (CO_2e) by 2020, (based on 2005/06 base year) (*)**
Target T1 C)	**Reduce overall Scope 1, 2 and 3 greenhouse gas emissions (CO_2e), by 3% each year (*)**

(*) Normalised by both Operational Floor Area (m^2) and Staff and Student Numbers (Full Time Equivalents)

The University's energy related emission data is reported in accordance with the DEFRA conversion factors published each year. We have set targets to reduce our energy related CO_2 emissions by 3% year-on-year, and by a total of 40% from our baseline year (2005/2006) by 2020.

Total energy consumption and associated carbon emissions (CO_2e) are monitored and reported annually. In addition, to account for changes in the overall size of the estate and staff and student numbers, our reduction targets are set and assessed against two normalising factors, i.e. **i)** the total operational floor area of the University estate, and **ii)** the total staff and student population of the University, expressed in "Full Time Equivalents" (FTEs).

For the academic year 2016/2017, total energy consumption (electricity, gas, heating oil and LPG) amounted to **37,153,473.04 kWh**; a **decrease of 9.1%** compared with the previous year. Energy related carbon emissions **fell by 18.2%**. Compared to the baseline year, total energy consumption has **fallen by 20.2%** and associated emissions are down by **27.2%** (Fig 1).

The larger drop in carbon emissions is due to a decline in the carbon intensity of mains electricity as a result of ongoing decreases in coal-based generation, reflected in the official DEFRA annual carbon conversion figures.

In relation to our intensity based reduction targets;

- Carbon emissions per m^2 operational floor area fell by **14.8%** compared to the previous year and have decreased by **40.8%** from our baseline year 2005/2006
- Carbon emissions per FTE (staff & students) have also fallen, by **20.5%** compared to the previous year and **40.1%** from the baseline year

In both cases we have far exceeded our target of a 3% annual reduction and have also surpassed our 2020 target of a 40% reduction in emissions (as a factor of floor area and FTE) from our baseline (Fig 2).

We also perform well in the context of the wider UK Higher Education Sector (Fig 3 & Fig 4), being below the average in terms of both energy consumption and carbon emissions per m^2 Floor Area. Please note; these graphs are currently based on HESA data sets from the 2015/16 academic year as the data sets for the 2016/17 academic year have not yet been published.

Fig 1: Total Energy Consumption and Carbon Emission trends

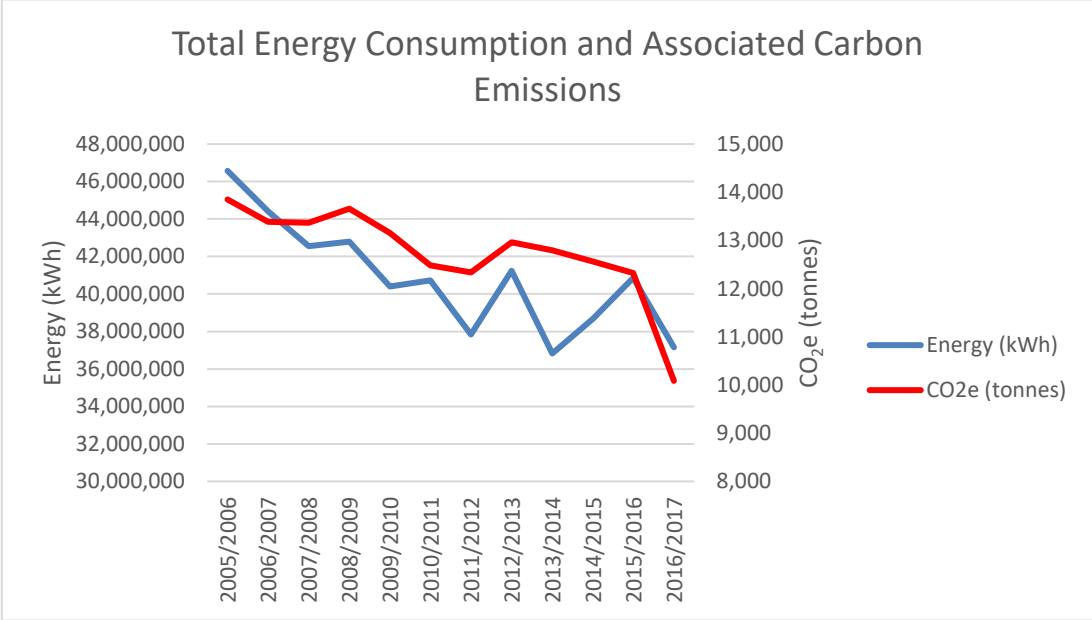


Fig 2: Energy and Carbon Emission trends as a factor of Floor Area and FTEs

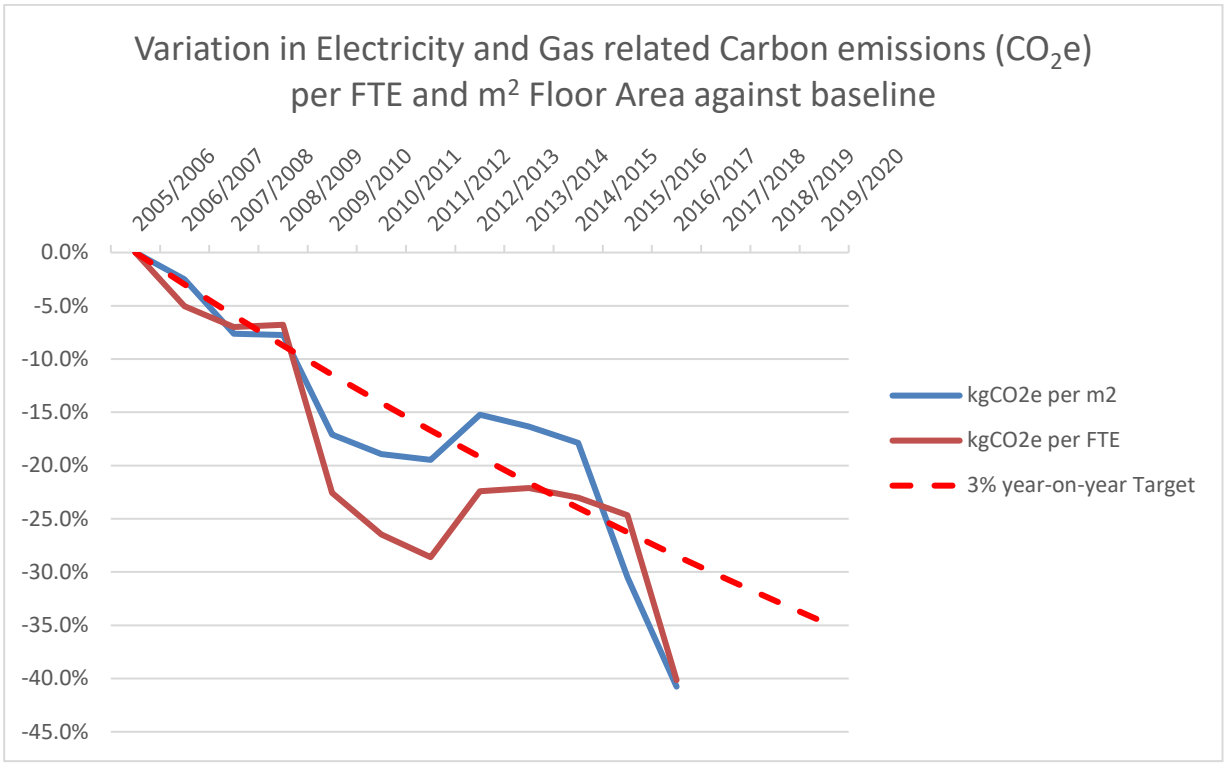


Fig 3: Higher Education Sector: Energy Consumption per m^2 floor area (2015/16)

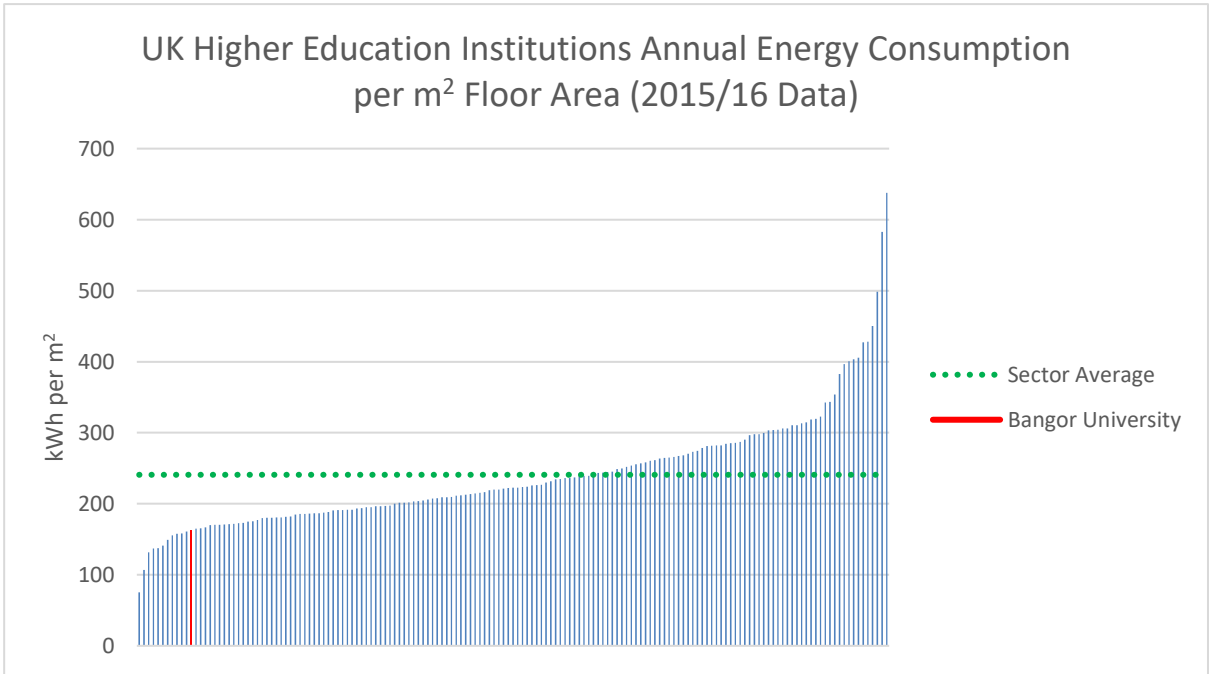
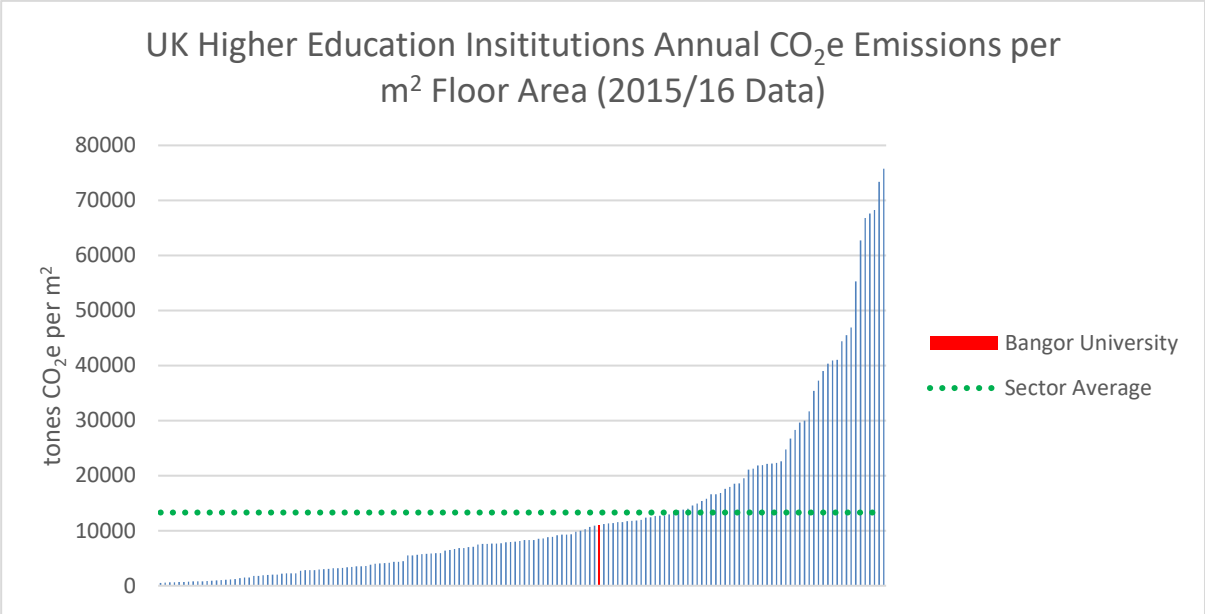


Fig 4: Higher Education Sector: Greenhouse gas emissions per m² floor area (2015/16)



Total Scope 1, 2 and 3 emissions have also **fallen by 17.2%** compared to the previous year to **10,594,140 kgCO_2e**. When considered in the context of the normalising factors, emissions have **fallen by 19.33%** per FTE and **17.17%** per m² operational floor area. These results significantly exceeds the target of a 3% reduction year-on-year.

As these takes into account all emissions from energy and transport as well as emissions arising from waste and waste water disposal, this significant reduction is a reflection of the positive results we are achieving in reducing our environmental impacts across the board.

Table 1: Scope 1, 2, and 3 emissions summary

Objective T1(c) : Summary	**2016/17**	**2015/16**
Overall Scope GHG emissions (kg CO_2e)	10,594,140	12,749,895
Total staff / Student FTEs	11,333	11,002
Total Operational floor area (m²)	220,982	220,268

Reporting Metric	**2016/17**	**2015/16**	**Variance**
kgCO2e/FTE	934.80	1,158.87	-19.33%
kgCO2e/m²	47.94	57.88	-17.17%

Under the UK Government's "Carbon Reduction Commitment- Energy Efficiency Scheme" (CRC) Bangor University is required to purchase carbon allowances for every tonne of energy related carbon we produce. The scheme is intended as a financial incentive for organisations to reduce their carbon emissions, and therefore contribute to the UK's statutory reduction targets set out in the 2008 Climate Change Act, i.e. an 80% reduction in 1990 greenhouse gas emissions by 2020.

The initial cost of allowances was set at £12 per tonne of CO_2, and rose to £16.60 per tonne in 2016/17. The current cost of allowances to the University is in excess of £200,000, however the CRC scheme is to be abandoned in 2018 in favour of an increase in the Climate Change Levy which will take effect from April 2019.

In terms of our energy usage and greenhouse gas emissions, Figures 3 and 4 demonstrate that Bangor University is performing favourably within the sector, being placed within the lower quartile for each of these categories[1].

Objective T2: Water

Target T2 A) **Reduce total annual water use by 2% per year (*)**

(*) Normalised by both Operational Floor Area (m^2) and Staff and Student Numbers (Full Time Equivalents)

Our use of mains water impacts upon the environment both through the depletion of a globally scarce natural resource and through managing the resulting wastewater. Wastewater requires management and treatment in order to minimise negative impacts on aquatic ecosystems. Such management, treatment and any disposal of sewage is an energy intensive process and so has an associated carbon footprint.

In view of this we set our target to reduce our water consumption by 2% year-on-year.

In previous years, achievement of this target has been challenging, and in no small part due to leakages from an aging subsurface infrastructure. However, following a proactive programme of identification and reparation of a number of leaks, as well as implementation of water efficiency measures including water efficient shower heads, and waterless urinals, consumption during the reporting period fell for a second consecutive year to its lowest level since our baseline was set in 2005/2006 (Fig 5). Water consumption for the 2016/17 academic year totalled **156,762.63 m^3**, a

[1] Source: Higher Education Statistics Agency Ltd. (www.hesa.ac.uk)

decrease of 7.1% against the previous year and **3.4% lower** than the baseline. This is considered to be a significant achievement given the increase in the size of the estate and tackling leak issues.

In relation to our intensity based reduction targets for water consumption (Fig 6);

- Annual water consumption per m^2 of operation floor area **fell by 3.2%** compared with the previous year, and by a total of **21.4%** from the baseline year
- Annual water consumption per FTE (Staff & Students) **fell by 9.8%** compared with the previous year, and by a total of **20.6%** from the baseline

In both cases we have surpassed our target to reduce water consumption by 2% year-on-year but, more importantly, also remained on-course to achieve the longer term reduction projection for a second consecutive year, despite previous deviations from a trend of overall reduction in consumption.

With a view to the wider UK Higher Education Sector, our consumption per m^2 of floor area falls below the sector average (data from 2015/2016) (Fig 7).

Fig 5: Total Annual Water Consumption

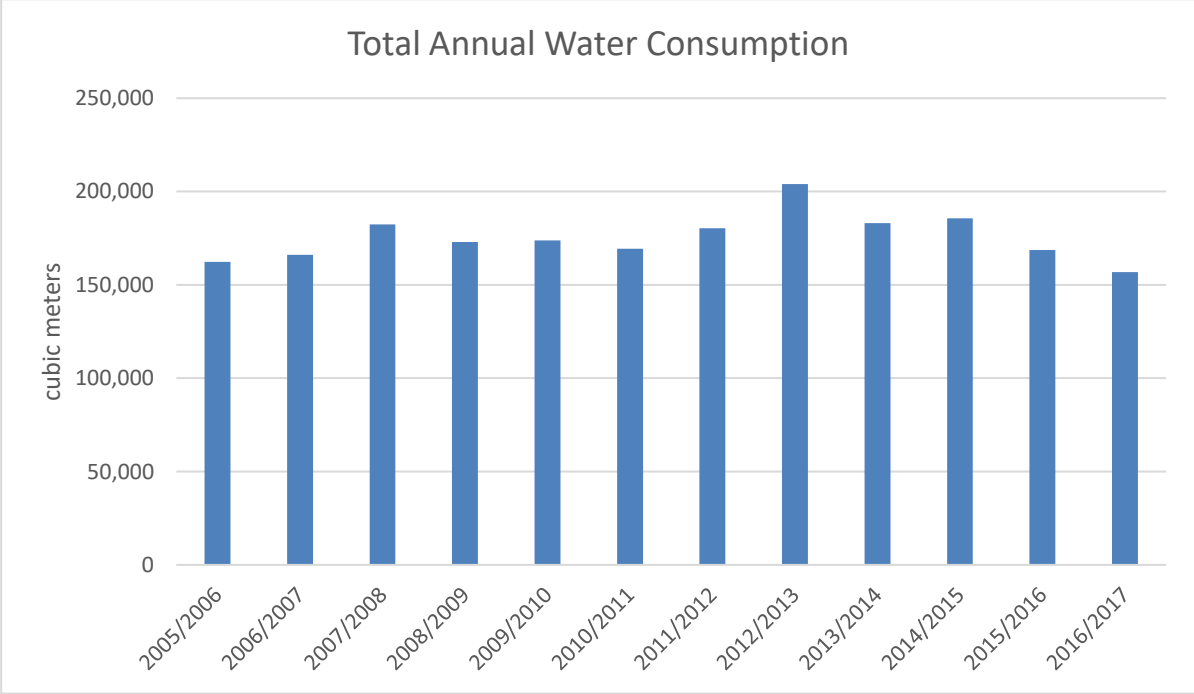


Fig 6: Water Consumption normalised by floor area and FTEs since 2005/2006

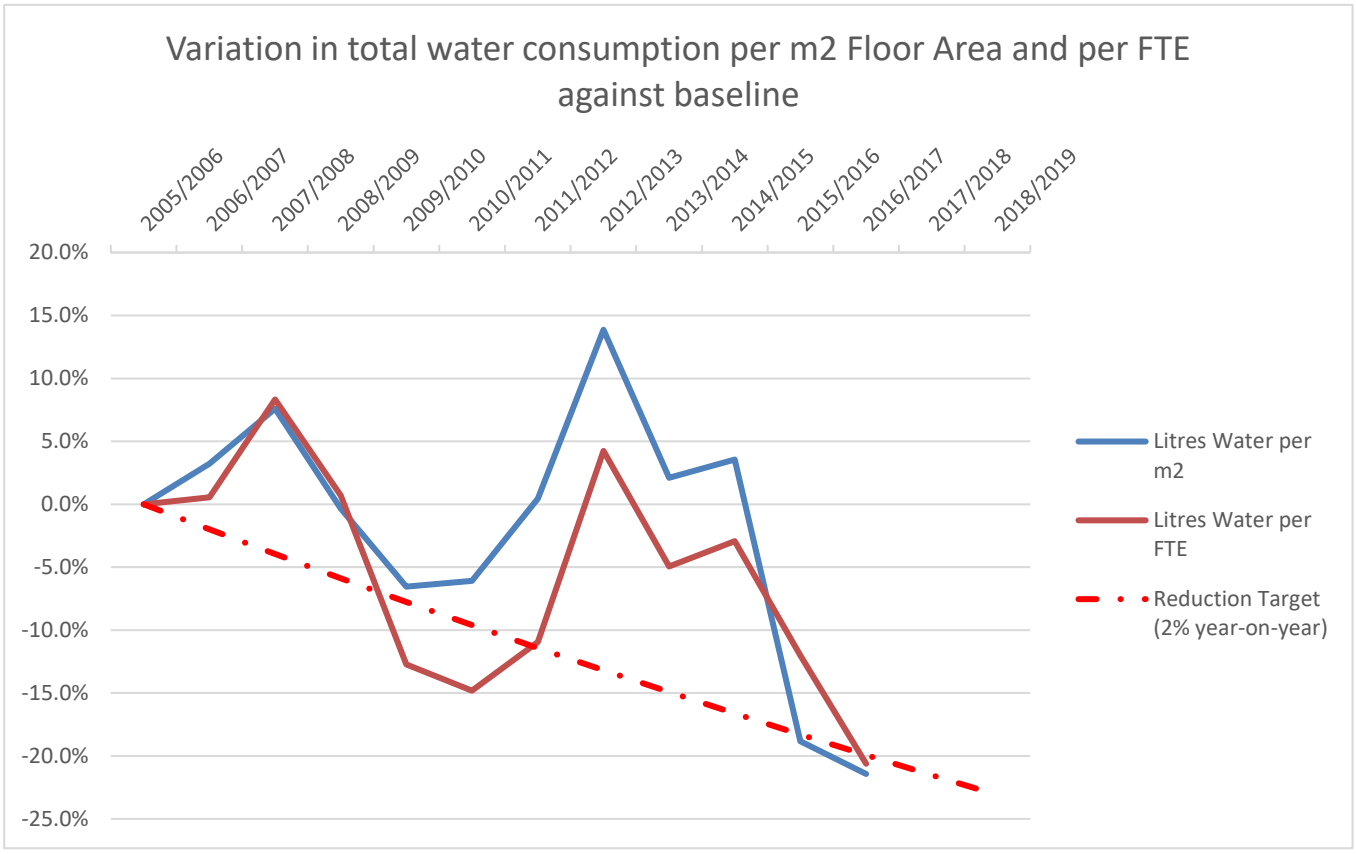
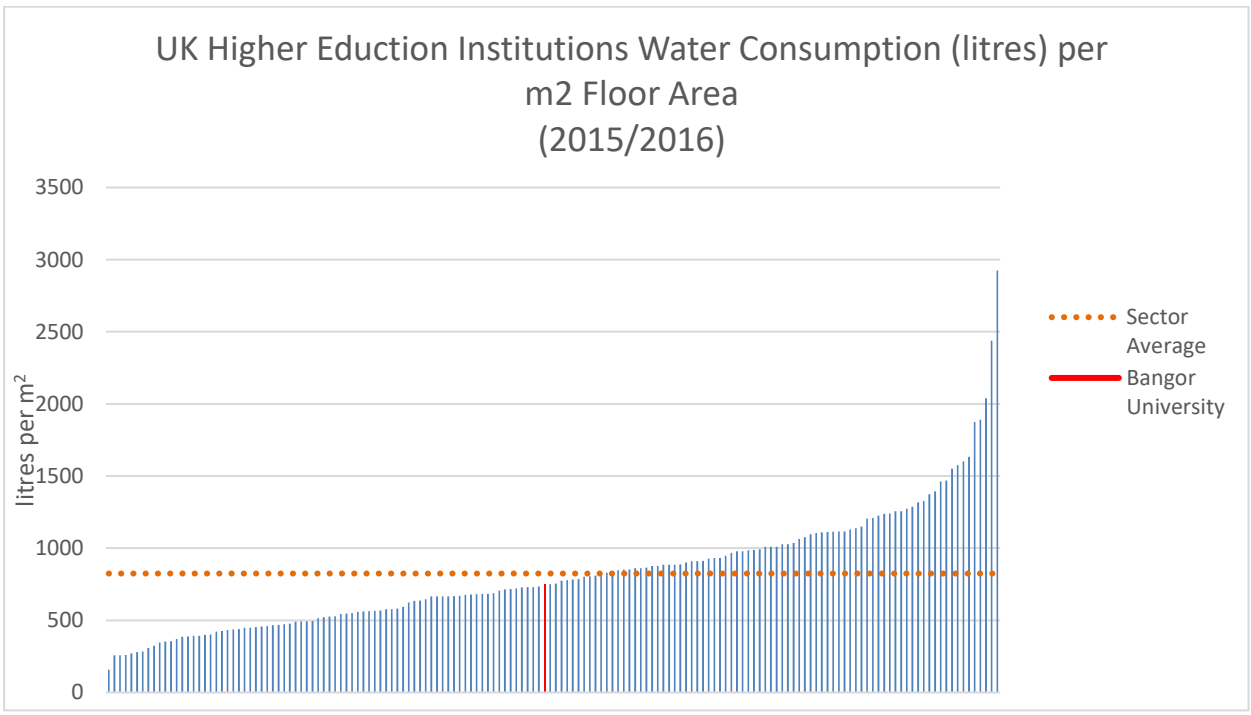


Fig 7: HE Sector Water Consumption 2015/16



Objective T3: Prevention of pollution

Target T3 A)	Zero pollution incidents recorded

There were no spillages or pollution incidents during the reporting period, and considerable effort continues to be made to reduce such risks.

All of our heating oil storage facilities have been replaced with modern double skinned polyethylene tanks, and all oil and chemical storage areas have been provided with spill kits and defined spillage procedures. We are, wherever practicable, replacing oil heating with mains gas or LPG, which not only reduces our carbon footprint, but also removes a potential source of pollution. To date we have removed oil heating from Ardudwy, Ynys Faelog, Meirion, Henfaes Farmhouse, and the Normal Site. For the academic year 2016/17, the total volume of heating oil purchased was 80.58% lower than in our baseline year (2005/06).

All of our discharges to controlled waters are, where required, subject to appropriate Environmental Permits.

Our Pollution Prevention Plan includes an Environmental Incident Reporting Procedure for anyone discovering an environmental incident such as pollution or fly tipping on University premises. Contractors working on the Estate are required to sign a declaration to comply with a range of "Contractor Standards and Working Practices" which includes conditions for protection of the environment during works, as well as receiving a Health, Safety and Environment induction prior to the commencement of work.

Objective T4: Minimisation of Waste sent to landfill

Target T4 A)	Recycle / divert from landfill 50% of all municipal waste generated by the University

Reporting on waste data has proved to be particularly challenging for a number of reasons. Whilst general waste and common recyclable materials (plastic, paper, card, cans, food) are collected by our main waste contractors, Gwynedd Council, a number of smaller waste streams (e.g. waste cooking oil, computer equipment etc.) are each collected by different waste contractors. In addition, the waste collection arrangements for the St Mary's site are made through the sites

management company, not through the University directly. In some cases, acquiring data on volumes of all wastes collected in a timely manner has proven difficult.

Furthermore, some issues have arisen around the reporting methodology previously used. Previous reports have presented data on the breakdown of our recyclable waste by type (plastic, paper, card, cans, food etc.). We are currently not provided with such detail by our main waste contractor as recyclables are collected as a comingled stream. The data presented in previous reports was based on a historic audit of recyclables to determine composition. The decision was taken not to present the data in such a way this year as it was felt the methodology was too out-of-date to be informative. It is our intention to review the methodology and work with our waste contractors to provide a revised and up-dated approach in the next report.

Based on the available data, the recycling & reuse rate for the reporting period stands at 45.56% (Fig 8).

This is a decrease of 5.08% compared to the previous year and falls short of the target to divert 50% of waste from landfill.

There are ongoing initiatives within the University aiming improve our performance, including the continued rollout of “binless” offices across the University. This requires staff to segregate their own wastes into mixed recyclates, food waste, and general (landfill), and deposit them in centrally located recycling hubs. Cleaning staff no longer empty individual deskside bins, which not only encourages staff to take ownership of their own wastes, but also leads to more efficient working practices within our Support Services.

The carbon emissions associated with our waste disposal have also increased by 9.05% compared to 2015/16. This is of course partly due to both the increased volume of waste and the increased proportion being sent to landfill, however another factor is a change in the calculation methodology applied. In previous years landfill waste has been split 50:50 between Municipal and Commercial classifications – in terms of carbon factors, municipal waste is significantly more carbon intense. It was considered that this approach was not sufficiently robust and that a more considered approach to the division of municipal and commercial streams was required.

The guidance on definitions of municipal and commercial waste have proven to be lacking in terms of classifying our waste. The primary difference between the two streams seems to be that municipal (‘household like’) waste is considered to contain a higher organic content, largely in the form of waste food, than commercial waste. However, as we have separate food waste collections,

contamination issues notwithstanding, there should be no significant organic component to our landfill waste. This is another issue that will require further consideration before the next report. For the purposes of this report, landfill waste has been split based on the residential or non-residential classification of buildings – resulting in a 35:65 split between Municipal (Residential) and Commercial (Non-residential).

Fig 8: Waste (Diversion from Landfill) Statistics

NOTE: It is important to note at this stage that CEPT was not active until October 2017, the systems are not in place to capture better data from 2017/18 so planned improvements will not be visible in the data until the academic year 2018-19.

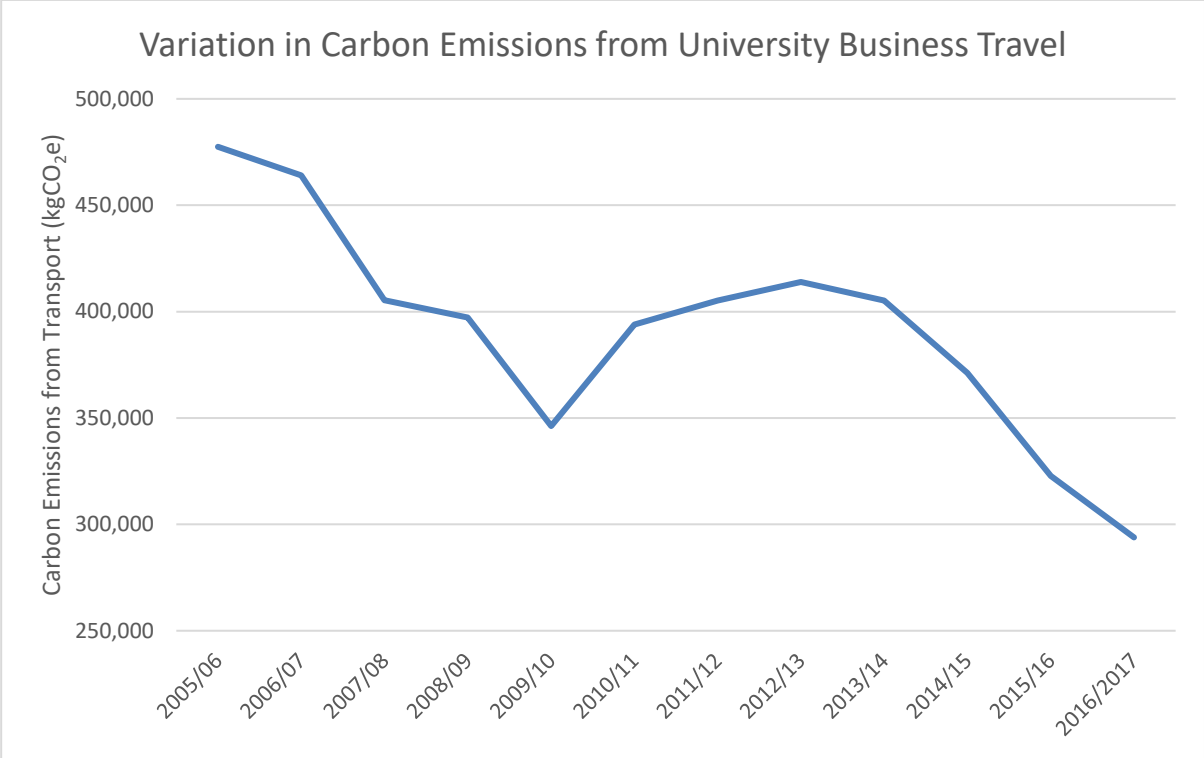
Objective T5: Travel and Transport

Target T5 A) **Achieve an annual reduction in vehicular business travel CO_2 emissions**

The previous target to reduce our vehicular business travel emissions by 20% of the 2005/06 base year by the end of the 2015/16 academic year was achieved and a new target to continue with annual reductions was set at the last Annual Review Meeting in 2017. The new target was met for the 2016/17 academic year, with total emissions arising from business travel were **8.3% lower** in 2016/17 than in the previous year and **38.0% lower** than the baseline (Fig 9).

These figures take into account purchases of Petrol and Diesel as well as vehicle hire and mileage claims for business travel by car.

Fig 9. Carbon emissions arising from business travel



The Campus Travel Plan 2015 – 2020, describes our aspirations to reduce the environmental impacts of single occupancy car journeys by promoting sustainable means of travel, focussing specifically on walking, cycling, and public transport. Achieving these objectives will not only enhance the local environment through reduced vehicle emissions, but will alleviate the undesirable impacts on the local community from congestion and parking problems.

A travel hierarchy has been established within our Sustainable Travel and Transport Policy, and a Cycle to Work Scheme, initially launched during 2012, is made available to staff during three periods each year. To date, 285 staff members have purchased a bike through the scheme; this equates to £200,160 worth of bikes and cycling equipment being purchased since its launch.

We have successfully worked with Arriva Buses Wales to negotiate staff and student discounts, and are members of the Arriva "Employers Club", which enables staff to access discounted bus travel on Arriva bus routes.

Following an initial trial in 2015, the Property and Campus Services department has now expanded its fleet of electric vehicles to four vans, three of which are utilised by the Maintenance

Department, and one by the Post Team. Consideration is given to further additions as and when existing fleet vehicles become due for replacement.

Objective T6: Sustainable Procurement

Target T6 A)	**Reduce procurement related GHG emissions (excluding construction related emissions) annually**
Target T6 B)	**Undertake annual Procurement Fitness Checks. Achieve Level 2 of the Welsh Procurement Maturity Model by 2020**
Target T6 C)	**Monitor progress against sustainability performance indicators and targets set within the Procurement Strategy**

T6 A) Reduce procurement related GHG emissions (excluding construction related emissions) annually Sustainability is a key strategic objective of the University with the aim of embedding sustainability across all functions. For that reason, the University no longer produces a separate Sustainable Procurement Policy but will incorporate sustainability objectives into the procurement process as standard and the procurement team will contribute to the University's Sustainability Strategy and Action Plan.

A methodology for reporting on greenhouse gas emissions associated with procurement has been developed within the Higher Education sector[2], which assesses the carbon emissions associated with expenditure on 75 key commodities. Performance is summarised in Table 2, however these data **exclude** the procurement of construction and electricity, since, a) construction activity varies significantly from year to year, and b) the reporting tool utilises a standardised conversion factor (i.e. kg CO_2/£ expenditure) for each commodity. Whilst this is considered acceptable for the majority of the commodities listed, the actual emissions associated with mains electricity vary significantly from year to year depending principally on the amount of coal fired generation. Conversion factors are released by DEFRA annually, however these variations are not currently taken into account in the HESCET reporting tool, which has used the same conversion factor since 2012.

For the academic year 2016/17 we successfully reduced our procurement related by 5.55% compared to the previous year (Table 2).

[2] *HESCET - Higher Education Supply-Chain Emissions Tool*

Table 2: Procurement Related Carbon Emissions

2013/14		2014/15		2015/16		2016/17	
Expenditure (£million)	CO2e (tonnes)	Expenditure (£million)	CO2e (tonnes)	Expenditure (£million)	CO2e (tonnes)	Expenditure (£million)	CO2e (tonnes)
£44.8	23,666	£47.9	22,266	£45.2	22,114	£43.4	20,886.4
	+8.4%		-5.9%		-0.7%		-5.55%

T6 B Undertake annual Procurement Fitness Checks. Achieve Level 2 of the Welsh Procurement Maturity Model by 2020

Following the Welsh Government's Fitness Check assessment in 2014/15, the University developed an action plan to ensure that the University could achieve Level 2 on the Procurement Maturity Model in any subsequent follow-up assessment. (The original score achieved was 1.4.) Almost all of the actions identified on Bangor University's Action Plan have now been implemented. The outstanding actions relate to undertaking a procurement training needs analysis for Corporate Procurement Staff and the continuing roll-out of electronic procurement. The training needs analysis exercise will be undertaken in 2017/18.

It is considered that reassessment would now place the University as operating at Level 2 of the Procurement Maturity Model as a minimum, and moving towards Level 3.

T6 C Monitor progress against sustainability performance indicators and targets set within the Procurement Strategy

Sustainability risk assessments were completed for 10 tender exercises this year. This assessment is intended to ensure that environmental, social and economic issues are assessed, understood and managed in all key procurement decisions that relate to the procurement of goods and services. The aim is to apply the tool to the procurement process to reduce adverse impacts / improve sustainability, which ultimately contributes to the sustainability objectives of the University.

The University to reports on the community benefits delivered from its contracts on an annual basis. Community benefits are contractual clauses that cover topics such as workforce, supply chain, community, educational and environmental initiatives, along with equality and diversity.

In this financial year, community benefits were delivered on three contracts. Firstly, a number of social value projects were undertaken as part of the Msparc building project, which is being constructed by Willmott Dixon. The list below provides a sample of the projects undertaken this year:

- Community bulb planting day in Gaerwen.

- Three apprenticeships from the Princes Trust for an initial 6 weeks. Two of them have now had full time posts on the Msparc project.
- Seven internships provided.
- Donation of changing rooms (old site cabins) to Gaerwen Football Club.
- Workshops and training events for BU Property Staff in Building Information Modelling (BIM).
- Tanio Arts Project – aimed to develop community links and to develop the STEAM agenda.
- Troi Project – 12 students undertook a 2 day crash course on site with professionals working on the Msparc Project.

The Msparc Team continue to work closely with Willmott Dixon to deliver further benefits.

Secondly, as part of a contract to demolish the W Charles Evans & Memorial buildings, the appointed contractor, Kier, arranged to paint a scout hut in Caernarfon. The project was co-ordinated by Kier, with materials being donated by Johnstones Paint, Travis Perkins and GTB Demolition. (Photographs can be seen in the attachment.)

Thirdly, the University's appointed Measured Term Contractor for Electrical and Mechanical Services, Owen & Palmer, have provided the following:

- Installation of the Christmas Lighting at Llanfairfechan (free of charge).
- employed 2 apprentices who are attending an electrical course at Coleg Menai;
- work experience for 4 electricians who are also attending Coleg Menai on a 2 day release rota.

Objective T7: Training, Awareness and Communication

Target T7 A)	**Implement programmes and schemes to raise awareness of Environmental Sustainability amongst staff, students, visitors and contractors**

Training awareness and communication are an integral part of our Environmental Management System. During the reporting period a number of initiatives were undertaken including:

- The annual Sustainability stall at Serendipity during Freshers' Week and the Students' Opportunities Fair (Serendipity 2)
- Induction training on sustainability for wardens and campus life co-ordinators in Halls
- Inclusion of sustainability issues within the Welcome Week presentation for new students. In 2017 The Sustainability Lab staff presented at 18 events reaching around 1000 students
- Contribution to teaching – e.g.

- An "Environmental Management at Bangor University" module for second year Environmental Management students.
- An introduction to Sustainability for the SENRGy 'Agriculture and Society' distance learning module
- 'Today's student, tomorrow's global citizen' module for the Bangor Employability Award (BEA)
- Annual contribution to a lecture/practical sessions for the Applied Behaviour Change module in the School of Psychology.
- Training sessions for central services e.g. the Library Services team, Halls teams, Undeb Sabbatical officers and staff
- Career opportunities in Environmental management for students

- Oil spill training to Grounds and Gardens and Sports facilities staff.

- Inclusion of environmental requirements in all new job descriptions
- Continuation of a programme of monthly Sustainability "Think Tank" sessions involving staff and students. Topics have included:
- Continuation of a programme of monthly Sustainability "Think Tank" sessions involving staff and students. Topics have included:
    - "A New Year – Time for your Big Ideas"
    - "Co-developing our Sustainability Action Plan"
    - "Sustainability engagement with students in Halls - #LoveHalls campaign"
    - "Plastic Oceans – reducing plastic use and increasing recycling"
    - "Environment, Sustainability & Libraries"
    - "Writing for Wellbeing"
    - "Co-creating Bangor's Biodiversity Action Plan"

- Student Switch-off – an inter-Hall energy competition for students in University accommodation and training of SSO student ambassadors
- "Snap it Off"- encouraging students to upload photographs of energy wastage onto the web, and seeking resolution by University staff
- Delivered Recycling Presentation to International Students
- Fairtrade Fortnight
- Communication on sustainability in the student International Newsletter

- Communicating sustainability activities and raising awareness of sustainability at Bangor University through the Sustainability Lab 'Sustainability@Bangor' Newsletter sent to all staff and students:
    - Sustainability @Bangor Spring Newsletter 2017
    - Sustainability@Bangor Christmas Newsletter 2017
- Partnership between Bangor University and Halls of Residence with British Heart Foundation to run the 'Pack for Good' campaign in halls to get students to donate their unwanted items to the charity at the end of the term.
- Love Your Clothes – a partnership between Bangor University's' Sustainability Lab, the Students' Union and WRAP challenging university students, staff and Bangor's wider community to donate one tonne of unwanted clothes for local charities as part of 'Love Your Clothes Bangor' – a series of events running in March 2016 to highlight the environmental impacts of clothing.

  Continual communication and awareness raising of sustainability and EMS through the Environmental Management website pages[3] and the Sustainability Lab website[4]

Objective T8: Biodiversity

Target T8 A)	**Ensure that biodiversity considerations are wherever practicable, incorporated in University activities**

Considerable work is undertaken across the University to protect and enhance our natural environment and promote its biodiversity. This is primarily led by activities at our Botanic Gardens in Treborth, and our agricultural holding at Henfaes both of which are havens for biodiversity and where proactive steps are taken to protect native flora and fauna, and to control invasive species. Within the development of our estate, we are also taking opportunities to promote biodiversity; a purpose built bat roost has been developed on the St Marys site to facilitate the refurbishment and construction of the new Student Village development, and we are working closely with the North Wales Wildlife Trust in installing swift nesting boxes on our buildings. Wildflower seeding

[3] www.bangor.ac.uk/eo/environment

[4] planet.cymru/en

and insect "hotels" have also been introduced where practicable, as well as student led pond restorations, tree planting and organic garden programmes.

The Biodiversity Policy was revised and approved by the Sustainability Task Group in September 2016. A Sustainability Action Plan is being co-developed with staff and students. The CEPT has formalised its relationship with Treborth Botanic Gardens and the Curator, Natalie Chivers is the Biodiversity Co-ordinator. This is a new development, and will be reported fully in the next annual report.

Table 3: Summary of Performance against 2015/2016 Targets

Ref	Objective	Targets	Status & Notes
T1	Maximise efficient use of energy, and reduce greenhouse gas emissions.	**T1 A) Reduce annual energy associated greenhouse gas emissions (CO_2e) by 3% each year (*)**	
			Emissions/m^2 of operational floor area **fell by 14.8%**
			Emissions/staff and student FTE **fell by 20.5%**
		T1 B) Achieve a 40% reduction in energy associated greenhouse gas emissions (CO_2e) by 2020, (based on 2005/06 base year) (*)	Total energy use is now **20.2%** lower than during the base year; associated carbon emissions have **fallen by 27.2%.**
			Emissions/m^2 of operational floor are now **40.8% lower** than in the base year
			Emissions/staff and student FTE are now **40.1% lower** than in the base year
		T1 C) Reduce overall Scope 1,2 and 3 greenhouse gas emissions (CO_2e), by 3% each year (*)	Total Scope 1, 2 & 3 Emissions per m^2 of operational floor area **fell by 17.17%** from the previous year
			Total Scope 1, 2 & 3 Emissions per staff and student FTE **fell by 19.33%** from the previous year
T2	Maximise efficient use of water	**T2 A) Reduce total annual water use by 2% per year (*)**	Total water consumption was **7.1% lower** than in the previous year and 3.4% lower than the baseline
			Consumption per m^2 of operational floor area **fell by 3.2%** from the previous year and **21.4%** from the baseline
			Consumption per staff and student FTE **fell by 9.8%** from the previous year and **20.6%** from the baseline
T3	Prevent pollution from University activities	**T3 A) Zero pollution incidents recorded**	The greatest risk remains that from heating oil, which is gradually being replaced with gas where practicable. As a result the University's purchase of heating oil has fallen to less than 20% of that purchased in the 2005/06 base year.
			There were no pollution incidents at the University during the 2016/17 academic year

T4	**Minimise waste to landfill.**	**T4 A) Recycle / divert from landfill 50% of all municipal waste generated by the University**		Recycling /diversion from landfill during the year was 45.56% compared with 48% the previous year.
T5	**Reduce business mileage**	**T5 A) Achieve an annual reduction in vehicular business travel CO2 emissions**		Emissions were **38.0% lower** than base year and 8.3% lower than the previous year
T6	**Embed a process for consideration of Sustainable Procurement issues within the wider procurement process**	**T6 A) Reduce procurement related GHG emissions (excluding construction related emissions) annually**		During the reporting period, total procurement related emissions **fell by 5.55%** from the previous year (NB: this excludes construction and electricity usage for reasons outlined in the report).
		T6 B) Undertake annual Procurement Fitness Checks. Achieve Level 2 of the Welsh Procurement Maturity Model by 2020.		Almost all of the actions identified on Bangor University's Action Plan have now been implemented. The outstanding actions relate to undertaking a procurement training needs analysis for Corporate Procurement Staff and the continuing roll-out of electronic procurement. The training needs analysis exercise will be undertaken in 2017/18.
		T6 C) – Monitor progress against sustainability performance indicators and targets set within the Procurement Strategy.		The Sustainability Procurement Policy has been revoked and incorporated within the Procurement Strategy.
T7	**Enhance Awareness and Communication**	**T7 A) Implement programmes and schemes to raise awareness of Environmental Sustainability amongst staff, students, visitors and contractors**		A number of awareness campaigns have been held throughout the year as summarised in the report
T8	**Promote Biodiversity**	**T8 A) Ensure that biodiversity considerations are wherever practicable, incorporated in University activities**		Ongoing biodiversity management plans are continuing at Treborth, and Henfaes, and a number of activities have been implemented across campus.

(*) these are "intensity targets" and performance will be assessed against the following normalising factors:

a) total operational floor area of the University's estate, and

b) total staff and student FTEs

The University will continue to monitor absolute variances on an annual basis

Key to Table 3

	Target met (or on course to be met)
	Target not met but improvement in performance since last year
	Target not met and deterioration in performance since last year

9. Greenhouse Gas Emissions

The Kyoto Protocol describes six key greenhouse gases, namely:

Carbon dioxide (CO_2); Methane (CH4); Nitrous oxide (N2O); Hydrofluorocarbons (HFCs); Perfluorocarbons (PFCs); Sulphur hexafluoride (SF6)

Bangor University's greenhouse gas emissions for the 2015/2016 reporting year (calculated as CO_2 equivalents) are summarised in Table 4.

Table 4 : Greenhouse Gas Emissions associated with Bangor University Activities 2015/2016

Source	Quantity	Units	Conversion(*)	Emissions	
SCOPE 1 - DIRECT EMISSIONS					
Natural Gas consumption	**20,624,452.46**	kWh	**0.18416**	**3,798,199.17**	$kgCO_2e$
Heating Oil purchased	**40,049.00**	litres	**2.95351**	**118,284.93**	$kgCO_2e$
Diesel Fuel purchased	**34,977.21**	litres	**2.60016**	**90,946.45**	$kgCO_2e$
Petrol purchased	**32,526**	litres	**2.19835**	**71,503.65**	$kgCO_2e$
LPG	**100,386.90**	kWh	**0.21451**	**21,533.99**	$kgCO_2e$
IMPORTED POWER :Scope 2&3					
Electricity consumption	**15,994,102.03**	kWh	**0.38443**	**6,148,612.64**	$kgCO_2e$
SCOPE 3 INDIRECT EMISSIONS					
Municipal Wastes	**212.29**	tonnes	**588.9063**	**125,020.38**	$kgCO_2e$
Commercial Wastes	**262.43**	tonnes	**100.0729**	**26,262.87**	$kgCO_2e$
Recycled Wastes	**397.28**	tonnes	**21.76**	**8,644.81**	$kgCO_2e$
Mains Water consumed	**156,726.63**	m^3	**0.344**	**53,926.34**	$kgCO_2e$
Wastewater generated	**144,285.74**	m^3	**0.708**	**102,154.30**	$kgCO_2e$
Indirect Transport (Grey Fleet)				**133,400.59**	$kgCO_2e$
Other					
Agricultural (est.)				**690,650**	$kgCO_2e$
Sequestration (Henfaes est.)				**-800,000**	$kgCO_2e$
Total Greenhouse Gas Emissions:				**10,594,140**	**$kgCO_2e$**
	Variance on Previous Year			**-17.2%**	

(Conversion Factors from DEFRA Greenhouse Gas Conversion Factor Repository 2016)*

10. Future Plans

Sustainability is a prominent enabler in Bangor University's Strategic Plan 2015-2020:

"SUSTAINABILITY: Deliver a financially, socially and environmentally sustainable University

The University operates in a region with unique environmental attributes and places sustainability at the heart of its activities: we aim to become, in all aspects, 'the Sustainable University'. Our ambition embraces not only the infrastructure and operation of university sites and operations, but how the University plans for growth and our role for Wales and beyond. We are not alone in recognising the changes needed to reduce our impact on the world in which we and future generations will live, and for our students to become 'global citizens', but we aim to be at the forefront."

The University is committed to sustainability and has demonstrated this in two ways during 2017:

- Establishing a Campus Environmental Performance Team to collaborate on Environmental Management
- During the restructuring of the University's governance include the Sustainability Lab in the Planning and Governance Team reporting directly through the Director of Planning and Governance (who is also the University Secretary) to the VC and the Executive.
- Adopting the Well-being of Future Generations (Wales) 2015 Act as a framework for sustainability.

We are committed to ensuring that our graduates will have a demonstrable knowledge of sustainable development practices gained from their studies and wider experiences of the University. We will enable students, staff, partners, businesses, alumni, and the wider community to implement positive change within their spheres of influence and ensure that the University is positioned at the forefront of global sustainable change (as reflected in our People and Planet University League and UI Green Metric positions).

The Property and Campus Services department is currently being reviewed, and will incorporate sustainability as an integral consideration in the future development of the University. All of our new buildings, such as the Science Quarter, will be designed to achieve the BREEAM "Excellent" rating as a minimum. Recently completed developments achieving this rating are the multi-million pound Pontio building, the Marine Centre Wales in Menai Bridge, and the St Marys "Student Village".

The introduction of the new ISO 14001:2015 Environmental Standard has had implications for our Environmental Management System, we have transitioned in August 2017 but work is now ongoing to ensure the transition of responsibilities to CEPT.

An ambitious 'Re-fit' invest to save energy efficiency programme is ongoing as we seek to achieve our long term objectives and targets.

The Well-being of Future Generations (Wales) Act 2015 places a statutory duty on certain public bodies in Wales to carry out their duties in a sustainable way. Although Higher Education Institutions are not specifically listed in the Act, we have publicly stated that Bangor University will apply the principles set out in the Act to all of our work as follows:

There is ONE Principle

We must act in a manner which seeks to ensure that the needs of our students are met without compromising the ability of students in the future to meet their own needs.

When making decisions we as individuals (whatever our position) and a University need to make sure that we take account of the impact we could have on current and future Bangor students and staff (and the people living their lives in Wales … the world)

There are FOUR Pillars

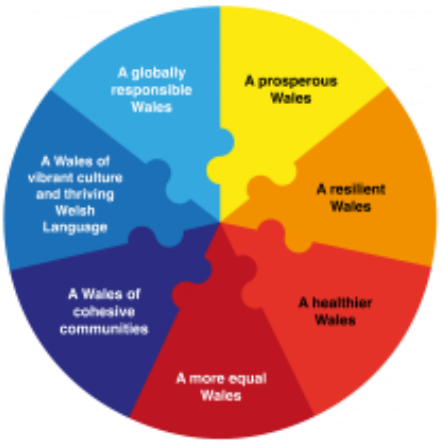
We need to consider improving the **financial, social, environmental and cultural well-being** of the university.

There are **FIVE principles in decision making:**

- Balancing short-term v **long term**,
- Will the decision **prevent** problems from occurring or getting worse,
- What impact will a decision have on people and the ability to deliver on BU aspirations
- **Integration** not fragmentation
- **Collaboration** to meet well-being objectives, and
- **Involving** all individuals to reflect the diversity within the organisation

These will help us work towards the **SEVEN goals (figure 10)**

Fig 10. Well-being of Future Generations (Wales) Goals



The Sustainability Task Group is committed to ensuring that sustainability is at the heart of the University's future, and as such, our Environmental Management System will be a key factor in influencing and achieving this commitment.

PRIFYSGOL BANGOR UNIVERSITY

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