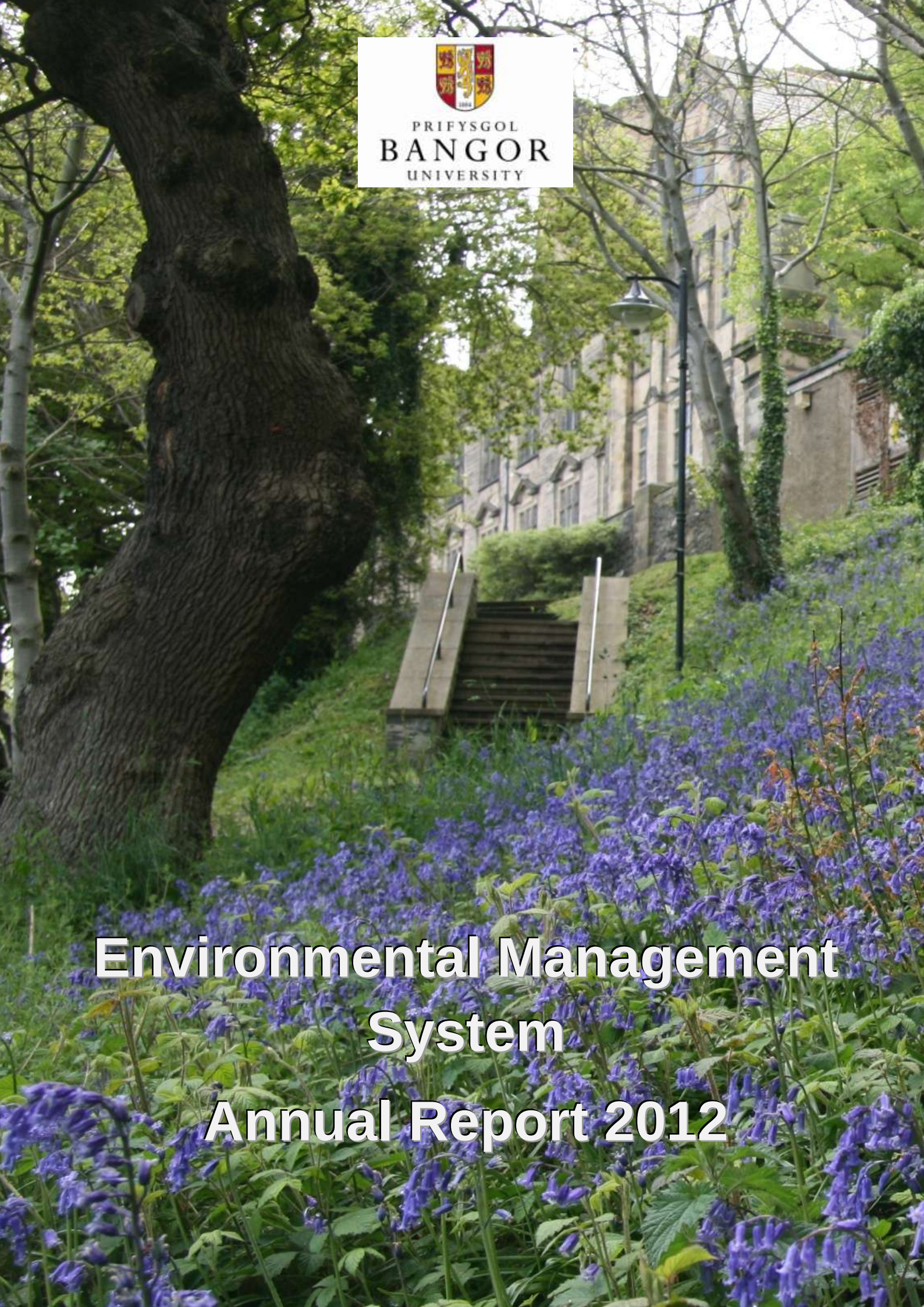


Environmental Management System

Annual Report 2012

Contents

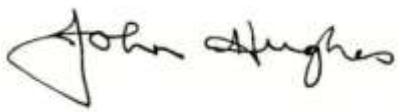
Vice Chancellor's Statement

I am delighted to present Bangor University's Annual Environmental Management System (EMS) Report for the 2010/2011 academic year.

One of the key priorities of our new Strategic Plan is to position ourselves as a global University, with a reputation for sustainability. We recognise that sustainability embraces people and planet as well as ensuring that we operate on a sound financial basis, and in November 2011 we signed the Welsh Government's "Sustainable Development Charter" to publicly demonstrate our commitment to becoming a more sustainable university. The environment is a cornerstone to sustainability and in order to ensure that we are meeting our obligations to the environment our EMS incorporates a thorough review of our environmental impacts with the objective of achieving continuing environmental improvement year on year. The consequences of this are already becoming apparent. We have, since 2009, been awarded the Green Dragon Environmental Standard for our EMS, progressing to Level 4 during 2011. Our aspiration is to achieve Level 5 (the highest level) of the Standard during 2012, and in the longer term the internationally recognised environmental standard ISO 14001. In addition our environmental achievements and progress have, for the past two years, earned us a "First Class Honours" degree position in the national University "Green League".

I am particularly impressed by the Student Union's environmental achievements last year. Not only did they progress from Bronze to Gold standard in the NUS Green Impact Awards they were also awarded the Co-operative 'Most Improved Union' Award for their huge leap in environmental performance, and a third national award sponsored by The Ecologist, for their "Rubbish Survival Guide" which encourages students to help keep Bangor's streets and the University campus clean and tidy.

Our achievements are a tribute to the commitment of the many staff, students, and members of the local community who are working in partnership to manage, protect and enhance the natural environment in and around our University.



Professor John G. Hughes,
Vice-Chancellor,
Bangor University **April 2012**

Executive Summary

This report relates to our environmental performance during the 2010/11 academic year (the reporting period). It describes our environmental monitoring data and key performance indicators in those areas where we have the greatest potential to impact upon on the environment. It outlines our energy usage, water consumption, waste generation, and transport emissions, and summarises performance in terms of compliance with the objectives and targets we had established for the reporting period.

Key Findings

During the 2010/11 academic year, Bangor University:

- consumed 15,954,994 kWh of mains electricity
- consumed 22,868,122 kWh of natural gas
- consumed 178,731 litres of heating oil
- consumed 71,612 litres of transport fuel
- landfilled 575 tonnes of mixed municipal waste
- recycled 285 tonnes of waste (33% of total)
- consumed 161,950 cubic metres of mains water
- produced 153,853 cubic metres of sewage
- drove 2,098,243 miles on business travel generating 394 tonnes CO2e
- generated 3,406 tonnes CO_2e from staff and student commuting
- produced 557 tonnes CO_2e from our agricultural activities
- sequestered 800 tonnes CO_2e at our landholdings at Henfaes Farm

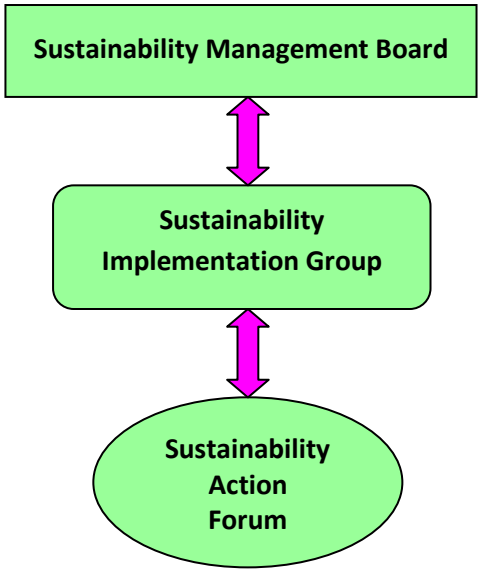
Generating a total of 16, 916 tonnes CO_{2e} from our activities as a University.

Introduction

Bangor University is committed to excellence. Our mission statement describes our overarching aim to be a "*"a leading research-led University with an international reputation for teaching and research, that fosters the intellectual and personal development of its students and staff, provides a supportive multicultural environment, promotes widening access and inclusiveness, and supports the economic, social and cultural well-being of Wales and the wider community it serves. Bangor University will be recognised regionally, nationally and internationally as a centre of excellence for a varied portfolio of academic programmes and for the high quality of the experience it provides for its students and staff"*.

We aspire to be sustainable by means of a balanced consideration of financial matters, our staff and students, the local community and of the environment around us. We have over 11,000 students and 2,000 members of staff located within an estate of 210 buildings across 346 hectares. We are committed to providing teaching, conducting research of the highest quality, engaging in knowledge transfer and enterprise and reaching out to the community, whilst at the same time taking good care of our staff and students. We will not only protect our natural environment at both local and regional levels, but will actively seek opportunities to enhance it.

In accordance with our Environmental Policy we aim to develop a culture of environmental stewardship amongst our staff and students. We understand that our activities have an impact on the environment, and are committed to continual improvement in our environmental performance. In this respect we have established the following structure for implementing our sustainability agenda:



The Sustainability Management Board is tasked with overseeing the evolution and implementation of a Sustainability Agenda for Bangor University and for reporting to the University Executive Committee. Specific Actions are achieved through the multifunctional Sustainability Implementation Group, supported with input from the wider Sustainability Action Forum. All three groups include staff and student representation.

Environmental Policy

PRIFYSGOL
BANGOR
UNIVERSITY

Environmental Policy

Bangor University has over 11,000 students and 2,000 members of staff located within an estate of 210 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 both locally and regionally, but to actively seek opportunities to enhance it.

Additionally, we aim to develop a culture of environmental stewardship amongst our staff and students. We understand that our activities have an impact on the environment, and are committed to continual improvement of our environmental performance, working to meeting the requirements of the Green Dragon Environmental Standard. This is fundamental to achieving our goal of becoming a leader in effective environmental management within the higher education sector in Wales.

We will adopt the following key principles within our approach:

- To minimise our environmental impacts and work towards the goals of sustainable development
- To ensure compliance with all relevant legislation and regulations associated with our activities
- To manage waste through reduction, re-use, and the promotion of recycling
- To reduce energy and water consumption, and promote green transport initiatives
- To reduce our contribution to global climate change by making significant reductions in our greenhouse gas emissions
- To work with suppliers who themselves have sound ethical environmental and sustainability policies
- To undertake all necessary steps to prevent the pollution of the natural environment
- To raise environmental awareness amongst staff and students through improved communication and involvement
- To embed sustainable development and awareness of environmental issues in our curricula across the University

This Environmental Policy will be reviewed annually by the Sustainability Implementation Group, endorsed by the Sustainability Management Board, and reported to the University Executive. It will also be communicated to the wider University population and is publicly available.

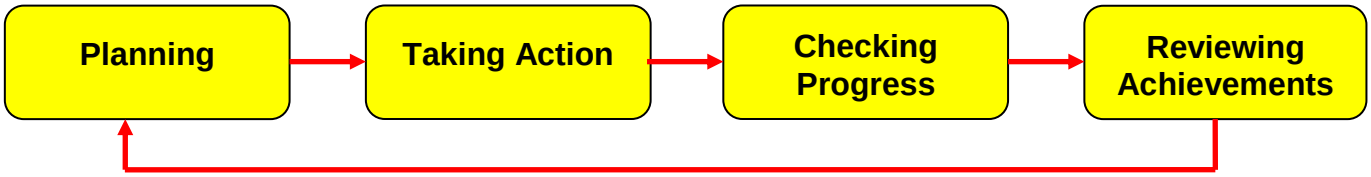
Signed: **(Professor John G. Hughes, Vice-Chancellor, Bangor University)**

Date: 10 February 2012

Issue 4: February 2012

Environmental Management System

Our EMS has been designed in accordance with the criteria set out in the Green Dragon Environmental Standard. This is a five tiered approach to environmental management that enables organisations to develop a phased approach to their EMS. Each tier incorporates the cyclical process of:



to achieve the key principles of:

- **Continual Environmental Improvement**
- **Compliance with Environmental Legislation**
- **Pollution Prevention**
- **Communication of Environmental Issues.**

Our progression through the Green Dragon is summarised below:

- May 2009 – Level 3
- May 2010 – Level 3
- May 2011 – Level 4

We are currently working toward achieving Level 5 in May 2012, and are considering the potential to achieve ISO14001 certification. Our EMS currently applies across the University estate, with the exception of the Prince Madoc Research Vessel and the Centre for Advanced Software Technology (CAST) Ltd.

The Environmental Management System is subject to ongoing monitoring by the Sustainability Implementation Group, and is formally reviewed annually by the Sustainability Management Board.

Legislation

Our EMS incorporates a register of legislation that is applicable to University's activities. The register is updated by the Environmental Manager who is responsible for ensuring that relevant environmental licences, registrations, and authorisations are in place. The majority of these currently relate to the Environmental Protection Act, the Environmental Permitting Regulations, the Energy Performance of Buildings Regulations, and to our involvement in the Carbon Reduction Commitment Energy Efficiency Scheme.

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. The significant Aspects include:

Energy consumption

Water Consumption

Oil and Chemical storage and use

Waste generation

Travel and Transport

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

Objectives and Targets 2011/2012

From the Aspects and Impacts assessment, we have derived the following objectives and targets for the current year:

T1:	Reduce energy related CO_2 emissions by 3% annually, and by 15% of 2005/06 levels by 2012
T2:	Reduce water consumption by 2% annually
T3:	Minimise pollution risks at the University
T4:	Recycle 40% of municipal wastes generated at the University
T5:	Reduce business travel related emissions to 20% of 2005/06 levels by 2016
T6:	Embed sustainable procurement practices across the University, and achieve Level 3 of the Sustainable Procurement Action Framework by December 2012
T7:	Enhance awareness of environmental sustainability amongst staff and students
T8:	Ensure that biodiversity considerations are, where applicable, incorporated in University activities

A report of performance against these targets will be incorporated in the 2013 Annual EMS Report

Training and Awareness

Training and awareness is an integral part of our Environmental Management System. SIG has produced a discrete “Communications Strategy”, and is working to raise the profile of environmental issues wherever practicable. Recent examples include:

- A sustainability “Maps and Compasses” session for new staff
- A “Switch Off This Christmas” energy saving campaign and competition
- An Environmental Management stall at Serendipity during Freshers Week
- Inclusion of sustainability issues within the Welcome Week presentation for new students
- An “Environmental Management at Bangor University” module for second year students
- Development of awareness material in partnership with the Gwynedd Local Service Board.

In addition we are undertaking a programme of training all “frontline” staff in waste awareness, focussing initially on the 100+ domestic staff, and subsequently the catering and direct labour staff. Fifteen members of staff from across the University also received “Internal Environmental Auditing” training from the British Standards Institution; this group of trained auditors will now be responsible for carrying out regular audits of the EMS.

Annual Performance: Academic Year 2010/2011

Energy and Greenhouse Gas Emissions

We aim to reduce our energy and related CO_2 emissions by 3% and water consumption by 2% each year. We are actively monitoring our energy and water usage using the Automated Metering and Monitoring and Targeting facility that records consumption in our main buildings on a half hourly basis, and we are committed to investing in energy and water efficiency measures to achieve our short and longer term targets. During the reporting period we have undertaken a range of Invest to Save initiatives including:

- Installation of Solar Thermal Water Heating in the Estates, Treborth Pavilion and Thoday buildings
- Loft insulation in Main Arts and many other buildings
- Lighting upgrades including LED and PIR detection
- Replacement of 13 aging gas and oil boilers with modern efficient condensing boilers
- Replacement of oil heating with gas / lpg

In addition we have undertaken a major upgrade of our Building Management System which will enable the Estates department to more effectively control heating and cooling in our main buildings and carry out adjustments according to user needs.

In accordance with the Energy Performance of Buildings Regulations, we have placed Display Energy Certificates (DECs) in the foyer / reception areas of 45 of our largest buildings. These DECs provide a publicly available indication of the energy efficiency of the building. This information will enable us to identify the least efficient buildings and prioritise efficiency measures accordingly.

Energy and Emissions – Key Statistics

Table 1: Energy Consumption

Energy	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Electricity (kWh)	15,447,781	15,613,647	15,159,976	15,851,415	16,007,982	15,423,994
Gas (kWh)	28,883,921	26,972,176	25,172,241	23,495,748	20,674,199	21,487,388
Burning Oil (litres)*	211,100	172,655	174,822	187,349	187,548	178,731
Total Energy Consumed (kWh)	46,569,362	44,415,966	42,185,330	41,333,062	38,670,190	38,805,931
Annual Variance		-4.62%	-5.02%	-2.02%	-6.44%	0.35%
Variance on Base Year (05/06)		-4.62%	-9.41%	-11.24%	-16.96%	-16.67%

(1 litre oil = 10.6 kWh)*

Table 2: Energy Related CO2 Emissions

CO2 (Tonnes)	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
Electricity	8,104	8,191	7,953	8,316	8,398	8,092
Gas	5,303	4,952	4,622	4,314	3,796	3,945
Burning Oil	537	439	444	476	477	454
Total	13,944	13,582	13,019	13,106	12,671	12,491
Annual Variance	-2.88%	-2.59%	-4.14%	0.67%	-3.32%	-1.42%
Variance on Base Year (05/06)		-2.59%	-6.63%	-6.01%	-9.13%	-10.42%

Since 2010, the Management Development Centre (MDC), a wholly owned subsidiary of the University, has been incorporated within the Environmental Management System. Energy consumption associated with the MDC is not required within the University's annual reporting for Higher Education Estates Management Statistics (HEEMS) on which our objectives and targets were initially based, In order to allow year on year comparison, they are reported separately in Table 3 below.

Table 3: Management Development Centre: Energy Consumption and Emissions

Energy (kWh)	2009/10	2010/11
Electricity	502,247	531,000
Gas	1,232,456	1,380,734
Total	1,734,703	1,911,734
Annual Variance		10.21%

CO2 (tonnes)	2009/10	2010/11
Electricity	263	279
Gas	226	254
Total	490	532
Annual Variance		8.78%

Under the UK Government's "Carbon Reduction Commitment- Energy Efficiency Scheme" we will be required to pay a carbon "tax" for the emissions associated with the University's energy usage from April 2012. 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 tax has been set at £12 per tonne of CO2, an annual cost to the University in excess of £160,000. Energy efficiency is therefore one of our key priorities within the EMS.

Water

We aim to reduce our water consumption by 2% each year. This is challenging given the increasing number of students and we will continue to work with both staff and students in raising awareness of the need to conserve water. We have installed water saving "Hippo" bags in many of our cisterns, and have undertaken an audit of wash room facilities to identify and rectify poorly performing taps. We are currently trialling waterless urinals in our Estates building and should these prove successful, plan to extend these facilities to other buildings within the Estate.

Water consumption is summarised in Table 4 below:

Table 4: Water Consumption

Water Consumption	2006/2007	2007/2008	2008/2009	2009/2010	2010/11
Cubic metres	166,054	174,937	165,396	166,267	161,950
Annual Variance		+5.35%	-5.45%	+0.53%	-2.60%

Prevention of pollution – no pollution incidents were reported during the period. All of our oil storage facilities have now been bunded, or 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 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, and Merion buildings. An annual inspection of oil tanks, bunds and spill kits has been formalised, and records retained within the EMS. Our Pollution

Prevention Plan, which is available on our website, includes a procedure for anyone wishing to report an environmental incident.

Waste – we aim to recycle 40% of our municipal waste and have made considerable progress in this area, increasing our recycling rate from 17% six years ago, to 33% in 2010/11, as shown in Table 5 below. However we are still some way short of meeting our target. In order to address this we are installing recycling banks in all academic and residential buildings. Food waste recycling collections have also now been extended to include all halls of residence as well as our catering outlets, and we are in discussion with the local authority regarding commingled collections that will allow mixed recyclates being collected from our external waste bays. We are also planning to extend the "binless office" approach, by reducing the number of desk-side bins and installing recycling banks in central locations.

During 2010 we signed up to Waste and Resources Action Programme (WRAP) "Halving Waste to Landfill Commitment" by playing our part in halving the amount of construction, demolition and excavation waste going to landfill by 2012. This will support national policy goals (i.e. 'Toward Zero Waste' by 2050 in Wales; 'Halving Waste to Landfill by 2012' adopted in England by the Government's Strategy for Sustainable Construction, and the 'Zero Waste Scotland' policy objective), and will be achieved by reducing waste, recovering more materials and using more recovered material in new build.
Specific targets associate with this initiative are to:

- implement Site Waste Management Plans that not only meet any minimum regulatory requirements, but exceed these requirements by setting project specific targets for waste reduction and recovery and measuring performance;
- recover a minimum of 70% of construction materials and packaging;
- recover a minimum of 80% of demolition and strip-out materials; and
- ensure that at least 10% of total material value derives from reused and recycled content in new build

In this respect the demolition of the Student Union and Theatre Gwynedd buildings during 2010 generated nearly 8,000 tonnes of waste, 98% of which has been recycled, or will be utilised in the construction of the new Pontio development.

Table 5: Waste Statistics

Municipal Waste (tonnes)	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011
Landfill	624	715	781	820	575
Recycled	211	297	320	346	285
Total	**835**	**1,012**	**1,101**	**1,166**	**860**
% Waste Recycled	**25.3%**	**29.3%**	**29.1%**	**29.7%**	**33.1%**

Travel and Transport – in March 2010 we commissioned Atkins to produce our first campus wide Sustainable Travel Plan, which is currently the subject of discussion by the Sustainability

Management Board. This included a further staff and student travel survey, building on the initial survey carried out in 2009. The data gathered from these surveys has enabled us to establish a baseline for travel habits to, from and within the University campus, and will subsequently allow targets to be established for a shift towards more sustainable modes of travel over the next five years. Although not formally adopted, the various actions identified within the Travel Plan are being considered, for example a Cycle to Work Scheme will be launched during 2012, and we are continuing to work closely with the local authority to identify opportunities to encourage the use of public transport and improved cycle routes.

Emissions associated with business mileage are currently calculated from fuel purchases and expense claims. We have established a target to develop procedures to more accurately calculate this aspect of our carbon footprint.

Estate Development - All of our new buildings will be designed to achieve the BREEAM "Excellent" rating, the most notable being the £34 million Pontio development which is due for completion in Summer 2013. As members of the Gwynedd Local Service Board (LSB) we aim to contribute towards significant carbon reductions in the County. An interim target of 15% of 2005/06 emissions by 2012 has been established, and as a means of working towards this target we have developed a specific Carbon Management Strategy, a "Carbon Reduction Routemap" (in conjunction with the Carbon Trust), and specific Action Plans relating to energy, waste and transport.

Objectives and Targets 2010/2011 Review

Performance in terms of our objectives and targets for the reporting period is summarised in Table 6 and colour coded as follows:

 Target met

 Target not met

Table 6: Summary of Performance against 2010/11 Targets

Ref	Objective	Targets	Status	Notes
T1	**Maximise efficient use of energy, and reduce greenhouse gas emissions.**	1 Reduce annual energy associated CO_2 emissions by 3% each year. Performance to be based on Higher Education Estates Management Statistics (HEEMS)		The annual reduction for 2010/11 was 1%. This has been attributed to the severe winter which increased gas consumption for heating.
T2	**Maximise efficient use of water**	1. Reduce total annual water use by 2% for 3 years from 2007/08 academic year. Performance to be based on Higher Education Estates Management Statistics (HEEMS)		
T3	**Prevention of pollution**	1. Monitor / audit of all oil storage facilities / spill kits.		
T4	**Minimise waste to landfill.**	1. Recycle 40% of all municipal waste generated.		Current recycling rate is 33%. This is being addressed in consultation with the local authority, and through internal training/awareness sessions.
T5	**Reduction in business travel undertaken by University staff and students.**	1. Develop process for accurately monitoring business travel.		This will be incorporated within Agresso as an online expense claim facility
		Prioritise Actions arising from University wide Travel Plan		
T6	**To embed a process for consideration of Sustainable Procurement issues within the wider procurement process**	1. All large contracts which are advertised via the Buy4wales web site are managed in accordance with the recommendations of the University Sustainable Procurement Policy		
		2. Achieve Level 3 of the Public Sector Sustainable Procurement Action Framework (SPAF)		
T7	**Enhance awareness of Environmental Sustainability amongst staff and students**	1. Deliver the specific actions set out in the University's Environmental Communications Strategy		

Greenhouse Gas Emissions

The Kyoto Protocol describes six key greenhouse gases, namely:

- Carbon dioxide (CO2);
- Methane (CH4);
- Nitrous oxide (N2O);
- Hydrofluorocarbons (HFCs);
- Perfluorocarbons (PFCs); and
- Sulphur hexafluoride (SF6)

Bangor University's greenhouse gas emissions for the 2010/11 reporting year (calculated as CO_2 equivalents) are summarised in Table 7 below:

Table 7 Greenhouse Gas Emissions 2010-2011

Source	Quantity	Conversion	Emissions
SCOPE 1 - DIRECT EMISSIONS			
Natural Gas consumption (kWh)	**22,868,122**	0.1836	**4,198,587** $kgCO_2e$
Heating Oil purchased (litres)	**178,731**	2.5421	**454,352** $kgCO_2e$
Diesel Fuel purchased (litres)	**36,878**	2.648	**97,653** $kgCO_2e$
Petrol purchased (litres)	**34,734**	2.3018	**79,951** $kgCO_2e$
SCOPE 2 - IMPORTED POWER			
Electricity consumption (kWh)	**15,954,994**	0.5246	**8,370,309** $kgCO_2e$
SCOPE 3 INDIRECT EMISSIONS			
Municipal Waste landfilled (tonnes)	**575**	290	**166,750** $kgCO_2e$
Mains Water consumed (cubic metres)	**161,950**	1.04	**168,428** $kgCO_2e$
Indirect Transport (Grey Fleet - personal vehicles)			**216,242** $kgCO_2e$
Indirect Transport (Commuting)			**3,406,000** $kgCO_2e$
Agricultural			**557,400** $kgCO_2e$
Sequestration (Henfaes)			**-800,000** $kgCO_2e$
Total Greenhouse Gas Emissions:			**16,915,672** $kgCO_2e$

Sustainable Procurement

We have developed a discrete Sustainable Procurement Policy and Strategy that aims to ensure that a thorough assessment of the environmental and social as well as the financial implications is undertaken during the procurement of goods and services. This will be achieved through the use of the Environment Agency's "Sustainable Risk Assessment", and through training of key procurement staff.

Our performance is assessed annually in accordance with the criteria set out in the "Forum for the Future" Sustainable Procurement Assessment Framework (SPAF). We have achieved our target of attaining Level 3 of the SPAF, and have developed an Action Plan to deliver further improvement. The delivery of the SPAF Action Plan is overseen by the Sustainability Implementation Group, and regularly reported to the Sustainability Management Board.

Future Plans

We aim to realise continual environmental improvement through the defined procedures and protocols set out in our Environmental Management System, and to ensure that the wider issues of sustainability are incorporated into the goals and plans of every dimension of the University's activities. Our overarching objective is to proactively further the social and economic, as well as the environmental, aspects of sustainability throughout the University, including:

- The improved dissemination of issues relating to sustainability and the environment throughout the University's staff and student population.
- Development of a "One Planet Living" approach to sustainability, including a discrete website
- Embedding sustainability training in staff development
- Progression to Level 5 of the Green Dragon Environmental Standard
- Cross cutting curriculum development for all students, irrespective of background
- Cataloguing and formalising biodiversity assets and the ecosystem services they provide
- The promotion of integrated transport issues in partnership with Gwynedd Council and other public bodies,

The success of these future plans can only be realised by maximising the participation of all staff, students, and external stakeholders, and through improved communication and reporting of all applicable issues.

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