Heating and Cooling Policy – Non-Residential Buildings.

Heating, cooling and thermal comfort management within University non-residential buildings

Effective from 1/11/2018

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1. Purpose

The Policy seeks to inform staff and students, and provide a consistent message, on the University's aims for the provision of heating and cooling across the academic estate, and how this impacts upon University environmental and energy performance.

2. What is covered by the policy?

This policy primarily outlines the minimum requirements set by the University in terms of internal room temperatures, the times at which these apply, and brief descriptions around how the University's Building Management System (BMS) delivers heating and cooling in practice.

Information on decision-making regarding the heating season is covered, with respect to what exactly is considered when assessing the case for reverting to winter heating mode following the summer holiday season.

The concept of 'Thermal Comfort' itself is also explained; providing guidance on the contributing factors to an individual's perception of comfort, how an individual's activities can impact on others with particular emphasis placed on portable electric heaters, and the exceptional circumstances where these would be approved.

The communication routes by which out-of-hours heating extension requests, air conditioning unit requests, and fault reports / complaints can be made are highlighted within the accompanying policy procedure.

3. Who is does the policy apply to?

Staff within University non-residential buildings should have a general understanding of the policy.

4. Roles and responsibilities

- **Registrar -** Policy signatory and holder.
- **ESS Head of Maintenance -** responsible for; the management of the University ESS defect reporting system; installation of new Heating, Ventilation and Air Conditioning (HVAC) systems; the maintenance of HVAC systems.
- **ESS Head of Sustainability –** responsible for; the management of University energy expenditure and budgeting; meeting University environmental legislation and energy targets; BMS contract management.
- **ESS Energy Manager -** responsible for; the management of University energy expenditure and budgeting; meeting University energy targets; BMS contract management; BMS operation; responding to HVAC-related issues.

5. Policy

The University aims to provide a comfortable working environment for staff and students whilst complying with Health and Safety requirements, and minimising carbon dioxide (CO_2) emissions and energy expenditure arising from the operation of heating and cooling systems.

During the heating season, the University aims to maintain internal temperatures within the range of 19 - 21°C during core teaching hours. The start and end dates of the heating season are dependent on a number of factors as outlined in the policy procedure.

Staff can submit out-of-hours heating requests with at least five working days' notice of an event. These will be reviewed, and on approval, actioned by the Energy Manager.

All new Air Conditioning (AC) system installation requests are also subject to an assessment and approval process, installations relating to comfort cooling are not normally accepted.

6. Related regulations, statutes and policies

List and if possible provide links to any relevant regulations or policies

Environmental Sustainability Policy: https://www.ncl.ac.uk/media/wwwnclacuk/sustainablecampus/files/enviromental-sustainability-policy-newcastle-university.pdf

Energy Policy: https://www.ncl.ac.uk/media/wwwnclacuk/sustainablecampus/files/energy-policy-newcastle-university.pdf

The Workplace (Health, Safety and Welfare) Regulations 1992 regulations: http://www.hse.gov.uk/pUbns/priced/l24.pdf

7. Procedure to implement the policy

See end of the document.

8. Monitoring and reporting on compliance

What will be monitored?	Frequency	Method	Who by	Reported to
BMS - room temperatures	*Half Hourly*	*BMS Trend*	*ESS Sustainability*	*ESS BMS Management Meetings*

9. Failure to comply

Staff and student dissatisfaction / complaints.

Increased energy consumption and costs.

Increased environmental impacts – CO_2 emissions from energy use contribute to global warming.

Failure to comply with University Environmental Sustainability Policy and associated targets.

Document control information		
Does this replace another policy? Yes / ~~No~~ If yes please state. **This policy replaces the Newcastle University Heating Policy for Academic Buildings (version 2_October 2013)**		
Approval		
Approved by:		**Date:**
Effective from:		
Review due:		
Responsibilities		
Executive sponsor:		
Policy owner: (This maybe an officer or Committee)	**John Hogan, Registrar**	
Policy author:	**Head of Sustainability, ESS.**	
Person(s) responsible for compliance:	**Head of Sustainability, ESS.**	
Consultation		
Version	**Body consulted**	**Date**
3		
Equality Impact Assessment: **Does the policy have the potential to impact on people in a different way because of their protected characteristics? Yes/ ~~No/ Unsure~~** If yes or unsure please consult the Diversity Team in HR for guidance. Yes, an individual's perception of thermal comfort may be affected by medical conditions / health issues. Reasonable adjustment will be made where this can be demonstrated.		
Initial assessment by: **Matt Dunlop**		**Date:** **25/09/18**
Key changes made as a result of Equality Impact Assessment		
Document location		
https://www.ncl.ac.uk/sustainable-campus/themes/energy/		

Heating and Cooling Policy (Non-Residential Buildings) - Procedure

Heating Season

During the heating season; the University aims to maintain internal temperatures in buildings within the range of 19 to 21°C. Depending on weather conditions, the heating season usually runs from the end September and ends in late May. Lower temperatures may apply in areas where work is non-sedentary in nature or where a process or activity in the space requires a lower temperature. The Estate Support Service (ESS) shall determine start and end dates for the heating season and publicise these via the ESS website. Heating will not be provided on bank holidays or closure days unless there is an identified operational requirement, and the ESS Helpdesk are made aware (see 'Out of Hours Heating' sub section below).

Outside of the heating season, if internal space temperatures drop significantly due to abnormal weather conditions, the ESS will actively monitor conditions and consider if heating systems should be switched on. The decision making process will balance factors including internal temperatures, availability of heating systems (which are maintained during the summer and are not always available), the weather forecast and cost/environmental impacts. In mechanically ventilated spaces, heating via airflow may be sufficient to meet the heating demand i.e. radiators may not be required.

Heating Times

The University aims to maintain minimum internal temperatures in buildings within the range of 19 to 21°C during core teaching hours - Monday-Thursday 08:30–18:30, Friday 08:30–17:30.

Most Heating, Ventilation and Air Conditioning (HVAC) systems in each building are controlled by a Building Management System (BMS). The BMS detects both internal and external temperatures and, based on previous performance, calculates the appropriate time to switch systems (boilers, pumps etc.) on in order to achieve the temperature set point by the start of the occupancy period. The BMS also performs a range of other functions including; frost protection of buildings/plant, and switching off radiator systems when external temperatures exceed 16°C.

Out of Hours Heating

Exceptions to the above time schedules may apply to facilities such as some research labs, libraries and PC clusters that operate outside these times. The level to which the heating is 'zoned' within academic buildings varies widely - facilities in regular out-of-hours use must be configured as a separate heating zone i.e. one which does not require heating of surrounding unoccupied spaces. In order to ensure energy efficiency, requests for out-of-hours heating may be refused where adequate zoning is not in place. Out-of-hours use will be restricted to a limited number of buildings wherever possible.

Before requesting regular out-of-hours use of a space within an academic building, Units should contact the Energy Manager to establish its suitability. Where additional zoning is required to enable such use, a Space and Project Request (SPR, see https://newcastle.sharepoint.com/hub/estates/Pages/Space-&-Project-Requests-.aspx) shall be submitted and the necessary work carried out prior to commencing the out-of-hours use of the space.

Requests for out-of-hours heating should be submitted, *with at least 5 working days' notice*, to ess-helpdesk@ncl.ac.uk, to allow the BMS to be programmed. Please mark these requests as "High Priority".

Thermal Comfort

Human perception of a comfortable temperature is subjective. It is based on a combination of environmental and individual factors, including: air temperature; the temperature of surrounding materials (walls, windows, furniture etc.); humidity; individual metabolism and clothing. An individual's responses to these factors also can also vary widely depending on physical fitness, health issues, fluid intake and personal acclimatisation.

Therefore, it is recognised that not everyone will achieve 'thermal comfort' at 19-21°C and it is expected that building users will moderate their own comfort by dressing appropriately for their preference, regardless of the season. Further information about thermal comfort may be found in the HSE website (http://www.hse.gov.uk/temperature/thermal/). Where local heating controls e.g. thermostatic radiator valves are provided, it is expected that building users will manage these in such a way that internal temperatures reach 19-21°C. Windows and doors should be closed during the heating season to limit heat loss.

Health and Safety Legislation

The Workplace (Health Safety and Welfare) Regulations 1992 Approved Code of Practice states that temperature in workrooms should provide reasonable comfort and specifies that this should normally be a minimum of 16°C, or 13°C for more active, manual work. The regulations do not set a maximum temperature.

Energy Conservation

Operation of University heating systems for non-residential buildings results in the annual emission of approximately 6,700 tonnes of CO_2. Increasing the temperature set point by 1°C can cause CO_2 emissions and heating costs to rise by as much as 8%. The University has set a CO_2 reduction target of 43% by 2020, and reducing unnecessary heating will help us achieve this goal.

Electric Heaters

Supplementary electric heaters are inefficient, environmentally damaging and can pose a significant fire risk. Electric heaters use significant amounts of energy, resulting in additional CO_2 emissions, and shall only be used in exceptional circumstances (e.g. heating faults) under the direction of ESS.

Electric heaters can also 'trick' the BMS into thinking the building temperature is sufficient and switch off the heating to the relevant heating zone (potentially large areas of the building, please see this illustrated below in Fig. 1):

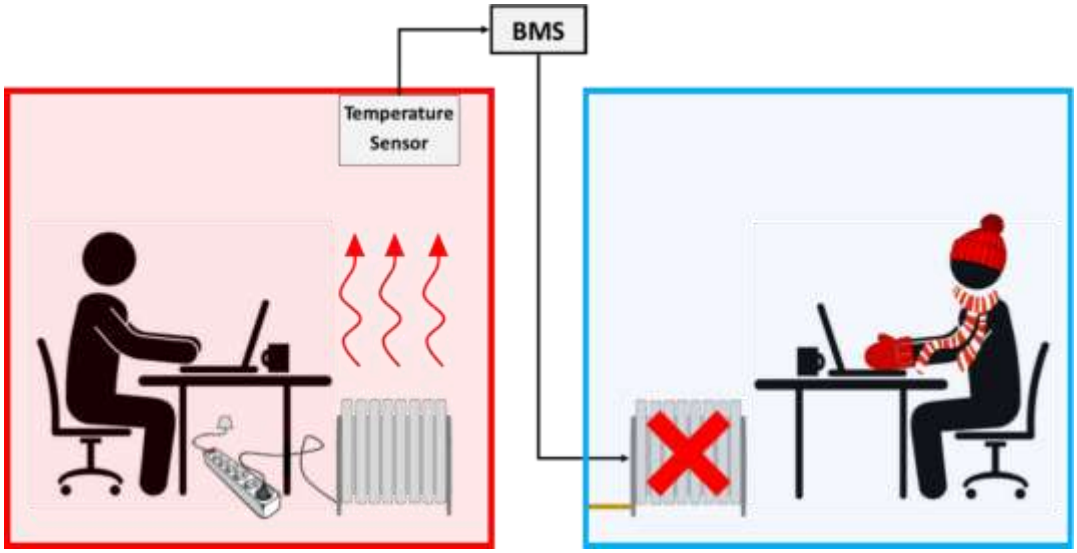

Figure 1: Impact of supplementary electric heaters on the BMS, and wider building heating system

In exceptional circumstances, outside the heating season, where internal temperatures are recorded below 19°C for a significant period, temporary heating may be appropriate as a last resort. Any temporary electric heaters must be Portable Appliance Tested, and for safety reasons only thermostatically controlled oil-filled radiators shall be used.

Units must liaise with ESS to ensure that any temporary heating can be operated safely i.e. preventing overloading of local electrical circuits. For safety reasons electric heaters must not be left switched on in unoccupied rooms, and must not, under any circumstances, be left on out of hours.

Cooling

In Newcastle, the number of days during the year where cooling is required is significantly lower than the number of days requiring heating. Air conditioning (AC) is not provided to most spaces and the use of AC for comfort cooling is not generally permitted – alternative, lower energy means of cooling spaces should be used e.g. natural or mechanical ventilation.

Where AC is available, it will normally be set to come on when the temperature exceeds 25°C. In rooms with AC it is important to keep all windows and doors closed to ensure the feedback loop is not disrupted, and the cooling continues to function as designed.

In most areas, AC is not available and instead, where possible, (fresh air) ventilation rates will be increased when internal temperatures rise. Where ventilation is the only method of cooling, opening windows and doors is acceptable. There is no upper legislative limit to temperatures, so please dress appropriately for the weather, and take measures as appropriate (drink sufficient water etc.).

Projects Requiring Cooling

The refrigerants used in AC systems can have a global warming potential thousands of times greater than that of CO_2. The University aims to limit the use of air conditioning due to its high costs and environmental impact. The installation of new AC systems is therefore subject to an assessment and approval process. It is recognised that internal temperatures must be tightly in controlled for some applications e.g. temperature sensitive research equipment, but requests for comfort cooling will not normally be accepted. ESS will work with units to assess alternative approaches to achieving thermal comfort for occupants. The assessment form is available at https://www.ncl.ac.uk/sustainable-campus/themes/energy.