DIRECTORATE OF ESTATES & FACILITIES

PROCEDURE AND INFORMATION MANUAL

EPM HS18 – ENERGY AND UTILITY

POLICY AND PROCEDURES

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1.0 Policy Mission Statement

The University of Manchester (UoM) recognises that energy consumption is necessary for the provision of educational and research activities, however realises that it has a responsibility to minimise and reduce energy consumption and costs in order to adequately discharge its statutory and mandatory obligations resulting from the Climate Change Act 2008, Paris Agreement and the Manchester Zero Carbon Commitment.

As far as is practicable, and consistent with the operational needs of the University, UoM will commit to the following by:

- **Operating in an energy efficient manner** (reducing consumption and associated costs);
- **Producing a local energy / carbon reduction strategy** (providing the effective use of staff and financial resources);
- **Producing an energy reduction delivery plan** (providing the effective use of energy/carbon reduction and financial resources);
- **Maintain an energy / carbon management structure (**with clearly defined roles);
- **Achieving local energy efficiency measures** (in line with local and national targets);
- **Minimising environmental impacts (** arising from the University's Energy consumption, finite fossil use, CO_2 emissions, and waste generation);
- **Investment in energy / carbon efficiency opportunities** by identifying funding sources for energy efficient improvements (including new clean energy efficiency technologies where they are cost effective and deliver value for money);
- **Considering energy conservation as part of the procurement evaluation process** (including the procurement of services, fuel, equipment and capital projects, to consider equipment with low energy ratings and taking into account whole life costs);
- **Informing and motivating staff to reduce energy consumption** (including raising awareness of the importance of energy conservation starting with the induction process);
- **Continual improvement in energy management practices** (improving performance by regular reviews of policies, procedures and working practices); and
- **Demonstrating that the Energy and Utility Policy and Procedures** is being implemented**.**
- **Become recognised** as a leader in providing an innovative curriculum around environmental sustainability
- **Support the development** of a more seamless knowledge exchange interface between our research communities and the University's Research and Business Engagement and Estate and Facilities directorates; and external organisations in the private, public and third sectors, locally, regionally, nationally and internationally;
- **Define and measure the** environmental impact of utility consumption and develop targets to reduce these and put in place ways to reach these targets.
- **Ensure students** are afforded every opportunity to work with the University on meeting its targets and develop innovative projects and proposals.
- **Develop clear and robust communications** strategy for environmental sustainability and to seek and maintain positive and effective engagement with the University community and its stakeholders in all environmental sustainability matters.
- **Ensure all designs** associated with UoM's capital and LTM programme reduce the Carbon impact in line with its statutory, mandatory and policy obligations.

This policy shall be implemented by undertaking the following:-

- Monitoring, auditing and reviewing efficiency measures in order to prevent pollution and contribute to the Government National Climate Change Programme;
- Actively seek to promote good energy and carbon control management practices through the fostering of good working relationships with the relevant agencies, local authorities and the community;
- Promoting energy efficiency awareness amongst staff, students and visitors through the distribution of the policy and local advertising schemes; and
- Maintaining an open line of communication on energy matters for employees and members of the public.

2.0 INTRODUCTION AND PURPOSE

The UoM is committed to reducing the impact to the environment from its activities. The implementation of this Energy and Utility Policy & Procedures shall help deliver the required reduction in emissions associated with the University's use of energy, and the use of non-sustainable resources, including aiming to:

- Comply with Government mandatory target (Climate Change Act 2008) to cut greenhouse gas emissions by 80% by 2050 against a 1990 baseline.
- Support the Paris Agreement to limit global temperature increase to below 2°C.
- Contribute towards Manchester's Zero Carbon 2038 target.

2.1 SCOPE AND DEFINITIONS

The scope of this policy extends to the whole University and includes the following areas:

- Capital Projects Unit - responsible for strategic planning, procurement, delivery and successful handover of major building projects.
- Central Procurement Office - promote efficient and effective procurement, to ensure that responsible procurement and value for money is maximised by disseminating best practice, advising on appropriate management of risk and ensuring compliance with statutory requirements.
- Client Services Unit - custodial role in the strategy management of the estate and brings together a number of estates and facilities client-side functions with the aim of providing a single point of service delivery for internal and external stakeholders.
- Communications and Marketing - centrally and across faculties and PS, provides University and Faculty wide communications.
- Design Services Unit - offers multi-disciplinary design and project management service in relation to the alteration, refurbishment, planned maintenance and new build.
- Environmental Sustainability - responsible for all environmental sustainability issues at the University.
- Estate and Space Management - provide estate, space and drawing management services for the whole of the University's estate.
- Estates Support - provide services in relation to timetabling, central teaching spaces, media services, estates health & safety, financial and procurement compliance and projects and utilities finance and administration.
- Faculty Estates Teams - operate within each Faculty and the PS to provide liaison and communication.
- Finance - provide a range of services and advice to all areas of the University to ensure that the finances support the University Strategic Vision.
- Hospitality and Events - responsible for University catering, hospitality, conferencing and events.
- Human Resources - provide support to managers and staff to develop and embed a performance-orientated culture, improve the quality of leadership and management, and motivate, engage and inform the workforce.
- Operational Services – provide building cleaning, waste management and campus cleansing, planning and maintenance of campus landscaping, car parking and access to secure cycle shelters.
- Maintenance Services - provide day to day maintenance and repair of building and infrastructures across all the campus areas.
- Security Services – provide security across all campus areas and manage access control systems.
- Staff Learning and Development - provide University staff with learning and development opportunities and support.

2.2 ROLES AND RESPONSIBILITIES

The Director of Estates and Facilities has overall responsibility to ensure that the commitments within the policy are upheld by the University. Other University leads and department heads will have designated responsibilities within their own roles in order to achieve continual improvement in the University's energy management.

2.3 GENERAL PRINCIPLES

This Policy and Procedures will deliver to best practice guidelines and aims to position the University as a leader in reduced energy consumption and increased efficiency, supporting the transition to a zero carbon organisation. In summary the University will:

- Comply with the Governments mandatory targets (Climate Change Act 2008)
- Support the Paris agreement to limit global temperature increase to below 2°C
- Contribute towards Manchester's Zero Carbon 2038 target
- Comply with legal requirements and adopt all CIBSE guidance including recommended temperatures, lighting levels etc.;
- Invest in efficient equipment and buildings through the critical examination of whole life costs and faculty needs;
- Restrict both the use and purchase of portable heaters;
- Implement an air-conditioning non-proliferation policy which includes restricting non-essential use, the removal of units from non-critical areas, and the designing out of air conditioning requirements from existing and new buildings;
- Provide staff with the knowledge of the impact to the environment of energy use and how to reduce the reliance on energy;
- Undertake campaigns to win the "hearts and minds" of staff working with Sustainability Champions, Energy Champions and where appropriate Lab Sustainability Teams across the University;
- Employ effective monitoring methods, which include localised sub metering of services;
- Engage with the Carbon Action Group;
- Provide quarterly reports on energy consumption to Environmental Sustainability Committee, and, when requested, the University Board of Governors; and
- Ensure the purchase of "A" energy rated appliances and or appliances which sport the European Eco-label.

2.4 MONITORING COMPLIANCE

This policy and procedures shall be kept under review and amended accordingly when appropriate to prove compliance with all relevant compliance obligations as well as to ensure that the University's own procedures and controls are being followed. The policy and procedures set out shall drive improvements in-line with the objectives and targets set within this policy.

2.5 POLICY CONTENT

[Insert policy content here]**Version amendment history**		
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Related policies/procedures/guidance etc.	
Policy owner:	Tony Small, Principal Mechanical and Energy Engineer and Emma Gardner, Head of Environmental Sustainability
Lead contact:	Tony Small, Principal Mechanical and Energy Engineer

3.0 POLICY OBJECTIVES

The Department for Education realise that tackling sustainability must be in the widest terms possible. Therefore accepts economical sustainability shouldn't be without considering social and environmental sustainability associated with fossil fuel usage at the same time. The combination of these elements are fundamental to truly future-proofing the Department for Education and are a cornerstone to providing a high quality, productive and efficient educational services, both now and in the long term.

The Department for Education recognises that efficiencies can, and must to be made by improving energy efficiency and developing more sustainable forms of delivery across higher education facilities, for example through working with the Carbon Trust and similar bodies on carbon reduction programmes that reduce energy consumption and expenditure. The Energy and Utilities Policy & Procedures has adopted the roadmap approach to energy management as per CTG054 "Energy Management", and consistent with the requirements of ISO 50001"Energy Management System".

The primary objective is to provide a framework for the reduction of energy consumption in line with the government target of 80% by 2050.

To further endorse the requirement to reduce energy consumption, Directive 2002/91/EC calls for a substantial increase in investments in energy efficiency measures within buildings. Energy containment and reduction in consumption initiatives will therefore be considered by the University's Capital Planning Sub Committee which will help to discharge the carbon reduction obligations. The Department for Innovation, Universities and Skills' grant letter to HEFCE for 2009-10 required the higher education (HE) sector in England to implement a carbon reduction target. HEFCE has announced that, from 2011, capital allocations will be linked to carbon reduction. HEFCE, Universities UK and GuildHE have published their 'Carbon reduction target and strategy for higher education in England' (HEFCE 2010/01). Institutions are required to develop individual carbon management plans and to report on progress and the results achieved

The fulfilment of the above energy targets will reduce the University generation of "greenhouse gases" and this will, in turn, reduce the cost implications for the University associated with the Carbon Reduction Commitment Energy Efficiency Scheme (CRC) and The European Union Emissions Trading System (EU ETS). Currently the University produces in excess of 60,000 tonnes per annum (2017 emissions) resulting in a financial surcharge of CO_2 emissions of in excess of £350,000.

4.0 ACTION PLAN

The University will adopt the roadmap approach as highlighted in CTG054 "Energy Management", and consistent with the requirements of ISO 50001 "Energy Management System". This approach to energy management is widely recognised and has been successfully adopted by numerous UK-based companies and organisations

These standards enable organizations to establish systems and processes necessary to improve energy performance, including energy efficiency, use, and consumption. Implementation will lead to reductions in greenhouse gas emissions, energy cost, and other related environmental impacts, through systematic management of energy.

The roadmap approach details specific requirements for UoM to develop and implement The Energy and Utility Policy and Procedures, establish objectives, targets, and action plans, which take into account legal requirements and information related to significant energy use. This enables UoM to achieve its policy commitments and take the necessary action needed to improve its energy performance and demonstrate the conformity to its legal and mandatory requirements.

The roadmap approach is based on the following:-

- "Commitment"
- "Policy"
- "Strategy"
- "Action Plan"
- "Review"

UoM is committed to support the delivery of the Energy and Utility Policy and Procedures. In addition includes securing University's Board support to this policy and establishing regular and appropriate reporting protocols. This support is essential for the long-term success the energy and utility strategy. UoM will demonstrate the importance of the programme regarding achieving the energy target reduction, and board backing to assist the managers who will be actively involved in implementing the strategy. Initial steps are to provide senior management with a clear understanding of the benefits that might accrue. UoM will commit to highlight no-cost and low-cost measures that will bring immediate savings (e.g. switching off lights that are not being used; repairing dripping hot-water taps). If possible, give an estimate of how much these actions might save.

UoM is aware that 'commitment' is more than a statement of support – it should establish accountability among managers involved in the implementation of the strategy, and should require regular reporting on progress. Having an 'energy champion' on the board is an excellent way of sustaining this commitment. In addition to top-level commitment, staff from all levels of the organisation need to be encouraged to join the campaign

UoM will develop a clear understanding of the protocols to identify and establish historic, current and predicted performance, which will be used to monitor and identify areas of waste and possible opportunities. In addition energy usage associated with UoM's long term maintenance, capital programme and daily activities will be fully quantified.

The energy needs of the UoM will be determined and appropriate management actions will be implemented to efficiently manage those needs. Barriers to good practice will be identified and removed.

UoM will conduct a thorough review of the current position, the position UoM wishes to achieve, and how to successfully achieve its reduction targets therefore it is essential a clear understanding of how energy usage and associated environmental issues affect the University.

This will include

- Establishing the amount of energy usage which is essential resource for research and educational purposes. The usage may fluctuate with research requirements, but may have a fairly constant baseline demand; therefore UoM should determine what reduction can be achieved without limiting activity.

- Acknowledging the social benefits by being 'seen to be green' and achieving accreditation under the Carbon Trust Standard or achieving ISO 50001 accreditation.

To fully understand the implications, UoM will collect all the associated information regarding gas, electric and water usage to enable clear understanding of the current energy and environmental profiles associated with energy and utility usage. This will involve collecting data from an agreed source and protocol for reporting purposes. In addition to site by site data which can be used for automatic metering and targeting of areas that will provide the largest reductions?

Over the period 2002-4 the Higher Education Environmental Performance Improvement (HEEPI) concluded a benchmarking exercise on the energy consumption of selected buildings in universities and colleges. Workshops with higher education facilities managers were held to develop ways of benchmarking energy consumption within the sector. Over 30 universities provided initial data on energy and water consumption for 223 buildings by this means (see table 1 for details. Whilst recognising an improvement to the current building regulation may have improved the benchmarks, UoM will endeavour to ensure its portfolio achieves no less than best practice.

Table 1

Building category	Fossil Fuel Performance kWh/m2				Electricity Performance kWh/m2			
	Best	Good	Typical	Range	Best	Good	Typical	Range
Admin/support	88	107	166	70-591	28	46	90	17-331
Sports centres	138	ID	325	138-826	88	ID	199	58-643
Libraries	73	ID	176	73-296	73	ID	186	73-234
Residences	126	198	240	30-387	35	47	57	35-271
Teaching	46	88	240	46-844	31	41	118	22-518
Labs –medical & biosciences	75	121	256	24-569	177	250	325	75-606
Labs – Engineering – phys sciences	15	92	148	12-338	66	93	130	58-259
Labs – chemical sciences	97	ID	242	41-400	156	ID	287	156-408
Computing - Maths	40	ID	105	40-175	114	ID	106	27-217

UoM will continually evaluate the Policy Mission Statement by conducting regular reviews of the Energy and Utility Policy and Procedures, in conjunction with UoM's existing environmental policies, regarding the use of energy, and the setting of energy and environmental objectives at both a corporate and University divisional level. To support this, organisational roles and responsibilities will be made clear and the University appointment of an appropriately qualified and enthusiastic Energy Team and environmental and sustainability team, who will have the backing of Senior Management to deliver the objectives of this policy.

The Energy and Utility Policy and Procedures shall be further supported by the compilation of an Energy Reduction Delivery Plan which will require a comprehensive review of the current building portfolio to establish possible project to support the reduction in energy. This document will set out detailed objectives and targets along with a methodology for achieving those (including a list of key members of staff involved in the implementation). The detailed plan should cover all aspects of energy usage through to point of use and should also include guidelines for new projects and procurement of new plant, where life-cycle energy costs should be considered which include:

<u>Existing</u>

- Emission (tCO_2)
- KWh
- CO_2 Saving (Tonne)

Replacement

- £/t CO_2
- CO2 Saving (Tonne)
- KWh Saving
- £ Cost Saving p.a.
- Simple Payback Period (years)

The Energy Reduction Delivery Plan, shall in addition, require condition surveys to include energy reduction techniques during its long term maintenance programme. This will ensure energy performance remains at the forefront of maintaining its building portfolio in condition A-B.

Existing performance will be audited through conventional and specialist audit procedures, and priority actions will be identified and implemented.

Training on energy wastage in conjunction with UoM's existing environmental policies will be delivered and awareness raised throughout the University of the Importance of the implementation of The Energy and Utility Policy and Procedures by building greater understanding of the importance of energy efficiency and environmental protection, both locally and globally. This will create a sense of ownership and act has a conduit to disseminate technical information and focus attention on key issues. The introduction of simple suggestion schemes by the faculty and students can be used to create a sense of ownership and often prove to be much more successful than those imposed. These in addition, can generate a sense of competition between departments, cost centres or across sites, by publicising details of their energy or environmental performance.

Energy reduction will be fully integrated into the core business processes in line with existing environmental issues associated with the University.

Benchmarking, both internal and external, will be undertaken as a measure of monitoring and performance improvement.

Controlling & Monitoring to include:-

Energy audits;
Monitoring and targeting;
Implementation of a metering strategy;
Better anticipation of seasonal weather trends to help inform energy management decision making processes; and Identifying areas within the University who excessively consume energy without just cause;

UoM will conclude 'energy audits' as a systematic review of the energy reduction programme's performance against both legal requirements and UoM policy objectives. The audit will provide verification that the systems that have been put in place are being followed. It identifies areas where corrective action is required and it highlights opportunities or improvement.

5.0 ENVIRONMENTAL SUSTAINABILITY PLAN

The University's Strategic Plan 2020 has a clear focus on sustainability, with one of its eight enabling strategies focusing exclusively on environmental sustainability, stating that the University will "…embed environmental sustainability as a key priority across the full range of our activities." Further within the plan the University is committed to:

'Transform the University of Manchester into a low carbon institution, whilst educating our students and delivering leading research, to address the global challenge of sustainability.'

To help realise these objectives UoM recognise energy consumption reduction is required in all areas which include the faculty activity. With this in mind, each faculty will be responsible for the annual delivery of proposed carbon reduction plans in accordance with the designated targets identified by The Energy and Utility Policy, in addition with the Energy Act 2011 and Climate Change Act 2008.

Energy and carbon management shall include:

a) Agreed energy saving and carbon reduction targets, in line with the HEFCE carbon reduction targets.

b) Develop potential for more resilient and renewable energy production. Energy Reduction Delivery Plan

Water management shall include:

a) Develop and implement biodiversity, and water management strategies.

b) Integrate systems for efficient use of water into building developments at the design stage. (CMP)

5.1 Energy and Carbon Management

UoM will, to ensure effective management by conducting regular carbon leadership level reviews of performance in energy efficiency and carbon reduction which should be reported annually to staff, the public and other stakeholders. Carbon measurements should replace energy measurements as the target for reduction, in addition to include within the Energy Reduction Delivery Plan the development of resilient and more renewable energy sources to ensure a guaranteed energy supply, whilst managing their overall carbon footprint.

All capital schemes associated with the University shall include an Energy Reduction Strategy detailing the current emissions and associated emissions regarding the proposed method of reduction for the scheme. The plan shall incorporate systems which highlight reductions above and beyond the building Regulations and Planning Guidance Notes, in addition, measure and monitor on a whole life cycle cost basis associated with energy using equipment.

The capital developments should be assessed to ensure options are evaluated on a whole life cost basis. Low carbon options may include renewable energy, passive cooling, ultra- efficient lighting and natural ventilation. Capital projects should include the following from initial stages of the project:

- Consider the effects of your project on the wider world and immediate future.
- The cost to the environment must be considered in judging all solutions and options
- In the judgement of solutions and options, sustainable development must always be considered.
- All participants in a project must be consulted and buy into a solution.
- Any solutions must be practical and balanced and not compromise basic sustainable development principles. For example, a good environmental solution must not compromise economic viability.
- Sustainable development solutions must be planned into the project and not an added extra, and the approach must be retained throughout all stages of a project.
- Projects must be evaluated at their conclusion to ensure that Sustainable Development has been delivered and to learn lessons to feed back into future projects.
- A life-cycle approach must be taken for all projects and options, and value for money decisions must include life-cycle costs and not the lowest capital cost.
- Sustainable Development solution must satisfy the basic needs and objectives of a project and not be adopted solely to demonstrate that the project has a sustainable development content.
- Look at the innovative and creative solutions to fit the sustainable development approach that are practical and evidence-based

The University has committed to reduce energy consumption therefore requires the introduction of sustainable development plans during its activities, more specifically during activities from its service providers regarding the delivery of maintenance and facility contracts. This requirement will offer a detailed analysis regarding third party activities and highlight compliance with the UK's statutory obligation in accordance to the Climate Change Act 2008, the University's targets and help reduce the environmental impacts in accordance with statutory targets.

5.2 Short Term (1 year)

The short-term objectives of this policy are:-

- Commission a site survey to establish the condition of the services infrastructure so that improvements can be identified;
- Liaise with current maintenance providers to better manage the existing energy- related infrastructure;
- Improve the control over the University's current energy consumption;
- Invest in a rolling programme of energy saving measures;
- Safeguard energy conservation measures by employing management information systems to deliver information in a format to better support managerial decisions;
- Introduce and implement mechanisms for gathering accurate consumption- related data;

- Compile performance data reports to identify current energy consumption trends so that corrective action can be quickly taken (if necessary);
- Establish a carbon emissions trading contract to ensure best value for money; and
- Identify cost effective energy efficiency measures including informing energy users of simple yet effective containment actions.
- Implement Energy and Low Carbon Strategy requirements regarding schemes and the upgrading of the building portfolio, works employed regarding change of use and new contract works.
- In accordance with the Environmental Sustainability Plan ensure energy reduction is embedded in the delivery of the of Long Term Maintenance Programme (LTM) ensuring a key theme is to improve energy efficiency so as to reduce the energy demands of buildings.
- Introduce an energy management contract to ensure building controls are fully utilised to provide optimum efficiency. Review the Design Team Guide to consider all elements provide the most efficient system associated with energy reduction.
- Introduce energy site log books
- Develop an Energy Reduction

5.3 Long Term (5 year)

The longer -term objectives of this policy are:-

- Review the University's energy procurement practices to identify whether energy can be purchased more innovatively and therefore potentially more economically;
- Technically analyse fuel combustion to help ensure that fuel combustion is undertaken efficiently;
- Reduce, wherever possible, the University's dependence upon fossil fuels through the use of renewable technologies;
- Implement a programme of invest to save measures, including the further installation of data logging meters, zone heating controls and expanding existing Building Management Systems;
- Where possible, to use energy from sustainable sources, and give further consideration for technologies with longer payback periods than currently accepted; and
- Giving a higher priority to energy efficient investment.
- Centralise twenty four hour services to reduce the number of buildings that are heated/illuminated for a minority of out of hours staff/students.

6.0 RESPONSIBILITIES AND ACCOUNTABILITIES

This section describes the key roles and responsibilities of staff employed who have an active or passive role and who can best influence energy reduction throughout the UoM portfolio for which the Directorate of Estates and Facilities assumes responsibilities.

Roles that interface with teaching staff, students or members of the public are included. This will specifically apply to the Faculty Estates team and the Environmental and Sustainability team who will be a key liaison between each faculty and offer guidance and advice where applicable.

The Director of Estates and Facilities will be the designated responsible person for the UoM's Energy and Utility Policy and Procedures and will be responsible for the strategic delivery. The Director of Estates and Facilities shall have the authority to take action and will be responsible for the overall Energy and Utility Policy and Procedures within the University estate. Implementation of the Energy and Utility Policy and Procedures will be delegated to the Principal Mechanical and Energy Engineer.

The Principal Mechanical and Energy Engineer for the Client Services Unit (CSU) will control the Energy and Utility Policy and procedures and will be responsible for its implementation, and will be responsible for detailing energy monitoring and target setting, in addition, to the technical aspects of energy and environmental management. The Principal Mechanical and Energy Engineer will be responsible for evolving and implementing an Energy Reduction Delivery Plan to assist in achieving the UoM's Carbon management targets associated with the energy targets.

The Head of Client Services Unit will be responsible for Improving site infrastructure regarding the DHW & heating, HVAC and general energy efficiency associated with the long term maintenance requirements. This will be achieved by increasing priority regarding energy efficient techniques during the delivery of the long term maintenance programme.

The Head of Communications, Media and Public Relations will promote the importance of energy conservation and develop reporting mechanisms on energy reduction techniques by raising awareness and developing into practical advice which can utilise by the UoM Staff during their day to day activities. Further activities will concentrate on delivering the right message regarding the specific conservation schemes.

The Assistant Mechanical and Energy Engineers will be designated as managers for the Energy and Utility Policy and Procedures and have overall responsibility for performance of the policy and will attend meetings and monitor performance regarding the technical aspects of energy and environmental management.

The Head of Environmental and Sustainability will be actively involved in the promotion of energy reduction techniques and will liaise with the Principal Mechanical and Energy Engineer and the head of communications, Media and Public Relations regarding the internal and external communication strategy to promote energy reduction. This will include engaging with sustainability/environment champions on awareness raising initiatives.

The Maintenance Services Manager will have responsibility for ensuring performance of the standards set out within the Energy and Utility Policy and Procedures by the CSU and will monitor staff performance regarding the delivery of the policy objectives associated with the maintenance practices. Maintenance Services Manager is responsible for ensuring that sufficient resources are made available to enable the objectives of the policy to be fully met. In addition ensure adequate induction and training is provided to new members of staff on all areas relating to the Energy and Utility Policy and Procedures as appropriate to their role and responsibilities.

The Faculty Estates Officers will be responsible for ensuring the delivery of the objectives of the Energy and Utility Policy within the faculty and will act as liaison regarding any energy reduction initiatives within the specific faculties.

The Senior Budget Administrator will be responsible for the collation of energy and environmental statistics associated with the financial implication, and production of concise meaningful reports when required.

The responsibility for procuring energy rests with the Estates and Facilities Directorate in addition to budgetary control. However, **it is the duty of all University staff to use energy as economically as possible**.

Conservation schemes shall be set out on a Division-by-Division basis to enable the identifiable reduction of energy consumption over the life and Long Term Maintenance Plan.

Each department MUST include energy conservation and reduction within its business plan. This must encompass technical improvement and advice received from the University Mechanical and Energy team.

Good housekeeping is key in the reduction of energy consumption. Energy conservation measures must be adopted within each department. The Energy team shall assist each department in identifying measures to achieve such reductions.

7.0 LEGAL CONSTRAINTS

Climate Change Act 2008

The UK has passed legislation that introduces the world's first long-term legally binding framework to tackle the dangers of climate change. The Climate Change Bill was introduced into Parliament on 14 November 2007 and became law on 26 November 2008

Two key aims of the Act

- improve carbon management, helping the transition towards a low-carbon economy in the UK
- demonstrate UK leadership internationally, signaling we are committed to taking our share of responsibility for reducing global emissions in the context of developing negotiations on a post-2012 global agreement at Copenhagen in December 2009.

Key provisions of the Act

- A legally binding target of at least an 80% cut in greenhouse gas emissions by 2050, to be achieved through action in the UK and abroad. Also a reduction in emissions of at least 34% by 2020. Both targets are against a 1990 baseline.
- A carbon budgeting system that caps emissions over five-year periods, with three budgets set at a time, to help stay on track for our 2050 target. The first three Carbon budgets will run from 2008-12, 2013-17 and 2018-22, and were set in May 2009. The Government must report to Parliament its policies and proposals to meet the budgets, and this requirement were fulfilled by the UK Low Carbon Transition Plan.

The above targets have been further detailed in the (Climate Change Act 2008) therefore The University targets shall, at least, reflect the legal requirements in accordance with the above and will make available reporting procedures associated with Carbon emissions.

The Paris Agreement

The Paris Agreement is an agreement within the United Nations Framework Convention on Climate Change (UNFCCC), dealing with greenhouse-gas-emissions mitigation, adaptation and finance, signed in 2016. The UK government played a major role when the world came together in Paris to reach the ambitious deal to reduce global CO_2 emissions. Less than a year later, the landmark Agreement has entered into force and has been ratified by the UK as a sign of the continued commitment to climate action across the world. The Paris Agreement is a historic document, the first to unite virtually every nation around their responsibilities to take action on climate. The Paris Agreement's long-term goal is to keep the increase in global average temperature to well below 2 °C above pre-industrial levels; and to limit the increase to 1.5 °C, since this would substantially reduce the risks and effects of climate change.

European Union Emissions Trading System (EU ETS)

EU Directive 2003/87/EC established the EU ETS, which is a mandatory scheme covering the emission of carbon dioxide from specified activities. The University is included by virtue of the aggregated thermal input of the heating boilers within the University's boundary, including the North, and South Campus. The EU ETS

is a cornerstone of the EU's policy to combat climate change and its key tool for reducing greenhouse gas emissions cost-effectively. It is the world's first major carbon market and remains the biggest one. The EU ETS works on the 'cap and trade' principle. A cap is set on the total amount of certain greenhouse gases that can be emitted by installations covered by the system. The cap is reduced over time so that total emissions fall. Within the cap, companies receive or buy emission allowances which they can trade with one another as needed. After each year, The University must surrender enough allowances to cover all its emissions, otherwise heavy fines are imposed. If the University reduces its emissions, it can keep the spare allowances to cover its future needs or else sell them to another company that is short of allowances.

8.0 Data Collection

This procedure applies to the gas, electric and oil usage associated with all the UoM's portfolio. This describes the accepted method of data collection and describes the tasks to be carried out, starting with manual meter readings, through data entry into the energy monitoring software Systems Link, data checking and annual reporting of emissions and external verification. All data information shall be managed and detailed via UoM Mechanical and Energy Team.

The supply data from the gas and electric invoices will be entered into the "Systems Link" software, including the declared Calorific Values, via a CSV file from the utility company. Oil invoices will be stored manually due to the minimal procurement of oil. Copies of invoices will be stored in G Drive E&S\Defra\Returns to DEFRA\. All Records are to be stored for a minimum of 10 years which will include paper copies of all invoices and stored in monthly order in the Beyer building archive room.

This data will be further supported by the collection of all main gas and electric meter read and recorded at the end of each month. These will be recorded on Planned Maintenance Sheets (PPM), with the operatives name and time when readings were taken. The locations of the meters are identified on the PPM return sheet.

8.1 Automatic Meter Readings

In co-operation with suppliers all fiscal gas meters will be set up for automatic meter reading, as a condition of the flexible purchasing agreement. The equipment installed also provides a parallel signal for the University's 'Coherent Data Collection Server' to automatically read into the 'Systems Link software for invoice verification.

8.2 Oil Consumption Readings

The use of oil on the Main Campus is limited to various dual fuel boilers and back up generation systems. Under normal circumstances oil use will only occurs when the burners are serviced

The consumption is calculated based on the quantity signed for on the supplier's delivery note and the Annual tank dip recordings

- The volume of oil used is determined from tank dips together with data from oil supply invoices.
- The litres consumed for the installation are totalled for the reporting year.
- Volumes are converted to tonnes using conversion factors taken from the Digest of UK Energy Statistics (DUKES)

- The total tonnes of oil used is converted to tco2 using the Net Calorific Values and Emissions Factors from the latest National Inventory report sector 1A4a Commercial/Institutional, and an Oxidation Factor of 1
- The formula used is CO2 = Activity x NCV x EF x OF.

8.3 Data Entry/Data Risk

All gas and electric meter readings and consumptions are entered into Systems Link via a CSV file on a monthly basis issued by the Utility Companies.

The System Link data is used to inform the Carbon Dioxide emission, and also provides a visual indication the data is reasonable, with degree day data and past performance.
The University Coherent Data Collection system imports data directly for comparison with the Utility Company readings.

8.4 Carbon Dioxide Emission Factors

The emissions factors which shall be used to determine the Carbon Dioxide emissions associated with natural gas and mains electricity will be sourced from the Environment Agency or DEFRA, 2012 Guidelines to Defra / DECC's GHG Conversion Factors for Company Reporting, Electricity emission factors from 1990 to 2010 per kWh (electricity CONSUMED):

Total Direct GHG, and for natural gas, Annex 1 - Converting from fuel use to carbon dioxide equivalent emissions, table 1c.

8.5 Data Checking

Data will be entered into the agreed data spreadsheet direct from the data entered electronically via the CSV into Systems Link, this will provide a visual check of the data both in numerical and graphic format and include weather normalised where possible. Once the data is entered the data is checked again by viewing the target graph or report of actual use versus target reduction emissions. Variations of 5% or more from target are investigated, with particular attention being given to meter rollovers, zero readings, zero consumptions and large changes in consumption patterns. Erroneous readings should be corrected or deleted within one month.

Data is checked for anomalies by the following:

- The Energy Accountant in providing management information on present and future information gathered from Systems Link.

- The Energy Accountant assistant will enter data from the invoices and meter reads in co-operation, with the Assistant Mechanical and Energy Engineer.

- The Assistant Mechanical and Energy Engineer will monitor and validate the all information and report to the Principal Mechanical Engineer.

9.0 ENERGY SAVING MEASURES

Energy consumption and reduction targets have been set for all Government departments, which include the UoM. To further realise the University's emission reduction objectives, the EPM PM7 Code of Practice for Design Teams has been developed to include specific requirements associated with LTM projects and capital schemes. Therefore the DTG should be consulted in association with this policy.

There are large energy savings to be made through the implementation of good housekeeping practices and everybody within the University can contribute. To re-state, the core aims of this policy are to help bring about:-

- A reduction in energy consumption;
- A reduction in energy costs, therefore creating more funds for direct education requirements;
- A reduction in CO_2 outputs, which have a direct impact on global warming; and
- The achievement of mandatory requirements to reduce energy consumption by 2020/2050.
- Compliance with Legislation

9.1 Good Housekeeping

Good housekeeping practices deliver immediate benefits in both the reduction of energy and delivery of cost savings. Good housekeeping requires the commitment of all staff.

Specifically, staff co-operation is required to change working practices to limit the non-essential use of energy, and management vigilance is required to ensure these changes are embed at all levels throughout the University.

The following list identifies a range of measures that all staff can take to control and limit the use of energy:-

- During the heating season (September to May) do not allow your room to be over heated. If areas are excessively warm contact should be made with the University's Energy Team to help implement measures to reduce the temperature;
- Do not allow your room to become overly cold if within an air-conditioned space. If areas are too cold contact should be made with the University's Energy Team to help implement measures to better control the temperature;
- Limit the opening of windows (where possible) to limit the loss of heating / cooling. Heated and cooled rooms with open windows require significant additional energy inputs.
- Switch off all computers and printers that are not in use especially overnight.
- Ensure all computer screens are set to automatically power down after 5 minutes of non-use;
- Ensure all computer terminals are set to automatically power down after 30 minutes of non-use;
- Switch off all electrical equipment not in use;
- If equipment possesses a hibernation or sleep button then please use it. Up to 50% of energy savings in large public sector organisations have been achieved through adopting this particular house-keeping measure;
- Consider if all of the room lights are required to be used. Where possible open the window blinds and switch off some of the lights;

- Switch off all lighting associated with storerooms, toilet areas etc. after use;
- Ensure lights are switched off within office areas subsequent to the last person leaving;
- Switch off all localised water heaters;
- Check the office heating thermostat and turn it down to a lower setting if possible;
- Only boil kettles with the bare minimum of water required;
- In areas where solar gain is not a problem, draw back window blinds and curtains to maximize the use of available daylight;
- Appoint Energy Champions for each area;
- Fit timers to photocopiers and other office equipment which deactivate appliances out of normal working hours; and
- Replace lamps with low energy alternatives.

All opportunities and ideas identified to save energy should be acted upon. Ideas, in particular, should be forwarded to the University's Energy Team and / or nominated Energy Champion.

9.2 Heating and Cooling Recommended Room Temperatures

To ensure correct temperatures are being observed within the University, thermometers should be fixed to internal walls, away from draughts, windows and doors.

1^{o}C of overheating or over cooling wastes between 8% to 10% energy, this wastage may be compounded by the extra energy that will be used in countering the heating/cooling. Local rises in offices due to portable heaters may trick the local thermostats causing the BMS to turn-off heating in the office/floor and in some cases the entire building.

People generally feel cold or hot **due to a change in temperature**. A change in temperature may be as a result of draughts or a difference within temperature within an area.

The recommended temperature targets prescribed throughout the University shall be in accordance with those defined by the Chartered Institute of Building Service Engineer (CIBSE) guides, and or other relevant statutory requirements.

Heating Periods

Academic/office areas:

9.2.1 Heating hours are optimised at 19^{o}C from 9.00am to 5.00pm, Monday to Friday, from October (or Semester 1) to May inclusive

9.2.2 Outside stated heating times; the University provides heated study areas within the Library, during library opening times, seven days a week, from October (or Semester 1) to May inclusive.

9.2.3 Outside stated heating times, the University is unable to heat individual academic rooms or floors unless a zoned or separate heating system is available

9.2.4 Residential areas: Heating hours are optimised to be at 21^{o}C from 7.30am until midnight.

Winter Conditions (OCTOBER TO MAY)

The University recognises that, as an educational establishment the majority of our staff and students assume a sedentary position whilst working and studying. Accordingly, it shall endeavour to maintain workplace temperatures at 19°C which the majority of staff and students should be satisfied with and is in accordance with the Maximum Temperature Regulations.

Experience in running the estate reveals some variations in temperature are due to the extensive glazing and concrete framing incorporated in to some of our buildings. Staff and students should bear this in mind when evaluating their feeling of comfort if moving around the University.

How you can help during winter conditions:

9.2.5 Check room temperatures are not uncomfortably high. If temperatures are over 21°C, turn down the heating (do not use portable electric heaters)

9.2.6 Ensure internal doors are kept closed between areas of different temperatures, such as an office and corridor, as this will keep the heat in and reduce cold draughts

9.2.7 Ensure windows and external doors are closed whilst the heating is on

9.2.8 Ensure radiators are not obstructed by heat absorbing furniture or files and avoid draping clothing or other articles over radiators as they absorb the heat being given off

9.2.9 Anticipate weather conditions and determine the type of clothing you should wear each day

9.2.10 Consider keeping a spare jumper in the office for those occasional 'off days' when you may feel chilly

9.2.11 Do not sit in sedentary positions for extensive periods

9.2.12 Arrange office furniture so that you can reach the radiator valve to turn on/off and up/down as you require

9.2.13 Try to sit where you can feel the radiant heat from the radiator or sunshine

9.2.14 If your room is feeling stuffy; renew the air by fully opening a large window for 10 minutes and promptly close

Summer Conditions (MAY TO OCTOBER)

As a general rule, the University does not control space temperatures, through comfort cooling, from May to October (or Semester 1), as the environmental and financial consequences of doing so are unsupportable. (Full details can be found in the University's Air Conditioning Policy). Room occupants are therefore asked to cope with any occasionally high summertime temperatures by opening windows and using the curtains or blinds that are provided.

How you can help during summertime conditions:

9.2.15 Check that doors and windows are kept closed to prevent the loss of conditioned air

9.2.16 Switch off unnecessary equipment and lighting whenever possible to reduce unwanted heat gains

9.2.17 Enable the energy saving feature on your PC monitor to switch off after a period of inactivity (5 minutes). Remember simply moving the mouse will reactivate the monitor

9.2.18 When upgrading personal computers, consider specifying low energy, which significantly

lower heating loads

9.2.19 Avoid the use of inappropriate equipment (fridges and kettles) within academic/office areas to reduce unwanted heat gains

9.2.20 Adjust blinds to keep out direct sunlight

9.2.21 If necessary, solar film can be fitted to dramatically reduce solar heat gain

9.2.22 If your room is stuffy; replenish the air by fully opening a large window

9.2.23 Do not use a supplementary heater to compensate for an overcool room; contact the Energy Team to report the problem

Out of Hours Heating/Cooling

In general, the University does not provide out of hours (evening/weekend) heating or cooling for academic and office areas.
However, out of hours heating and cooling can be requested for activities such as weekend conferences, night classes or private functions. The University reserves the right to recharge the additional costs for this service.
In considering requests, the University will need the following information:

9.2.24 Any out of hours requests will be directed to one of the core out of hours buildings, unless special dispensation is given by the Director of Estates

9.2.25 Rooms, floors or buildings requiring heating/cooling

9.2.26 Expected occupancy hours and occupancy level (number of people)

9.2.27 The start and end date for which heating/cooling is required

9.2.28 All requests should be made to the Central Timetabling Unit at least **5 days** in advance of the expected start date.

Personal Comfort

To use the University's heating and cooling systems effectively requires treading a thin line between no complaints, a few complaints and lots of complaints. One must appreciate that the University has difficulty in satisfying everyone's comfort needs all of the time. Your cooperation and tolerance on this matter is therefore appreciated. If you do experience continued periods of uncomfortable office temperatures (below 19^{o}C or 28^{o}C and above), please report the problem to the Energy Team.

Health and Safety

All electrical items used on University premises MUST comply with the Electricity at Work Regulations and subjected to a portable appliance test (PAT) before use and at regular intervals. Unapproved items may cause numerous hazards including:

9.2.29 Electric shocks from poor insulating cables

9.2.30 Overloading of electricity circuit

9.2.31 Overheating of unwound cable

9.2.32 Trip hazards and falls

Heaters also generate heat through a heating element so offer a much increased fire hazard in offices therefore all heater shall be subject to approval from the Estates and Facilities Energy Team and only used in emergency and or abnormal situations. The general policy includes the use of oil filled radiators which includes CE marking.

Any air conditioners must also be registered with Estates so they may be monitored annually in accordance with the Refrigerant Gas Legislation.

Electrical Costs

The electricity costs of the University are constantly increasing and portable heating/cooling represent some of the most inefficient devices for these situations. Electrical heating is much more expensive than using a gas boiler system and emits almost 3 times the carbon compared to gas fired heating. A 2kW heater will emit 1kg of CO_2 every hour when running.

9.3 Heating Season Boiler Reinstatement Protocol (West Campus)

Boiler Service

During the summer shutdown period the Maintenance Services Unit (MSU) will carry out all repairs, servicing and insurance inspections to the all boilers and associated equipment i.e. pressure vessels located in the Precinct Centre (West), in addition to the single boiler located in the basement of Ellen Wilkinson (Humanities). Boiler servicing will also be carried out on each of the decentralised systems.

The intention will be to start the servicing at the earliest opportunity following acknowledgment that the current heating season has come to an end. All work should be scheduled for completion on or before the 31st August each year.

Pre-Season Plant Room Check

In preparation for the new heating season MSU will visit each plant room to ensure all pumps, inverters, control panel switches etc. are set in the auto position. Direct communication will be required with the Energy Management/Controls teams to prevent any unnecessary running of the plant. Plant areas to be considered include the following:

9.3.1 Check air compressors duty and standby are fully operational.
9.3.2 Check that Low Temperature Hot Water (LTHW) system valves are open
9.3.3 Check LTHW is full and vented (pressure tested)
9.3.4 Check operation of any pressurisation units
9.3.5 Run LTHW Constant Temperature (CT) and Variable Temperature (VT) pumps, (i.e. check remote run / stop auto change over)
9.3.6 Check operation of LTHW control valve liaising with BMS Engineer
9.3.7 LTHW control valve to be left 0% open by BMS Engineer
9.3.8 LHTW system ready to be operated remotely
9.3.9 Check condensate valves are open
9.3.10 Check high limit valves are open, electronic and pneumatic
9.3.11 Check operation of steam control valves liaising with BMS Engineer
9.3.12 Steam / heating control valves to be left 0% open by BMS Engineer
9.3.13 Check operation of steam traps
9.3.14 Main building isolation valves to be left by Plant Operator so that steam can be raised on the working boiler whilst warming through the main distribution lines.
9.3.15 In the event the main distribution lines are up to pressure, the BSM Engineer should be in a position to ease open the steam control valve for the particular building
9.3.16 Steam should be ready to use, lines pressurised, on the last working day (Friday) before the start of Fresher's Week. If steam is not required the boiler pressures will be reduced to minimise the distribution line losses.

Decentralised Plant

9.3.17 Each gas fired boiler plant to be checked and each boiler tested fired in conjunction with BMS engineer to ensure remote operation

The above items are not an exhaustive list however provide an example of the plant to be considered.

Heating Reinstatement

The instruction for MSU to reinstate the heating will come from the Principal Mechanical and Energy Engineer or a representative from the mechanical and energy team.

Whilst there is usually a target date to re instate the heating, the need to provide heat into the buildings is often short notice. The instruction to MSU should therefore be to ensure all heating systems are fully operational as quickly as is reasonably practicable. This may take a further 2 to 3 days following this instruction to charge the mains up to full pressure and make available at the point of use.

The sequence may include raising 2 boilers up to pressure and to feed steam throughout the ring main network to assist in charging the system as quickly as possible. If the preferred steam supply is via Humanities there will be a single boiler up to pressure. The use of 2 boilers (1 x Humanities and 1 x Precinct) will require the condense return to be delivered back to both boiler houses to enable this protocol of firing. During this period for the system to reach the desired pressure the heating in the decentralised buildings should be re-instated accordingly.

On conclusion of the ring main being fully charged to the correct pressure, the buildings on the central network can be switched sequentially on to full load. At this junction, MSU will ensure all the electrical emersion heaters associated with the summer DHW supplies are isolated. Subsequent to the full reinstatement of the steam main, the steam supply shall be delivered by Humanities boiler therefore shall be the primary source of steam to minimise energy usage.

In the event of adverse temperatures and capacity issues are experienced, the prime duty will then be delivered by the precinct boiler house until such times the Humanities boiler can deliver the total demand requirements. To maximise the usage of the Humanities boiler, all associated plate heat exchangers shall be sequenced to reduce peak demand therefore protecting the system pressure. In the event the steam demand is fully serviced by the precinct boilers the plate heat exchanger sequencing shall be returned into the normal sequencing position unless otherwise directed.

Energy Efficiency

Once the entire network is up and running and a base load has been achieved MSU must confirm back to the Energy Management team.

Further instruction may then be given to ensure the most efficient running of the plant. This can be a combination of instructions to MSU/Controls team to reduce the number of boilers in operation, reduce the loading on individual buildings or adjusting the sequencing and timings.

Adjustments to the controlling of the plant may be carried out by the Energy Management/Controls team directly. In all cases confirmation of the current position must be

communicated to all parties on a regular basis.

Heating Season Boiler Reinstatement Protocol (East Campus)

Boiler Service

During the summer shutdown period MSU will carry out all repairs, servicing and insurance inspections to the boilers Boiler servicing will also be carried out on each of the decentralised systems. The Stopford MTHW boilers are always available to feed the Stopford, Michel Smith and AV Hill Buildings.

The intention will be to start the servicing at the earliest opportunity following acknowledgment that the current heating season has come to an end. All work should be scheduled for completion on or before the 31st August each year.

Pre-Season Plant Room Check

In preparation for the new heating season MSU will visit each plant room to ensure all pumps, inverters, control panel switches etc. are set in the auto position. Direct communication will be required with the Energy Management/Controls team to prevent any unnecessary running of the plant.

9.3.18 Check air compressors duty and standby are working
9.3.19 Check that LTHW system valves are open.
9.3.20 Check LTHW is full and vented (pressure tested)
9.3.21 Check operation of any pressurisation units
9.3.22 Run LTHW CT and VT pumps, (i.e. check remote run / stop auto change over)
9.3.23 Check operation of LTHW control valve liaising with BMS Engineer
9.3.24 LTHW control valve to be left 0% open by BMS Engineer
9.3.25 LHTW system ready to be operated remotely.
9.3.26 Check condensate valves are open
9.3.27 Check operation of steam control valves liaising with BMS Engineer
9.3.28 Steam / heating control valves to be left 0% open by BMS Engineer
9.3.29 Check operation of steam traps
9.3.30 Main building isolation valves to be left by Plant Operator so that steam can be raised on the working boiler whilst warming through the main distribution lines.
9.3.31 In the event the main distribution lines are up to pressure, the BSM Engineer should be in a position to ease open the steam control valve for the particular building
9.3.32 Steam should be ready to use, lines pressurised, on the last working day (Friday) before the start of Fresher's Week. If steam is not required the boiler pressures will be reduced to minimise the distribution line losses.
9.3.33 Check high limit valves are open, electronic and pneumatic
9.3.34 Heating control valves to be left 0% open by BMS Engineer
9.3.35 Main building isolation valves to be left by Plant Operator so that LTHW can be raised on the working boiler

Decentralised Plant

9.3.36 Each gas fired boiler plant to be checked and each boiler tested fired in conjunction with BMS engineer to ensure remote operation

The above areas is not an exhaustive list however provide an example of the plant to be considered.

Heating Reinstatement

The instruction for MSU to reinstate the heating will come from the Principal Mechanical Engineer or a representative from the mechanical and energy team.

Whilst there is usually a target date for switching on, the need to get heat into the buildings is often short notice. The instruction to MSU should therefore be to get all heating systems operational as quickly as is reasonably practicable.

Energy Efficiency

Once the entire network is up and running and a base load has been achieved MSU must confirm back to the Energy Management/Controls team.

Further instruction may then be given to ensure the most efficient running of the plant. This can be a combination of instructions to MSU/Controls team to reduce the loading on individual buildings or adjusting the sequencing and timings.

Adjustments to the controlling of the plant may be carried out by the Energy Management/Controls team directly. In all cases confirmation of the current position must be communicated to all parties on a regular basis.

Heating Season Boiler Reinstatement Protocol (North Campus)

Boiler Service

During the summer shutdown period MSU will carry out all repairs, servicing and insurance inspections to the 2 larger boilers located in the Sackville Boiler House.
The smaller summer boiler is usually in use supplying the ring main. Boiler servicing will also be

carried out on each of the decentralised systems.

The intention will be to start the servicing at the earliest opportunity following acknowledgment that the current heating season has come to an end. All work should be scheduled for completion on or before the 31st August each year.

Pre-Season Plant Room Check

In preparation for the new heating season MSU will visit each plant room to ensure all pumps, inverters, control panel switches etc. are set in the auto position. Direct communication will be required with the Energy Management/Controls teams to prevent any unnecessary running of the plant.

9.3.37 Check air compressors duty and standby are working
9.3.38 Check that LTHW system valves are open.
9.3.39 Check LTHW is full and vented (pressure tested)

9.3.40 Check operation of any pressurisation units

9.3.41 Run LTHW CT and VT pumps, (i.e. check remote run / stop auto change over)

9.3.42 Check operation of LTHW control valve liaising with BMS Engineer

9.3.43 LTHW control valve to be left 0% open by BMS Engineer

9.3.44 LHTW system ready to be operated remotely.

9.3.45 Check condensate valves open.

9.3.46 Check high limit valves are open, electronic and pneumatic

9.3.47 Check operation of steam control valves liaising with BMS Engineer

9.3.48 Steam / heating control valves to be left 0% open by BMS Engineer

9.3.49 Check operation of steam traps

9.3.50 Main building steam isolation valves to be slowly opened to warm through the heating steam, (steam may already be in use in the plant room supplying DHW heating)

9.3.51 When warmed through the BSM Engineer can start to ease open the steam control valve for the particular building at any time.

Decentralised Plant

9.3.52 Each gas fired boiler plant to be checked and each boiler tested fired in conjunction with BMS engineer to ensure remote operation

The above areas is not an exhaustive list however provide an example of the plant to be considered.

Heating Reinstatement

The instruction for MSU to reinstate the heating will come from the Senior Mechanical Engineer or a representative from his team.

Whilst there is usually a target date for switching on, the need to get heat into the buildings is often short notice. The instruction to MSU should therefore be to get all heating systems operational as quickly as is reasonably practicable.

Energy Efficiency

Once the entire network is up and running and a base load has been achieved MSU must confirm back to the Energy Management team.

Further instruction may then be given to ensure the most efficient running of the plant. This can be a combination of instructions to MSU/Controls team to reduce the number of boilers in operation, reduce the loading on individual buildings or adjusting the sequencing and timings.

Adjustments to the controlling of the plant may be carried out by the Energy Management team directly.

In all cases confirmation of the current position must be communicated to all parties on a regular basis.

9.5 Lighting

The Head of Department shall make practical arrangements to ensure that all lighting associated with the department is not used unnecessarily. All lights shall be switched off at the end of the working day. Store cupboards, toilets and other areas of intermittent use shall have the lighting switched off during periods where not in use.

9.4 New Installations

During the design of any new building, high efficiency, low energy light fittings shall be specified and the design shall conform to the recommended light levels stated within the CIBSE Lighting Guide for Educational Buildings and any subsequent amendments. All designs shall be no more than 10% above the lower recommendations in the aforementioned guide.

9.5 Electrical Equipment

All electrical equipment, which consumes energy, shall be evaluated prior to purchase in respect of its energy consumption. In general, all equipment should be purchased with an "A" energy rated status and or appliances which sport the European Eco-label where possible, therefore, on the basis of the lowest life cost. This evaluation shall include energy costs.

9.6 Ventilation

Excessive ventilation within a building can result in large heat losses and energy wastage. Whilst UoM are committed to ensure the ventilation rates are provided in accordance with CIBSE guides and The Building Regulations Approved Document Part F "means of ventilation", the University must provide ventilation by the most energy efficient means available. Therefore the following areas shall be fully considered and implemented:

9.5.1 If feasible to use natural ventilation then implement.

9.5.2 If practicalities prevent this, is it feasible to use mechanical ventilation.

9.5.3 If practicalities prevent this, is it feasible to use mixed mode ventilation.

9.5.4 If practicalities prevent this, is it feasible to use heating and cooling (without humidity control)

9.5.5 If practicalities prevent this, is it feasible to use full air conditioning (with humidity control)

9.5.6 building air leakage standards to be implemented to minimise unwanted ventilation and avoiding solar overheating thus minimising the energy consumed in air conditioned and/or mechanically ventilated areas.

9.5.7 Conduct carbon performance rating (CPR) for offices, which sets out requirements for new and refurbished buildings where an air conditioned and/or mechanically ventilated systems is to be significantly used.

9.5.8 Provide heat recovery via run around coils, etc. on full fresh air handling units, including tempered air systems.

9.5.9 Supply and extract systems must be designed such that heat recovery can be easily facilitated. Ensure that the energy flow cannot be reversed when external conditions change e.g. provides a by-pass for summer operation.

9.5.10 Provide effective control of dampers for minimum fresh air and free cooling on recirculation systems.

9.5.11 Ensure that fresh air and exhaust dampers are closed when the building is not occupied or during periods of non-activity.

9.5.12 Ensure that only the minimum fresh air required is treated, preferably automatically by varying the minimum fresh air content during occupied periods with respect to air quality.

9.5.13 Provide effectively-controlled free cooling wherever possible.

9.5.14 Minimise duct lengths and bends and providing adequately sized ducts.

9.5.15 Ensure that the control strategy considers all full and part load conditions, and is fully described and correctly configured.

Doors and windows should be closed whenever possible. Doors and windows must be closed in all air conditioned areas.

Ideally, internal temperatures should not be regulated by opening doors and windows if heating and cooling device are fully operational.

9.6 Water Services

The University values water as a precious resource and shall measure, monitor and report on its consumption annually to staff, students and the public. Water will be considered and managed as a precious resource therefore designs of all new University facilities will include the most efficient technology. Reporting on water use will provide an important part of each of the University's portfolio and own sustainability reporting.

Whilst many people think that England has an abundance of water, there is actually less water available per person here than in many other European countries. Poor management of water costs the UoM money that could be used for direct educational resources, and the management, distribution and disposal of water produces carbon, which contributes to the overall carbon footprint of the UoM. Using water generates carbon mainly through heating for hot water but also through the energy required to pump water to get it to the appropriate outlet.

There are four main aspects of water use UoM should address:

1. Measuring, monitoring and reporting on water consumption
2. Improving efficiency of use
3. Reducing leakages
4. Avoiding the use of bottled water.

Low carbon building developments must include the best possible efficiency of water use in the design stage, well before a building is constructed. Potential water use needs to be considered as part of improved building energy use and measured effectively.

The University adopts a policy of using only bottled tap water for meetings or gatherings on their sites, rather than buying in bottled spring water. It takes energy, transport, and many litres of water to produce a half litre of bottled spring water.

Leakages always need urgent attention as they can often remain undetected for long periods wasting huge volumes of water and therefore money. Across the country over 10% of all water is lost through leakages once it has left the water supplier's infrastructure.

All employees shall take reasonable measures to conserve water. All taps shall be turned off when not in use.

Any suspected water leaks shall be reported to the University's maintenance service department for immediate attention. Any prolonged leaks should be brought to the attention of the Estates and Facilities Energy Team.

Key actions

1. Efficient use of water should be integrated into building developments at the design stage.

2. Water costs and consumption should be measured, monitored and reported annually by the University as part of their Annual Report to staff, students and the public.

3. Leaks in the University infrastructure should be identified and fixed immediately.

4. Water efficiency technology should be adopted as standard across the University campus.

5. Routine purchasing of bottled water should be avoided.

Water use has a direct association with climate-change mitigation. Significant amounts of energy are used in the supply and treatment of water. Water UK (2007) estimates place the carbon costs of water supply at around 0.271 grams of CO_2 per litre, a figure likely to be much higher if the water is heated. Therefore, a more efficient use of water in educational facilities could result in a significant reduction of their carbon footprint.

There are various considerations to help reduce water consumption with in the built environment which is too large to fully list however the following areas shall be considered and included in all designs.

WC

Install a cistern displacement device – saving approximately one Litre per flush

- Retrofit to a dual flush or lower flush system – giving the option for a half flush.(Note: Where dual-flush toilets are specified, they should have guidance or symbols instructing the user on the appropriate operation of the flushing device)
- Replace old WCs with those that give a flush volume of up to 6 L (maximum)

Urinals

Controlled flushing through foot triggers or motion sensors can reduce consumption by 120–

200 L per day.

Taps

Flow restrictors, non-concussive self closing taps and sensor taps can reduce consumption by up to 50% (Note: the choice of tap should be appropriate for the intended use)

Leak detection

Inspect all fixtures and fittings, graph monthly bills, or conduct internal monitoring through sub-metering to identify possible leaks.

Boilers

Adjust boiler blowdown amount and frequency to reduce waste and to control total dissolved solids (TDS).

- Collect and reuse steam condensate
- Control steam losses

Water Audits

Water audits are to be conducted which shall be detailed as appropriate to meet circumstances and needs. The audit shall look at the amount of water entering the site, the amount leaving the site and the amount consumed. This basic calculation shall provide an overview of costs, potential savings and areas of wastage. It will also highlight discrepancies, which will indicate leakage or other losses. The initial audit should also aim to establish a framework for ongoing monitoring of water consumption inside the building or site.

- Calculate water in: collect existing data – bills, records, audits, spatial plans
- Identify and measure main sources of water
- Identify areas of high use and leakage
- Sub-meter and monitor use
- Audit key components of use
- Calculate water out: wastewater

10.0 MONITORING AND TARGETING

The energy and water consumption for the University site shall be monitored monthly and logged on a database. The consumption shall be compared with that of the previous year and compared against the cumulative reduction requirements in accordance with the targets detailed within this policy. Any unexpected increases or decreases shall be investigated to identify the cause of the deviation. Corrective action shall then be implemented to bring consumption back to plan.

To enable accurate monitoring of individual departments, a programme of sub meter installations shall be scheduled. This will enable the automatic recording of energy consumption.

11.0 ENERGY AUDITS

Energy audits shall be carried out on all the University's building portfolio and shall incorporate all areas within the built environment. The University's Energy team shall undertake these audits with assistance from others when required. The results of these audits shall be analysed to identify the use of energy within the University's buildings and other consumption containment opportunities. Audits will be targeted and will be more frequent in areas of high energy consumption.

In order to carry out the audit, there will be a requirement to monitor the energy used both before and after any infrastructure modifications in order to assess the effectiveness of those modifications.

12.0 TRAINING AND PUBLICITY CAMPAIGNS

The Estates and Facilities Directorate shall be responsible for raising awareness across the University in respect of energy efficiency. In support of this, each faculty and department shall nominate an "Energy Champion" to aid in the delivery of the good housekeeping measures identified previously.

The University Energy Team will liaise with the "Energy Champion" to:-

- Visit departments to advise on energy efficiency and energy conservation methods;
- Encourage staff/students to visit energy saving schemes of particular interest and encourage staff to put forward suggestions for further improvement;
- Make building users at all levels aware of the need to save energy;
- Erect appropriate energy advice notices (e.g. adjacent to light switches and windows); and
- Make frequent spot checks to eliminate energy wastage.