Estates & Facilities Directorate

Energy Policy 2020 – 2025

Originator(s): Paul Eccleshare

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Approver(s): Umesh Desai (Director, Estates & Facilities)

Contributor(s): Steven Hatherley, Michael Jelley, Karl Letten, David Oldham (Estates and Facilities), Pete Norman (ITMS) and David Rose (Health and Safety)

Document Control

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Introduction

De Montfort University (DMU) operates and maintains a range of buildings in the heart of Leicester City, providing an educational, working and living space for around 26,000 students and approximately 2,200 members of staff. Meeting their needs with regard to heating, hot water, lighting, computing, cooling, cooking, etc. requires a large amount of energy. The benefits of using this energy is obvious to the users, but many of the dis-benefits are hidden and removed. The obvious dis-benefit directly affecting DMU is the financial cost of energy use. In 2017 / 18 DMU spent over £2.5 million on electricity and gas combined. These costs increase each year as a consequence of the increasing global demand for energy. Every pound spent providing heat, light, etc. is a pound less spent on teaching resources for our students. DMU places great importance on providing a high quality teaching environment, as evidenced in the award of a GOLD standard in the national Teaching for Excellence Framework in 2017, and it is therefore imperative that the university minimises the impact of energy cost on its business to enable it to maximise investment in the student experience.

The use of energy also carries with it social, reputational and environmental costs by contributing to climate change, resource depletion, poor air quality, etc. DMU's consumption of gas and electricity between April 2016 and March 2017 resulted in nearly 9,000 tonnes of carbon dioxide gas being emitted into the environment. The university is acutely aware of these impacts and takes its responsibility to minimise them very seriously which is reflected in this policy.
Whilst the 'function' of energy management sits within the Estates and Facilities Directorate, the responsibility for reducing energy waste is a matter for all staff and students to address in every part of DMU.

Every member of staff and every student has a responsibility to consider the implications of their energy use on their environment and take opportunities to reduce consumption.

Policy Aims

The purpose of this policy is to articulate DMU's commitment to the responsible use of energy in order to control cost risks, reduce carbon emissions and minimise the potential negative social impacts of energy consumption whilst at the same time provide healthy spaces within which people can work and live. To achieve this DMU will aim to:

- Support the United Nations (UN) Sustainable Development Goals (SDGs) that relate to energy use, primarily SDGs 7 (Affordable and Clean Energy) and 13 (Climate Action), but also SDGs 9 (Industry, Innovation and Infrastructure), 11 (Sustainable Cities and Communities) and 12 (Responsible Consumption and Production).

- Comply fully with, and where possible exceed, the standards set out in all relevant legislation including the EU Energy Performance of Buildings Directive and Part L of the Building Regulations.
- Procure energy using a risk managed approach to provide value for money for DMU.
- Heat, cool and ventilate its buildings efficiently and in line with the principals set out in this policy.
- Invest more widely in energy saving / carbon reduction projects, including those set out in the adopted Carbon Management Plan.
- Actively monitor energy use and set consumption targets for each building.
- Promote energy / carbon / climate change awareness to staff and students to foster sustainable practices.

Section 1 - Strategic Framework

Internationally - The United Nations Sustainable Development Goals

The United Nations (UN) Sustainable Development Goals (SDGs) were launched in 2015 and are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity. Altogether there are 17 SDGs, each of which has a number of targets that need to be achieved for the Goal to have been met. Implementation of the goals, described as 'localisation', is the responsibility of member countries and their institutions. To support each goal they must reflect its targets in their own legislation, strategies and policies. The two goals most pertinent to DMU's energy use are SDGs 7 and 13.

SDG7 – Affordable and Clean Energy

The five targets developed for this SDG aim to:

- Ensure that there is universal access to affordable, reliable and modern energy services.
- Increase substantially the share of renewable energy in the global energy mix.
- Double the rate of improvement in energy efficiency.
- Facilitate access to clean energy research and technology and promote investment in energy infrastructure and clean energy technology.
- Supply modern and sustainable energy services for all developing countries.

What is DMU doing?

DMU already contributes to this SDG by procuring most of its electricity from renewable sources, generating some of its own electricity from photovoltaic (Solar) arrays and generating renewable heat using ground and air source heat pumps and biomass heating. DMU invests annually in energy efficiency and its Institute of Energy and Sustainable Development (IESD) provides world class teaching and research on sustainable energy technologies in both developed and developing countries.

SDG13 – Climate Action

The five targets developed for this SDG focus on developing resilience and capacity to manage the impacts of climate change on communities, particularly those in developing countries. This includes education and awareness raising and a commitment to ensure that by 2020 £100 billion is being mobilised annually to assist with carbon mitigation in developing countries.

What is DMU doing? DMU is already contributing towards this goal. Through the Environment Policy DMU has made a commitment to embed Education for Sustainable Development (ESD) into teaching, learning and research. In addition, the university's Institute for Energy and Sustainable Development

(IESD) carries out world leading research into local renewable energy smart grids for rural communities in developing countries, helping them to meet their energy needs without the need to go through the "fossil fuel" stage of their energy evolution.

Nationally

The Climate Change Act 2008 (the Act) established a legally binding target on the UK to reduce its carbon emissions by 80%, based on a 1990 baseline, by 2050. The Act introduced a system of five-year carbon budgets as shown in table 1 below.

Table 1 – UK Carbon Budgets 2008 - 2032

Budget	Carbon budget level	Reduction below 1990 levels
1st carbon budget (2008 to 2012)	3,018 MtCO2e	25%
2nd carbon budget (2013 to 2017)	2,782 MtCO2e	31%
3rd carbon budget (2018 to 2022)	2,544 MtCO2e	37% by 2020
4th carbon budget (2023 to 2027)	1,950 MtCO2e	51% by 2025
5th carbon budget (2028 to 2032)	1,725 MtCO2e	57% by 2030

By 2016 UK emissions were 42% below the 1990 baseline, meaning that the UK is on track to meet the third carbon budget. To meet the target for 2050 the UK must continue to reduce its emissions by at least three percent per year. In 2016 the UK Government played a leading role in securing the Paris Agreement and, along with 174 other countries, committed to take action to maintain global mean temperatures below two degrees Celsius above pre-industrial levels by the end of the century and to pursue efforts to limit the temperature increase even further to 1.5 degree Celsius. In addition to this, the UK Government stated its commitment to the fifth carbon budget in July 2016. Both of these actions demonstrate a continuing desire for the UK to be a leader in carbon reduction. It is therefore reasonable that the Government will require the higher education sector to play a part in achieving national emissions reduction targets.

Locally (Leicester)

Leicester City Council has set itself the ambitious target to achieve a 50% reduction in the city's carbon by 2025 from a 1990 baseline. The council refreshed its Sustainability Action Plan in 2017, which restates this target and emphasises the importance of a partnership approach working with Leicester's businesses and organisations to achieve this aim. Government figures show that by 2015 Leicester City had achieved a 41% reduction in CO_2 emissions from its 1990 baseline. As DMU's CO_2 emission make up almost 1.5%[1]of the city's 'emissions from industry' it has a key part to play in helping the council to achieve its objectives and, in addition, maximise the opportunity to share and develop expertise in the field of city scale carbon reduction practices.

[1] 8,965 tCO2 DMU / 625,500 tCO2 emissions from city industry.

Within DMU – Internal Strategy

Estates and Facilities Strategic Plan (2018 to 2023)

As part of the Estates and Facilities Directorate's Strategic Plan the following aims and deliverables have been adopted in relation to energy use:

Aim	Deliverable
Facilitate and more sustainable campus and reduce energy consumption.	• Promote sustainable energy alternatives through capital building projects in accordance with the adopted Carbon Management Plan and Energy Policy. • Consider major energy schemes such as district heating and water source heat pumps.
Promote renewables.	• Deliver the Carbon Management Plan. • Purchase renewable sources of energy.

Environmental Policy

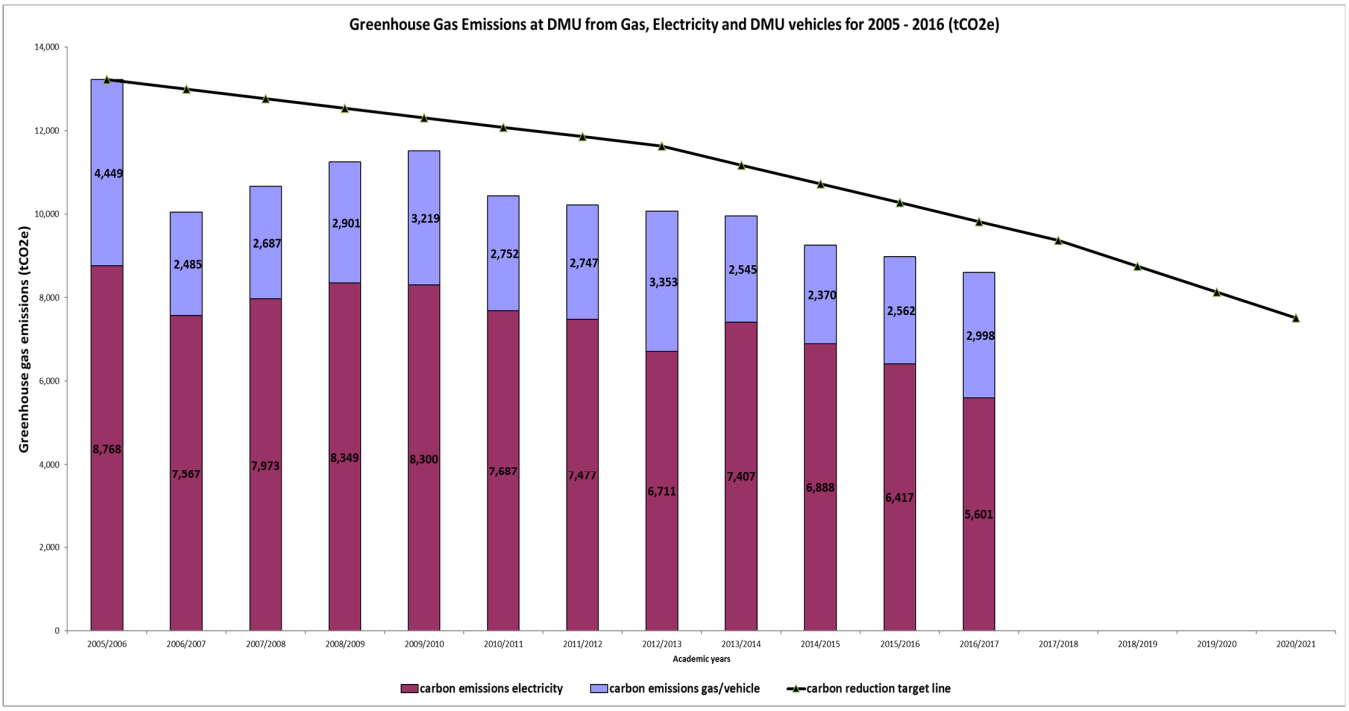
DMU's Environmental Policy commits it to taking a strategic approach to reducing its emissions of greenhouse gases and to reducing its use of natural resources.

Carbon Management Plan

DMU's adopted Carbon Management Plan (CMP) sets out its strategic direction on carbon management between 2011 and 2020. Over this time DMU has set itself the ambitious target of a 43 percent reduction in its emissions of CO_2 by 2020 based on a 2005 baseline. The CMP contains detailed information on the kind of projects that will enable the university to meet this objective, including project costs, etc. The type of projects promoted include low energy lighting retro-fits into existing buildings, upgrading of controls / sensors on the Building Energy Management System (BEMS), PC switch off software, etc. The use of renewable energy systems is also cited as essential to meet the plan's targets.

To date DMU has been very successful in meeting the annual targets set out in the CMP, even against a backdrop of increasing student numbers, longer operational hours, etc. However, over the next two years DMU will have to work harder to ensure that it meets its 2020 objectives whilst developing a new CMP that will set targets and take DMU beyond 2020 and closer to carbon neutrality.

Figure 1 – Carbon emissions from energy use 2005 – 2016 (tCO_2e)



Section 2 - Campus Energy Trends

Energy consumption across the whole campus continues to increase each year as a result of new campus developments, increasing student numbers and longer opening hours in many buildings. Figure 2 below shows that absolute electricity use has increased by 5.44 per cent over the last five years. Given that electricity unit prices have also increased every year over the same period, the cost of electricity to DMU in 2017-18 was nearly 25 per cent (£422k) higher than in 2013 – 14.

Figure 2 – Electricity cost and consumption 2013 – 2018

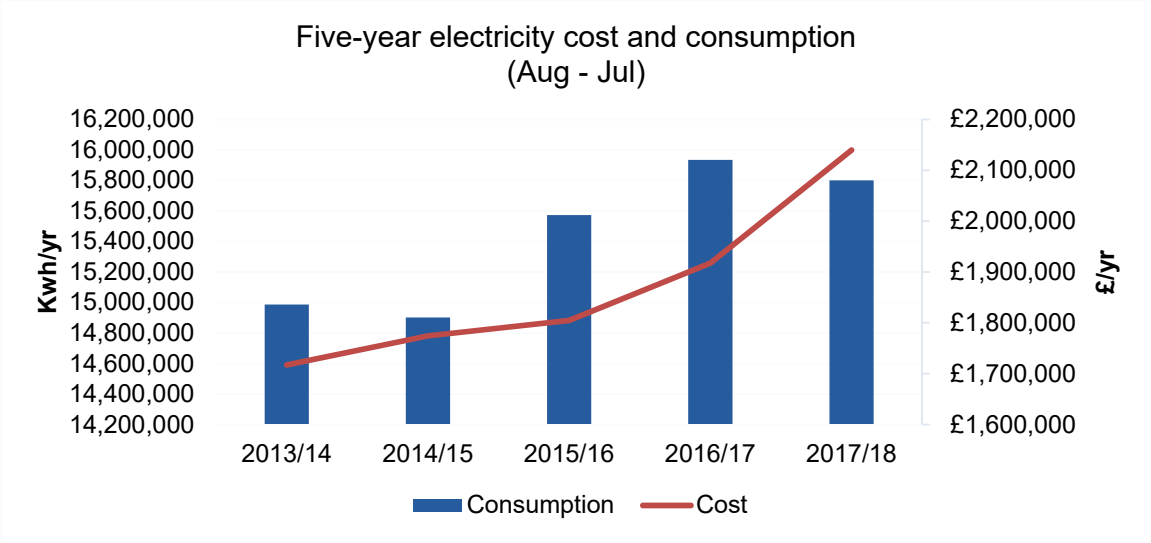
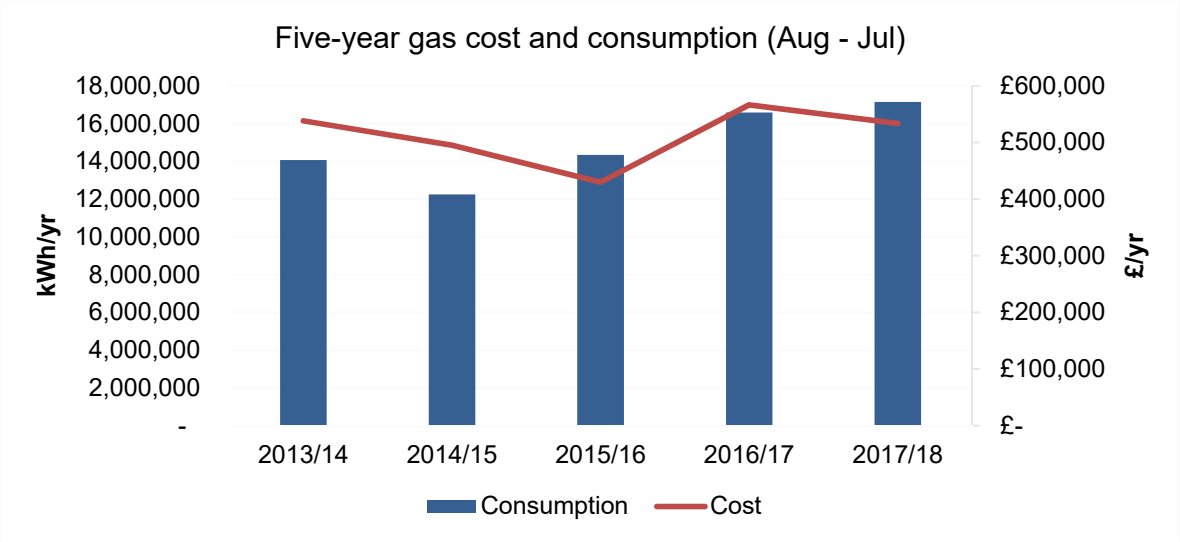


Figure 3 shows the annual gas consumption over the last five-years, which has been adjusted to remove the effect of weather on the data. It can be seen that consumption has increased by 21% during this period. DMU has benefitted from lower wholesale gas prices during this time, insulating it temporarily from the financial effect of the increasing consumption.

Figure 3 – Gas cost and consumption 2013 – 18 – consumption corrected for the effect of weather each year.



Time of Day Tariffs

The cost of electricity to DMU is increasingly inflated by "non-energy costs". These are costs associated with maintaining and developing the national grid rather than the electricity itself which have increased markedly in recent years as the UK Government tries to balance meeting increasing demand and keeping energy affordable in a global energy marketplace, whilst also meeting carbon reduction targets. The cost of this must be passed onto consumers. Currently around 60% of DMU's electricity costs are made of these non-energy costs, as shown in figure 4. These costs will increase to form 70% of electricity costs by 2020, see figure 5 below.

Consuming electricity between 4 pm and 7pm on a weekday costs approximately 50% more than consuming energy between 8am and 9am on the same day. DMU will look to become much more flexible in its approach to accessing the electricity supply grid to minimise the impact of high market price signals on its operating costs. Strategies such as self-generation (renewables, CHP, etc.), battery storage and the use of emerging initiatives, for example Demand Side Management (DSM), may provide routes to mitigate rising non-energy costs.

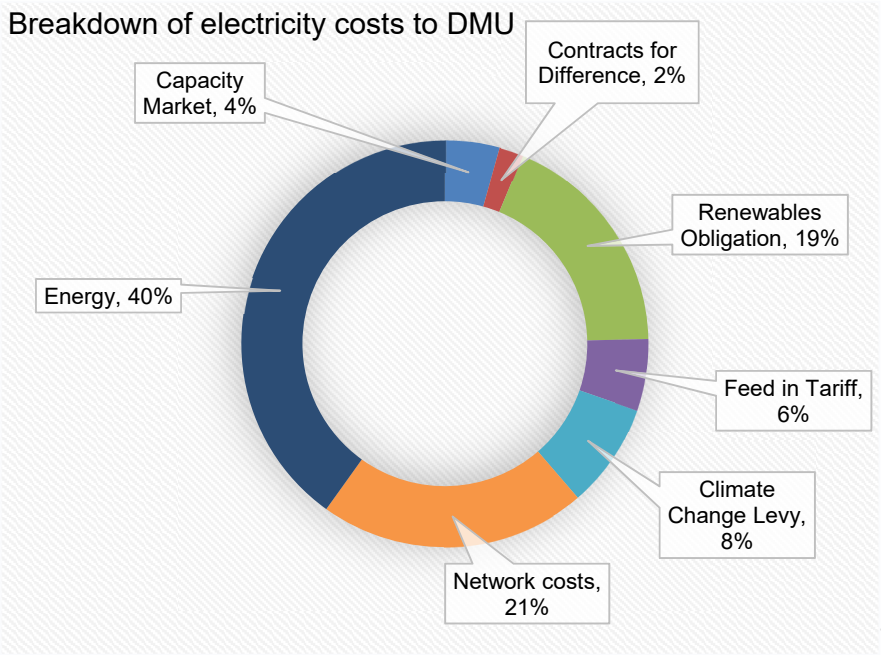


Figure 4 – components of DMU electricity costs showing 60% of non-energy costs

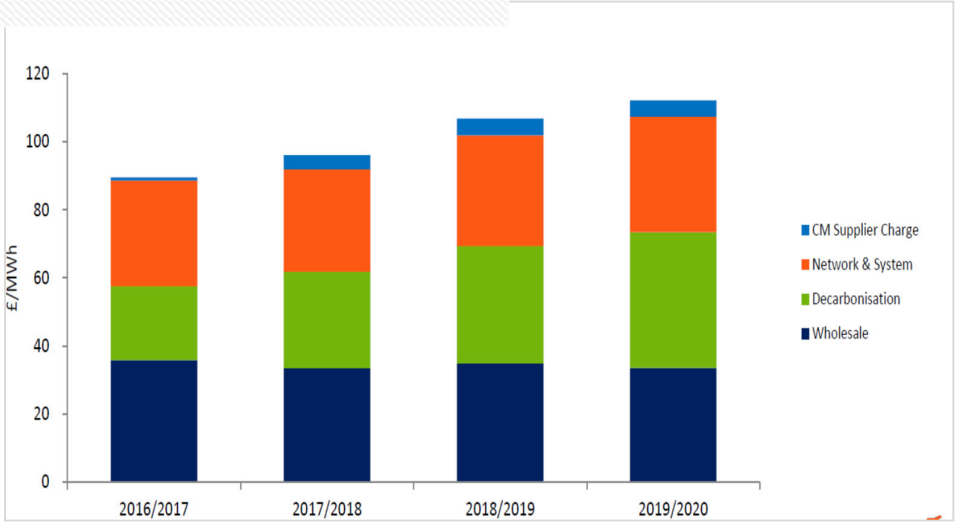


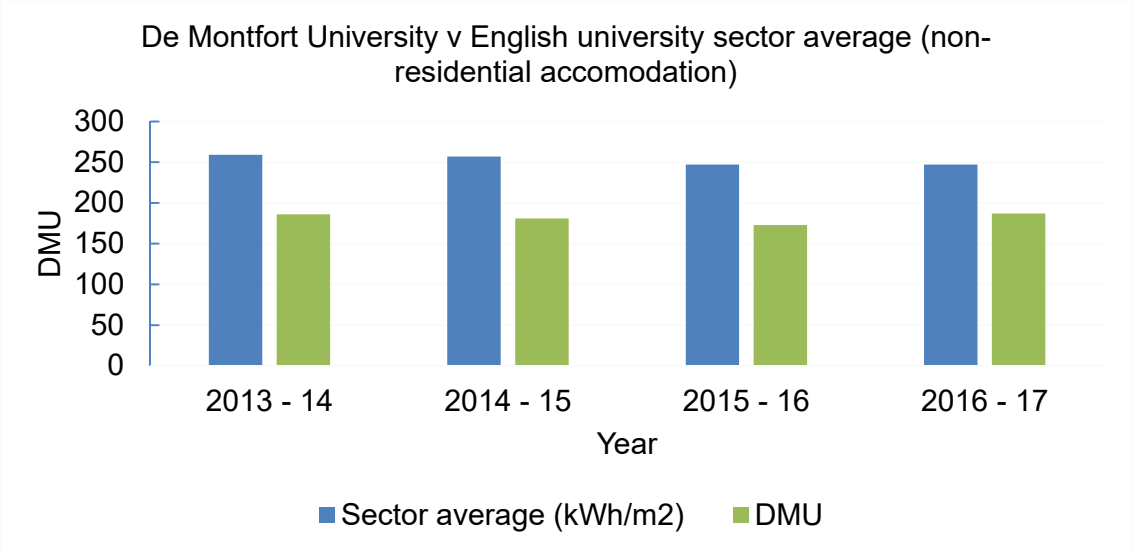
Figure 5 – Graph showing the predicted future contribution of electricity cost elements to the wholesale cost of electricity

Benchmarking - DMU against other Higher Education providers.

HESA statistics

Figure 6 below shows the results of a benchmarking exercise using data from the Higher Education Statistics Agency Ltd (HESA), which annually receives mandatory data from all HE providers in England. Figure 6 below compares DMU's energy use intensity for its non-residential buildings against other English universities. It can be seen that DMU has consistently maintained its operation using approximately 30% less energy than the sector average. When compared to the '1992' universities (former polytechnics) DMU consumes approximately 11% less energy than the group average. This benchmarking exercise will be repeated regularly to monitor DMU's performance.

Figure 6 – HESA data showing DMU energy performance (kWh/m2) against the sector average



Green League

DMU has consistently performed well in the University Green League, published by People and Planet who are a student-led movement that aims to empower young people with the skills, confidence and knowledge needed to make positive change with regard to poverty, human rights and protection of the environment. Over the last six years, DMU has been awarded "First Class" status as a result of People and Planet's assessment of DMU's policies and performance across a range of sustainability criteria, including Energy Source, Carbon Management and Carbon Performance.

In the section specifically related to energy sources DMU scored poorly (24.2%). The criteria for this section is the level of contribution that Combined Heat and Power (CHP) generators make to the overall total of energy use (0% as the university has no CHP units), the amount of electricity for its own uses that DMU generates (score = 17.5% due to the 7 photovoltaic arrays DMU has on its campus) and buying some or all of its electricity from renewable sources. In 2017 DMU scored 6.7% for this last element but this will increase in the future as from April 2017 DMU contracted with its electricity supplier to only purchase electricity from certified renewable sources.

AUDE – Sustainability Leadership Scorecard (SLS) / Green Scorecard

The SLS is a partnership between the Environmental Association for Universities and Colleges (EAUC), the Association of University Directors of Estates (AUDE) and Arup. It is a tool into which data from a range of sources can be input to develop a picture of an institutions sustainability performance. Participation in the SLS is voluntary and the university has taken part in the first year of the scheme and is committed to take part annually in future. The SLS online tool enables the university to undertake a gap analysis of its own policies against the SLS criteria and to compare its performance against other participants.

Benchmarking conclusion

Overall, DMU performs considerably better than the English university sector average in terms of energy use and carbon management. However DMU strives to be a leader in this field and consequently there is room for improvement in the areas of implementing carbon reduction initiatives and self-generation.

Section 3 - Energy Management

Heating Strategy

Building Energy Management System (BEMS) Programming.

It is the responsibility of the Head of Maintenance to ensure that DMU's BEMS system is programmed with all holiday, term-time and non-term time dates and occupancy hours at the start of each academic year to ensure that the buildings mechanical services, such as heating and ventilation, are not working when they are not needed.

Heating Season

- **The Core Heating period:** will operate from 1st October to 30th April each year and during this period the heating systems in all buildings will be enabled to provide heat to the appropriate temperature set point. The BEMS system will provide an optimised start and stop time for each building based on its operating times, internal space and external temperatures and the optimisation regime set out below. A heating hold-off set point based on Outside Air Temperature of 16°C will be applied to a majority of the campus buildings.
- **Heating off period:** outside of the Core Heating Period the normal condition for all space heating systems shall be off. The Estates and Facilities Directorate will monitor internal building temperatures and weather forecasts throughout this period and respond to any requirement for heating as needed.

Heating start and stop time optimisation

Each building's heating start and stop time shall be determined by the optimisation routines of the BEMS. The default standard will be:

- The buildings "occupancy" time shall be set to its official opening time, established from the Security Team's records.
- The start optimisation period shall be a maximum of three-hours with a target temperature of 20°C by the occupancy time.
- The end optimisation period shall be a maximum of two-hours with a target temperature of 20°C by the end of the occupancy time.

Variations to the above default setting may be needed to provide a comfortable working environment in some buildings. These will be agreed with the Energy Manager and Head of Maintenance and recorded on the BEMS system.

Heating Set Points

The Chartered Institute of Building Service Engineers (CIBSE) recommend a temperature set point range for different areas and activity types that takes into account the typical experience of appropriately dressed occupants, as shown in table 2 below. DMU will adopt and aim to maintain these during the building's occupancy hours.

Table 2 – Heating temperature set points by area type (CIBSE Guide A – table 1.5).

Area type	Temperature set point range (°C)
Classrooms Lecture Theatres Laboratories Corridors Galleries Toilets	19 -21
Offices	21 -23
Workshops	16 -19
Libraries	22 - 23
Sports Halls	13 - 16
Kitchens	15 - 19

Out of Hours Heating

"Out of Hours" is defined as any period outside the normal building occupancy hours or programmed teaching times. Information relating to building opening hours is available via DMU Connect.

DMU does not provide heating outside of these times. However, in exceptional circumstances Out of Hours heating requests can be made through the Estates Helpdesk. All applications will require the approval of the Director of Estates and Facilities before the heating time can be actioned. Requests for out of hours heating should be made at least **two-working days** before the heating is required.

In instances where the programmed teaching time falls outside of the published building opening hours the **faculty must submit an out for hours request form to the Estates Helpdesk at least two-working days before the heating is required.**
Outside of normal building opening hours, a fabric protection temperature set point will be employed with an internal temperature of 10° Centigrade as part of the DMU's frost protection strategy.

Christmas, bank and concessionary holidays
No heating will be provided to any building other than the main library and Estates Services Buildings (24/7 Security base), over periods when the university is closed, unless otherwise agreed in advance by the Director of Estates and Facilities.

Special events
For special events organised by DMU Events, such as open days, etc. space heating to normal levels will be provided as required provided that at least **two-working days**' notice is given to the Estates and Facilities Directorate via the Estates Helpdesk by the event organiser.

Management of Portable Heaters

The use of portable electric heaters is prohibited within DMU's buildings, unless exceptional circumstances prevail. DMU needs to manage this form of heating because:

- Electric heating incurs four times the cost and over twice the carbon intensity of gas heating, increasing the cost overhead of DMU and reducing its carbon efficiency.
- Portable electric heating constitutes an increased fire risk to the buildings and occupants.
- It is difficult to ensure that such equipment is PAT tested and safe to use. This increases the risk of failure and fire.
- Portable heating can cause localised high temperatures which can confuse the Building Energy Management System and may result in the main heating system to the area and other parts of the building being switched off.
- The building's electrical system is not designed for heavy load equipment such as portable heaters, and this can cause overloads to occur leading to failure of circuits or even entire electrical systems. This can result in the loss of worktime for several hours whilst the circuits are reset and tested.

Where building heating systems are not capable of providing the required level of heating as set out in Heating Set points table 2 above, the Estates Maintenance Team may issue "approved" portable electric heaters on a temporary basis until the building's heating system is repaired. For Health and Safety reasons only portable heaters issued by Estates Maintenance are allowed to be used within DMU's buildings. A log of all distributed heaters will be maintained by Estates Maintenance and reviewed monthly. Once the faulty heating issue has been resolved the portable heater(s) will be withdrawn from the area and the heater log updated.

Where portable heaters are provided by Estates Maintenance it will be the responsibility of an assigned person within the receiving area to ensure that the heaters are turned off when not necessary and always overnight and at weekends, public holidays, etc. A replacement charge will be payable by the faculty or department for heaters that are not returned to Estates when they are no longer needed.

Heating System Basic Design Principles

- Low carbon / ultra-low NOx systems must always be considered as part of any new / replacement installations.
- Heating systems will be zoned and controlled by the BEMS. New-build and newly acquired buildings will be zoned and controlled by BEMS.
- New-build and refurbishment projects will install local point of use domestic hot water systems where feasible. Heating and hot water systems will be separate.
- Heating and cooling pipework, valves and flanges will be insulated to the current standards as a minimum.

Cooling Strategy

The cooling of spaces using air-conditioning equipment introduces large additional costs with regard to energy, maintenance and carbon emissions, in addition to challenges of locating large plant equipment, and therefore must be limited to only those areas where there are frequent occurrences of high internal temperatures and no other cooling option would be possible. The use of portable air conditioning equipment is not permitted.

The Estates and Facilities Directorate will adopt a proactive approach within student occupied areas that may be suffering from unacceptable levels of overheating and will make an assessment of the situation. The initial criteria that must be met for an assessment of potential cooling need to be undertaken are:

- The current situation does not meet legislative or regulatory requirements; or
- natural ventilation is insufficient to remove heat gains; or
- Students and their associated equipment consistently raise the ambient temperature to above 28°C for a period of time that is deemed to be unacceptable.

Requests for cooling linked to research processes will be considered on their own merits by the Director of Estates and Facilities.

If, after assessment, cooling is required DMU will adopt the principles set out in CIBSE guidance TM36, “Switch-off, absorb, blow-away and [finally] cool”.

- **Switch-off**: assess internal heat gains and solar gains and seek to reduce as much as possible. Identify any heat generating equipment and re-locate this if possible. Assess lighting heat loads, would LEDs / lighting controls help reduce these? If high solar gains are present consideration needs to be given to installing blinds and / or fitting solar films, etc.
- **Absorb**: the opportunity to absorb the remaining heat loads passively should be explored, through exposing thermal mass, introducing phase change materials, introducing night cooling of the space, etc.
- **Blow away:** natural ventilation, personal (fans) or mechanical ventilation should be considered to mitigate the remaining heat loads. For anything other than personal fans an engineered approach is required.
- **Cool:** where mechanical cooling is unavoidable the system must be designed to minimise energy use and controlled by the DMU’s BEMS system to generate a cooling set point that is a minimum of 25°C.

All mechanical ventilation and AC equipment must be controlled by the University’s BEMS system, through which full view of temperatures, CO2, motor status, baffle position, etc. must be clear.

Comfort cooling will not be considered within staff offices and administration areas unless exceptional circumstances can be demonstrated. A review of these circumstances will be undertaken by the Estates and Facilities directorate and if any resulting action is proposed this must be agreed by the Director / Deputy Director of Estates and Facilities.

Server Room Cooling

There are many small server rooms around the campus that have mechanical cooling systems associated with their location. It had been agreed between ITMS and Estates that the set point for these units is to be 24°C. Wherever possible server rooms are to be located in spaces with outside walls to enable free-cooling to be easily achieved, which may be backed up by mechanical cooling when the external air temperature is in excess of 24°C.

Mechanical Ventilation Strategy

Mechanical ventilation will only be provided to areas where sufficient ventilation cannot be achieved naturally (e.g. by opening windows, etc.) All mechanical ventilation shall be controlled by the BEMS and its operational status graphically displayed to ensure that it is only operated when needed and it is operating efficiently. Time schedules, occupancy sensors, CO2 sensors and temperature sensors shall be used to control the mechanical ventilation to ensure efficient operation, and the outputs of these will be displayed on the BEMS. Where heating or cooling batteries are required, these should be connected to the parent building's systems wherever possible. All fan motors should have inverters fitted, controlled by the BEMS system. Heat recovery must be an integral part of all new mechanical ventilation systems except in circumstances of process extract units where it would be undesirable to do so.

Lighting Standards

The use of daylight is to be maximised but balanced against the need for thermal comfort (both summertime overheating and winter thermal cooling) and be controllable to avoid glare, etc. The following guides should be consulted:

- CIBSE Guide 5: Lighting for Education for all teaching spaces.
- CIBSE Guide 7: Lighting for offices.
- CIBSE Guide 9: Lighting for Communal Residential Buildings should be consulted for residential developments.

Artificial lighting in classrooms, lecture theatres and offices will be controlled, as a minimum, by absence detection. Where cost effective and practicable daylight dimming must also be installed. Great care must be taken in the placement and programming of occupancy sensors in laboratories, workshops or other areas where a sudden reduction in lighting levels could cause potential harm to the areas occupants.

The minimum luminaire efficacy acceptable to DMU in regard to all newly installed luminaires will be 90 lumens per circuit-watt (Lm/W) and all new lighting shall be of **LED** type to reduce maintenance costs.

New lighting schemes should provide the illumination levels set out in table 3 below:

Table 3 – recommended design lux levels for different areas based on CIBSE recommendations.

Area to be lit	E_m (lx)	Comments
Standard classrooms and offices	300	Lighting should be dimmable
Auditorium / lecture halls	500	Scene setting must be used.
Demonstration areas (including within other rooms)	500	750 lx within lecture areas
Art rooms, laboratories, workshops, etc.	500	Consultation with users must be undertaken to establish colour temperature and rendering needs.
Reception areas	200	
Corridors and circulation areas	100	
Stairs	150	
Library bookshelves	200	200 lux on the vertical face of the books
Library reading area	500	
Sports halls, gyms and swimming pools	300	Check if special requirements relate to the activity in the space
Canteens	200	
Kitchens	500	
Conference / meeting rooms	500	Lighting should be dimmable.

Exceptions to the aforementioned standards can be made in some circumstances where there is a justified reason for deviating from them. Prior permission of the Director of Estates and Facilities is required.

New Build and Refurbishment Projects

DMU understands that it is vital to incorporate low energy / low carbon features into the design of new buildings and major refurbishments as early as possible in the design process. To ensure that this is achieved the Project / Maintenance Officer responsible for the works is required to complete an Energy & Sustainability Notification form (see appendix A) and submit this to the Energy Manager at the start of each project (RIBA stage 0).

DMU's Energy Manager must be informed by the Project / Maintenance Officer of all projects that will have an impact on building services (heating, lighting and ventilation). The Energy Manager may need to commission an Energy Consultant to assess the most energy efficiency / low carbon opportunity. This could include whole building thermal modelling which must go beyond the basic requirements required for Part-L of the Building Regulations to account for both regulated and non-regulated loads, including specialist functions and equipment. All significant energy loads within the building must be accounted for. This is to reduce future cost, maintenance and compliance risks associated with poor infrastructure decisions.

In order to mitigate against the warming effects of future climate change, designs must produce a workable strategy for maintaining comfort conditions for 40-years from the date of commissioning, or for the expected

lifetime of the building whichever is shorter, based on the UKCP18 climate change probability scenarios.[2] Simple, robust passive strategies are to be employed wherever possible. Overly complex strategies and systems should be avoided.

The design team must consider the integration of low or zero carbon (LZC) energy technologies as part of the building's M&E strategy. The financial lifecycle benefits of these technologies must be stated considering the energy and carbon cost savings that DMU could benefit from. Where opportunities for LZCs exist but fall outside of the scope of the project the Energy Manager should be notified of these opportunities for their future consideration via projects delivered through the energy saving budget, capital bids, etc. All new M&E systems, or changes to existing M&E systems, must be approved by the Senior Electrical and Mechanical Engineer, The Energy Manager and the Head of Maintenance so that the most efficient option in terms of operational and maintenance costs can be assessed.

Building Certification

DMU aspires to using robust, cost effective and auditable environmental assessment procedures for its building projects. DMU also aspires to create sustainable buildings and, during any new build, refurbishment, modification, infrastructure renewal or fit-out project, will consider industry recognised sustainability standards such as BREEAM and SKA HE. The relevant standard(s) to be applied will be defined by the Director of Estates and Facilities on a case by case basis. Alternative assessment methodologies / standards such as PassivHaus, LEED or the WELL Building standard may be adopted by Estates for a project subject to the prior agreement of the Director of Estates and Facilities.

The appropriate method and rating needs to be agreed at RIBA Stage 0 and must be clearly stated as part of the tender documentation for the project.

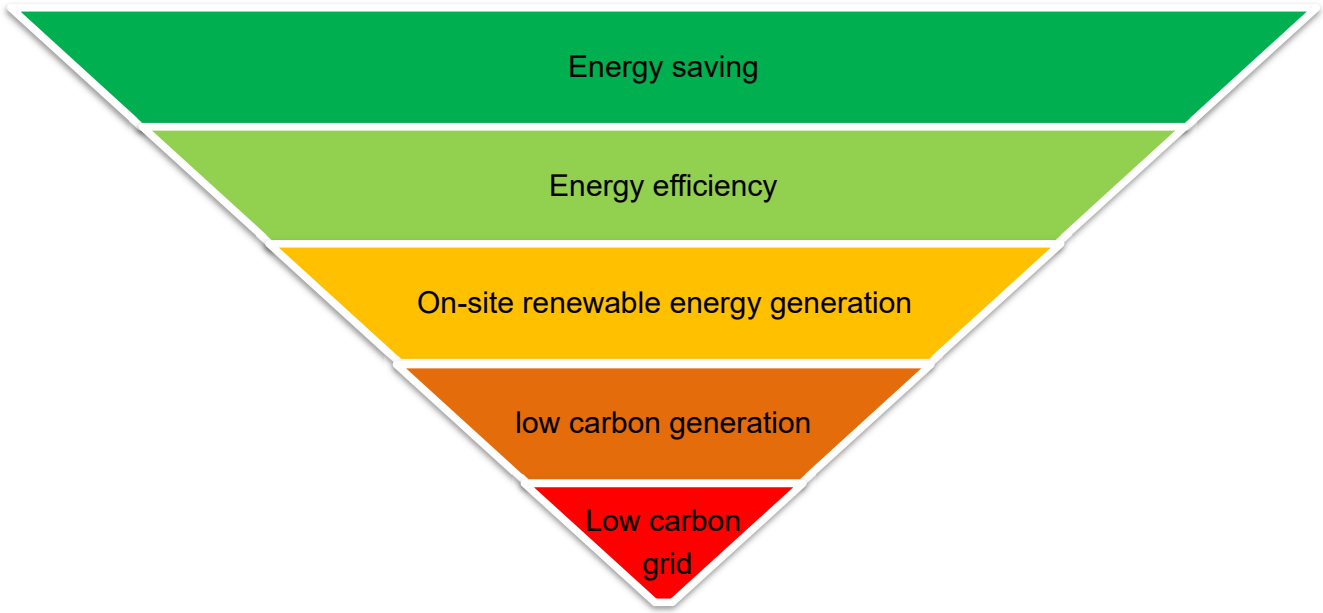
If appropriate, it is the Project / Maintenance Officer's responsibility to ensure that by RIBA stage 1 that an appropriate assessor has been appointed to ensure that the sustainability requirements are embedded into the project brief from the start.

[2] Data sets of temperature scenarios are available from the Met Office Hadley Centre to allow simulation of the buildings performance over the next forty years.

The Energy Hierarchy

The energy hierarchy set out in figure 7 below sets out how DMU will seek to manage its energy needs. This design philosophy should be considered as part of all capital projects associated with building systems or fabric undertaken by the university. This approach will guide DMU to making the best choices to reduce energy costs, mitigate supply risks and reduce carbon emissions.

Figure 7 – The Energy Hierarchy



Energy Saving

DMU will seek to minimise energy wastage across its campus by ensuring things that are not needed are not used, i.e. lights, ventilation and heating are turned off when not being used.

Energy Efficiency

DMU will work to ensure that the energy that it consumes is used as efficiently as possible. A classic example of this is LED lighting, which will provide the same function as fluorescent lighting but for approximately 40% less energy. It will also explore opportunities to 'time-shift' energy loads and to store electrical energy so as to reduce exposure to "peak-rate" imported electricity as much as possible.

On-site Renewable Energy

DMU will look to exploit opportunities to maximise on-site renewable energy generation where the business case supports it. This will help the university to avoid the non-energy costs associated with imported electricity use as well as deliver carbon savings.

On-site Low Carbon Generation

Technologies such as Combined Heat and Power systems will be assessed to see if they can help DMU avoid the increasing non-energy costs whilst keeping carbon emissions low. This technology could also be used to increase the resilience of DMU to imported electricity outages.

Low Carbon Grid

After reducing waste, increasing efficiency and generating as much energy as it can DMU's remaining energy needs will be sourced from certified low carbon sources wherever this is not cost prohibitive.

Hand-over

It is the Estates Project Officer's responsibility to ensure that, when a development project has been completed, the energy systems are formally handed over to the Head of Maintenance and the Energy Manager. This is essential to ensure that these personnel are able to operate these systems in-line with their design philosophy. These personnel will require a formal introduction (tour) to the installed systems, and explanation of their working strategy and a demonstration of their operation. O&M manuals for the project and associated certification will be provided as part of this exercise. This hand over should be undertaken by contractors qualified to explain the systems and answer questions about their installation and operation.

Building Metering and AMR System

DMU utilises an Automatic Meter Reading (AMR) system to monitor energy and water use and reduce waste. DMU's AMR system must be connected to all new fiscal and sub-meters installed as part of any project. All new fiscal and sub-metering must be able to integrate with the existing AMR system, which **requires a pulse-output**.

Metering should provide sufficient 'evidence' to pinpoint avoidable wastage without requiring expensive and time consuming detection work. CIBSE TM39 should be consulted as a guide to meeting DMU metering requirements.

Minimum requirements are:

- Metering at a whole building level should be through the fiscal supply meter. Where no fiscal meter is provided, it must be on the main supply to the building. A single meter point for electricity, gas and water must be provided and connected to the AMR.
- All supplies to potential tenant areas must be sub-metered with meters that meet the MID Class 1 requirements to allow the tenants to be recharged for their utility use.
- All generators of heat or electricity, including renewable energy systems, must be sub-metered in a manner that complies with any financial incentive schemes in operation (e.g. FiTs, RHI, etc.) and that allows their performance to be monitored.
- All main energy consumers (heating, lighting, AHUs, external lighting, etc.) to cover at least 90% of final energy use must be metered.
- Specialist areas such as server rooms, server room cooling, furnaces, heat treatment or forming processes, sport floodlighting, etc. must be metered.

The university will share data from the AMR system with staff of the university to use for legitimate educational / research purposes.

AM&T Software

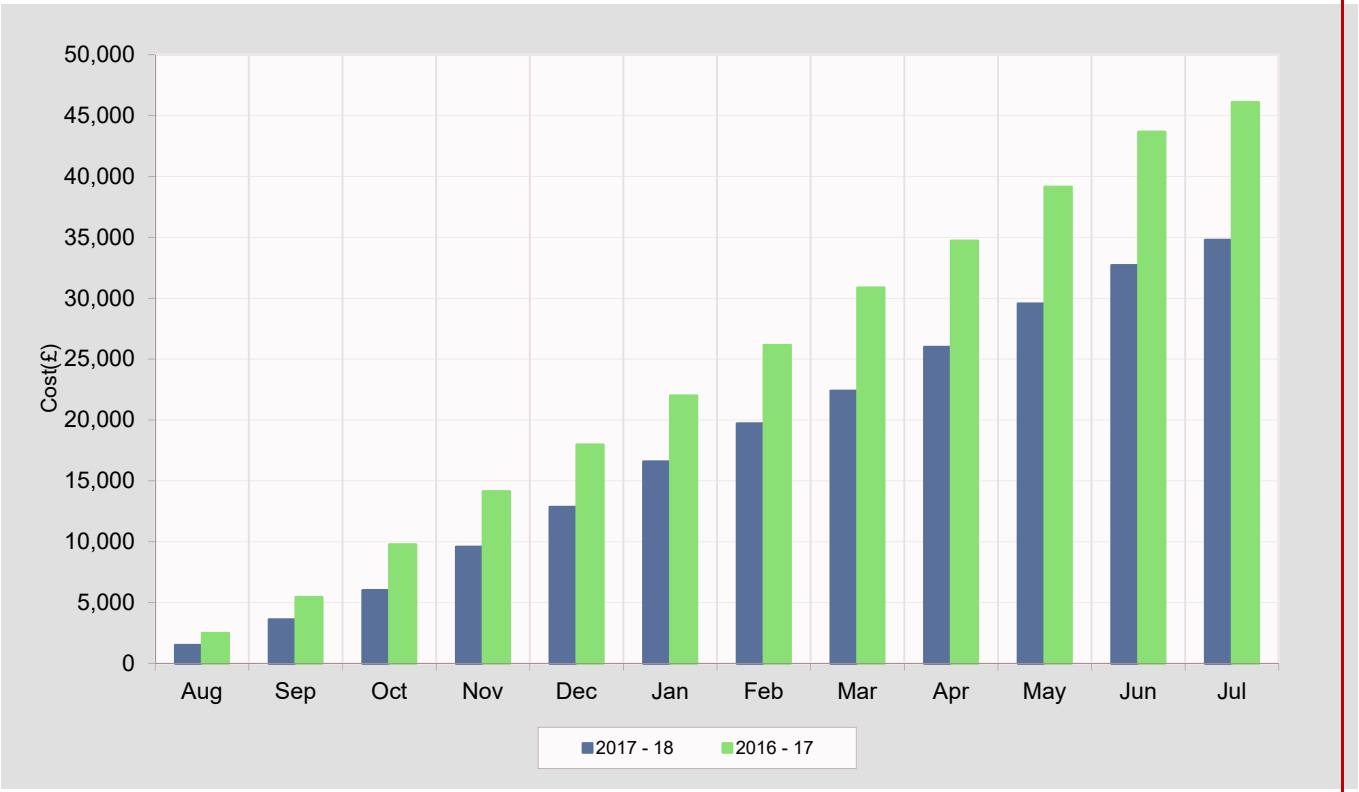
With more than 500 fiscal and sub meters on campus, the quantity of data can quickly become overwhelming. For this reason a monitoring and targeting software package must be maintained to provide up to date information on consumption, exception reporting and logging of data. The Energy Team will select, maintain and operate the AM&T software, which will be funded from the energy budgets.

Investment in Energy Saving

Every year DMU invests in improving the efficiency with which it uses energy through a specific "Energy Saving" budget, which is used to procure technologies such LED lighting, improve building controls and deploy techniques to raise awareness of energy use on the campus. Figure 8 below shows the recent impact of investing in LED lighting and working with local staff to get better control of cooling systems in the

Leicester Media School - Bede Island building. These interventions, deployed in July 2017, have resulted in a financial saving of nearly 25% (£11,300) over one year. In purely energy cost terms this represents a six-year payback on investment. However cost savings have also been made in reduced maintenance costs and reduced carbon emission tax costs. Additional benefits were also achieved by providing a much better working environment for staff and students as the new lighting provided a highly visible uplift to the building's interior. This reflects a typical investment and outcome from energy saving initiatives funded from the budget.

Figure 8 – Accumulative energy cost difference per month Aug 2016 – Jul 2018 for Leicester Media School – Bede Island.



DMU will make an annual revenue allocation of £250,000 per annum to enable specific investment into energy efficiency projects to be made by the Energy Manager. This funding can be allocated to energy saving projects that form part of Carbon Management Plan or energy saving works that are incorporated into other capital projects.

In addition, DMU will explore and, where appropriate, utilise external funding opportunities where this will allow an increased level of activity to reduce energy with no or low additional financial, operational or reputational risk to the university. It is the Energy Manager's responsibility to promote such funding opportunities to senior managers within the Estates Directorate for consideration.

The Energy team will focus on high energy consuming buildings / areas / processes to achieve locally agreed and achievable energy reduction targets in a manner that empowers the users to take some responsibility for their energy use and develop working practices and interventions that improve energy efficiency.

The Energy team will work with the Sustainability team to support initiatives related to raising awareness of energy and climate change issues. In addition the Energy Team will provide support to academics teaching around energy and climate change themes by providing building tours, proving building data to support research, etc. The Energy team will also provide support to raise awareness of the UN's SDGs that relate to energy and climate change.

DMU will continue to explore opportunities and initiatives to reduce energy consumption, carbon emissions and energy costs going forward, with larger scale capital works being subject to CCPG approval.

Legislative Compliance

DMU will comply with all relevant energy legislation, for example the requirement of the Energy Performance of Buildings Directive, the Carbon Reduction Commitment, Part L of the Building Regulations, etc. These legal standards will be the minimum standards that the university will work to, and it will seek to surpass these standards where there is a positive business case for doing so.

Electric Vehicle (EV) Charging

All newly installed EV charging points must be electrically sub-metered and the sub-metering must be connected to the university's AMR system. For each new EV charging installation the university must implement the most cost and carbon efficient approach, which may include the use of renewable energy, energy storage, vehicle to grid systems, etc.

Section 4 - Responsibility for the Energy Policy

Role of the Executive Board / Operational Leadership Group

- Approval of the Energy Policy.
- Include energy cost / consumption and carbon management considerations in strategic decisions made by the DMU.
- Ensure that sufficient resources are available to implement this Policy.

All building users shall be responsible for:

- Maintaining a healthy internal environment within the building by operating windows, blinds, etc. as appropriate.
- Ensuring that radiators are not blocked with furniture, clothing etc.
- Turning off lights and other equipment when they are not required.
- Reporting any faults and areas where there is over or under heating to the Estates Helpdesk (x6366/ estateshelpdesk@dmu.ac.uk).
- Wearing suitable clothing for the prevailing weather conditions.
- Operating the use of authorised portable / temporary heating and cooling equipment to ensure that it is operated efficiently and not operated when unnecessary.

Responsibility of the Estates & Facilities Directorate.

- Extending or shortening the heating season as determined by weather conditions. Decisions shall lie with the Energy Manager and the Director of Estates and Facilities.
- Adjusting excessive or insufficient space heating temperatures. Responsibility will rest with the Head of Maintenance and the Energy Manager.
- Creating and reviewing the Energy Policy. This will be undertaken by the Energy Manager and the Head of Estates Management / Associate Director of Estates, supported by Estates Heads of Service.
- Investigating complaints will lie with the Head of Maintenance, supported by the Energy Manager, who shall respond and provide feedback within five working days.
- Monitoring and controlling temperatures using engineered solutions via the Building Management Systems (BEMS).
- Maintaining the energy and water Automatic Monitoring & Targeting (aM&T) system to monitor usage and expenditure against budgets, targets and benchmarks. This will be carried out by the Energy Manager and the databases will be used to provide such reports as are required by Faculties, Departments and Directorates to manage energy and water usage and to comply with legislation.

Section 5 - Energy Procurement

The Energy Manager and the Procurement Category Manager for Estates will annually review the performance of the DMU's procurement approach to energy and, if necessary, make recommendations to the Head of Procurement and the Director of Estates and Facilities as to any changes that should be considered. DMU will work to ensure that the energy supply contracts provide value for money and reduce the financial risks of exposure to a volatile wholesale energy market. DMU will also procure energy in line with the emerging Flexible Framework procurement strategy.

Sustainable Energy

DMU will work to secure the commitment from our suppliers to provide the university with electricity generated from renewable sources. This will help support the development of more renewable electricity generation facilities. To ensure the electricity is from genuine sources of renewable electricity it will be backed by a certified accreditation scheme such as the Renewable Energy Guarantees of Origin (REGOs) scheme administered by Ofgem. Any additional cost for renewable energy must be affordable.

Appendix 1 – Energy and sustainability notification of works form.

Name of project	
Project Manager / Maintenance officer	
Phone Number (including prefix)	
Project name	
Affected building and areas	
Description of works (please provide as much detail about energy systems / sustainability impacts of the project as possible) Consider:- • Energy efficiency and reducing carbon emissions. • Enhance occupant comfort, experience and productivity. • Designing for long life, low environmental impact, low maintenance, and flexibility • Reducing construction waste • End of life recycling. • Reducing water consumption. • Increasing biodiversity. • Promoting and supporting sustainable travel modes.	
Start date	
Duration of works (in weeks)	
Project Budget	

Version number:

Created by:

Date created: