Sustainable Construction& Refurbishment Policy and Guidelines

Northumbria University
NEWCASTLE

Sustainable Construction & Refurbishment Policy and Guidelines

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Introduction

Northumbria University is committed to realising significant enhancements to the environmental sustainability of our campus and operations, including further improvements in carbon emissions and reduction in waste and the use of plastics.

Our Estate has a major part to play in allowing us to meet our sustainability goals. We need to ensure that all construction and refurbishment projects work towards reducing our negative impacts, and where possible enhance the environment.

To help achieve these improvements, there are six Key Themes which include targets and requirements for all projects. These Key Themes need to be embedded at all stages of any refurbishment or new construction, from project inception through to completion.

The Key Themes are:

- Towards Zero Carbon Buildings – Minimising all regulated and unregulated energy and water use and embedded carbon.
- Smart Buildings – Buildings should adapt to the changing occupancy patterns automatically to minimise energy use.
- Living Labs – Provision of facilities and data monitoring to enable our buildings and estate to be a tool for teaching, partnerships and research.
- Greening the Campus – Enhance Biodiversity and Wellbeing through appropriate green spaces and green walls and improved habitats.
- Reducing waste – Through appropriate design, minimise waste from construction and also from end of life disposal. Maximise use of recycled products.
- Climate Change Adaptation – Designs should take into account future predicted temperatures and mitigate against the effects of increased extreme weather events.

It is recognised that on occasion the Targets within these Guidelines may not be possible due to factors outside of the University's control, such as location and transport links.

Where these Targets are not possible, or measures required are impracticable, minimum standards in energy, water and materials must be agreed at the start of the project. These must follow the principles set out in these guidelines, and throughout the project it must be demonstrated that every effort is being made to get as close to the Targets as possible.

Key Themes

Towards Zero Carbon Buildings

Targets

New Buildings and Extensions

- A rated DEC after one year – Covering all emissions including regulated and unregulated.
    - Total energy use should be calculated at design stage using TM54 methodology to estimate DEC rating.
    - Seasonal Commissioning with monitoring of energy use throughout the first twelve month period to ensure the target is met.
- BREEAM Excellent rating as a minimum.
- Embodied carbon and lifecycle assessments to be included at the design stage.
- HVAC plant and lighting should respond to the changing occupancy levels of the spaces, with appropriate zoning to minimise energy use during low occupancy.
- Building Heating Systems to be designed for low temperature heat.
- Heat sources specified to avoid the use of fossil fuels for heating and hot water generation.

Refurbishments

- Lighting to be upgraded to LED, with occupancy and daylight controls.
- Where technically feasible, building fabric elements should be brought up to current Part L requirements.
- HVAC should be able to respond to occupancy levels to minimise energy use, through occupancy sensors and CO_2 sensors.
- Where there are changes to heating systems, designed for low temperature heat.
- Projects to be assessed under SKA ratings:
    - £100,000 to £500,000 minimum Silver SKA rating
    - Over £500,000 Gold SKA rating
- Major refurbishments (over 50% of building) to achieve minimum of B rated DEC after one year.
- The technical feasibility of replacing fossil fuel heating systems with low carbon alternatives to be considered within the scope of major refurbishment projects involving works to heating and cooling systems.

Smart Buildings

Smart Buildings adapt to changing conditions and occupancy, automatically controlling the building operations and systems to deliver optimum comfort during occupancy, whilst ensuring the lowest costs and environmental impact.

The University buildings' occupancy varies greatly day to day and month to month. Buildings should therefore adapt effectively to these changes to optimise building performance, with the intention to have zero energy use in unoccupied spaces.

Targets

- HVAC equipment to have suitable occupancy controls and respond to occupancy.
    - Specialist HVAC, such as labs, should utilise real time sensing of contaminants in the room environment and exhaust to enable, where possible, reduced fan speeds.

- HVAC equipment to be linked to the University BMS system.
- Lighting to be zoned appropriately, with occupancy and, where there is daylight, daylight sensors.
- Electricity and water to be monitored, managed and minimised.

Living Labs

Living Labs use our buildings and Campus as a real life environment for teaching and research. Offering the opportunity to achieve greater engagement with the study material, and a more well-rounded educational experience, whilst also fostering collaboration and research.

Targets

At the earliest stage of a project consideration needs to be given to how it can contribute to Living Labs:

- Stakeholder engagement at the design concept to determine what can be added to enhance or develop research and teaching opportunities.
- Ensure, through a SMART Buildings approach, that data from the building is available via the University's existing monitoring software.

Greening the Campus

Green spaces are proven to help with staff and student wellbeing, as well as benefitting local wildlife. Green spaces also help absorb air pollutants, leading to a healthier Campus.

Targets

- All projects to enhance and increase green spaces and biodiversity.
    - Plant species identified within the Biodiversity Action Plan should be used.
    - Habitat enhancements, such as bird boxes or insect hotels, should be added.
- Minimum 10% increase in Biodiversity Net Gain, as required by Biodiversity Net Gain Regulations 2024.

Reducing waste

The UK construction industry is the largest consumer of natural resources, and in 2012 was responsible for sending 11.6 million tonnes of waste to landfill.

Targets

- All projects: zero waste to landfill of non-hazardous waste.
- Identify opportunities to Design out Waste:
    - follow guidance in WRAP: Designing out Waste: A design team guide for buildings.
- Identify all elements that can be reused, recovered or recycled on site.
- For refurbishments at least 25% of waste should be re-used on or off site, or recycled through a closed loop scheme (e.g. manufacturer's take back scheme).
- Preference should be given to suppliers who operate a take back scheme.
- For new builds, suitable compound space required for storage of bins.

Climate Change Adaptation

Predicted climate models for Newcastle upon Tyne[1] suggest that:

[1] Climate change impacts: evidence base for Newcastle upon Tyne (Newcastle City Council, 2016)

- Summer mean temperatures could increase from the current average of 13.5°C to between 14.6°C and 18.2°C by 2050.
- Summer rainfall will reduce, but winter rainfall could increase.
- Extreme rainfall events and flash floods could increase in intensity and frequency.
- Likelihood of heatwaves and droughts in summer will increase.

With these potential changes, existing lightweight buildings and existing infrastructure and drainage may not be fit for purpose by 2050.

Targets

- Design in passive cooling measures and design out the need for mechanical cooling.
    - Increase thermal mass of buildings.
    - Careful exclusion of solar gain.
    - Green walls and green roofs should be used where possible.
    - High levels of insulation and airtightness.
- Thermal comfort calculations should be based on predicted temperatures in 2050.
- Design suitable Sustainable Drainage Systems (SuDS) which also add greenery and enhance biodiversity, such as urban swales (see also requirements in Greening the Campus).
    - Consideration should be given to how the project can help develop a holistic approach to water management across the Campus.
- Provide external shading through appropriate planting.
    - Plants should be suitable for potentially drier summers.
- Reduce water demand:
    - Install low water usage equipment which is on the Water Technology List (WTL) or has an EU Water Efficiency Label.
    - Install water leak detection devices or add submeters to the BMS with alarms for out of hours water use.

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