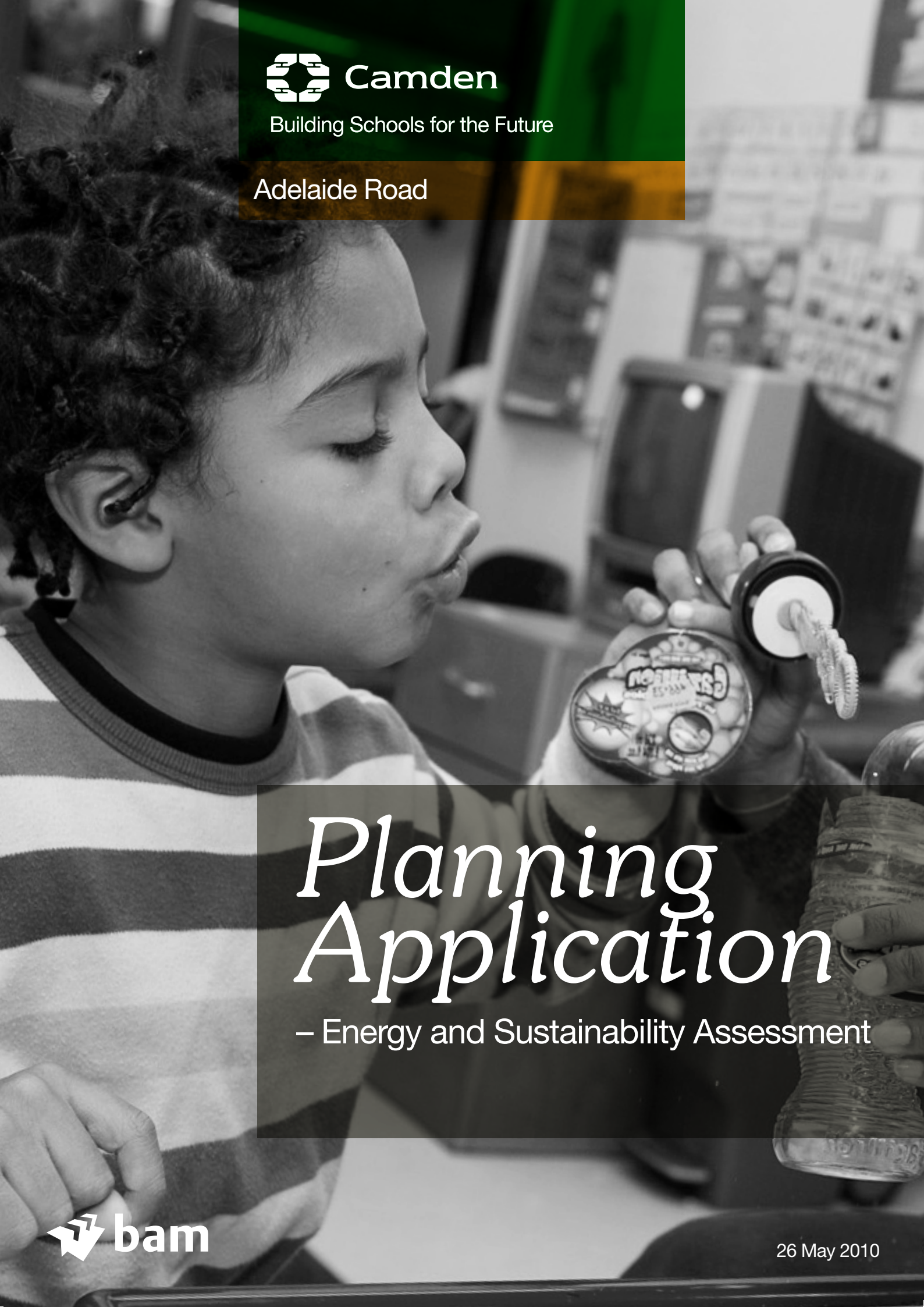


Camden

Building Schools for the Future

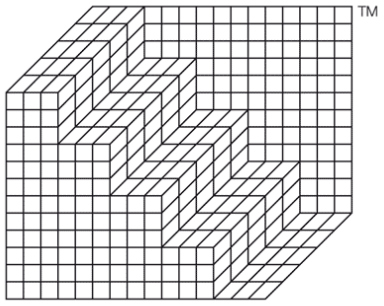
Adelaide Road

Planning Application

– Energy and Sustainability Assessment

bam

26 May 2010



Buro Happold

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025901 Camden BSF

UCL Academy Adelaide Road

Energy Efficiency and Sustainability Statements

May 2010

Revision 00

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author

signature

date **May 2010**

approved

signature

date

Contents

Appendix B – DCSF Carbon Calculator Output

Appendix C – Proposed Drainage Layouts

1 Introduction

The proposed development comprises new learning facilities for the current Swiss Cottage School (primary and secondary) and a new build academy for University College London. This report will focus on the UCL Academy Development to the North of the Site. The site is located to the south of Adelaide Road, Camden, London and is approximately 2 ha in size. The facility currently comprises 3 No. schools, namely, Swiss Cottage (primary and secondary) and Frank Barnes (primary, for deaf children) Schools. The site comprises existing school buildings and hardstanding with minor areas of soft landscaping.

The following report will highlight the energy assessment targets we are aiming for and also some Key sustainability aspects with sections specifically explaining our BREEAM aspirations, how we plan to increase the schools efficiency and in turn reduce carbon, will detail the renewable energy sources that will be implemented, discuss the PassivHaus measures we have taken on board and detail the sustainable measures taken on board for drainage and water use.

2 Aspirations of the Proposed Development in terms of BREEAM

The project will achieve BREEAM 'very good' as per the Camden Sustainability Brief.

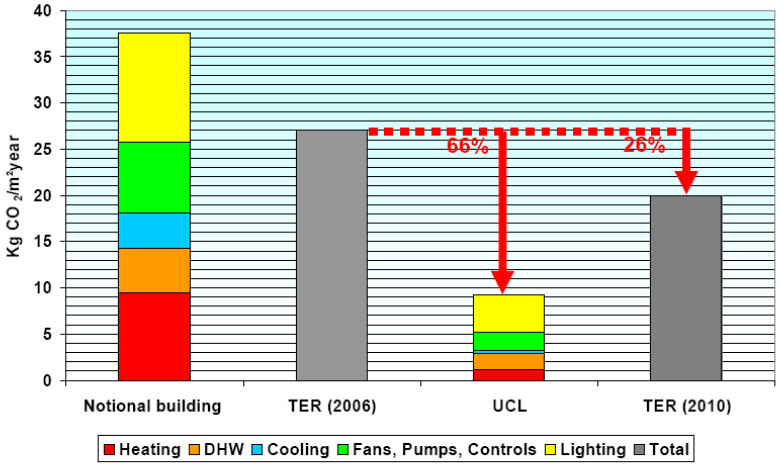
The design has targeted BREEAM 'Excellent' in line with the Brief requirements. The BREEAM pre-assessment is attached please see **Appendix A**

3 Efficiency and Carbon Reduction

Efficiency and Carbon reduction has been a key driver in our design for UCL Academy. Several measures have been incorporated looking into both the equipment used and the most efficient way to use the equipment on a daily basis once installed. Below will detail the energy usage figures calculated for the building and show evidence of the targets we have been required to meet:

3.1 Building Regulations Part L (Conservation of Fuel and Power)

Part L (2006) compliance calculations have been performed for the school completed by a registered level 5 energy assessor. The calculation is in accordance with the National Calculation Methodology against set room activities and excludes the emissions associated with the electrical consumption of small power equipment. The results shown therefore differ from the emissions calculated to show compliance with the sustainability brief and the predicted energy consumption in use. The effect of providing a fully considered, passive, low energy design solution has resulted in a building that significantly exceeds the minimum standards necessary to comply with the current building regulations by 66% for UCL.



Building regulations Building Emission Rating - UCL

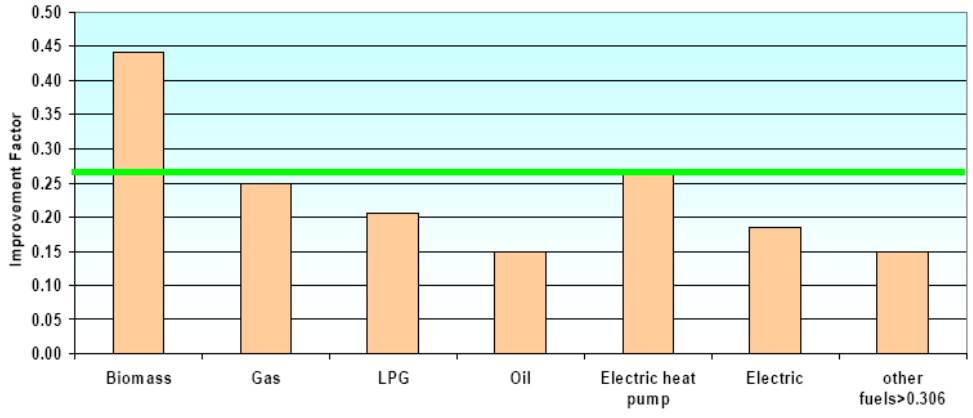
3.2 Building regulations Part L(2010) update

When the Building Regulations Part L were updated in 2006 it was identified that further improvements and revisions would be introduced in 2010. The consultation on the proposed revisions to these regulations has now closed and the Building Regulations part L(2010) are expected to be published in April 2010 to apply to buildings designed after October 2010 and buildings where construction work starts after October 2011.

Shown below is a short summary of the main changes to the current regulations from the consultation documents and their potential impact on the design of the schools.

3.3 Variable Target Emission Ratings

The Target Emission Rating (TER) for buildings other than dwellings is expected to be 25% less than that for Part L(2006) so as to be in line with the government target for new buildings to be 'carbon neutral' after 2019. The TER will depend on the proposed heating fuel used. For electric heat pumps it is likely to be around 26% less than the current standard.



The design proposal utilises an electric heat pump to provide 90% of annual space heating demand, with the balance provided by condensing gas boilers. This achieved an emission rating 66% lower than the 2006 target and therefore exceeds the anticipated improvement for the 2010 regulations.

3.4 Building fabric insulation

The minimum standards for building fabric insulation and air permeability are expected to remain at the current 2006 standard. The proposed design exceeds these standards by a significant margin, with some elements meeting or approaching PassivHaus standards.

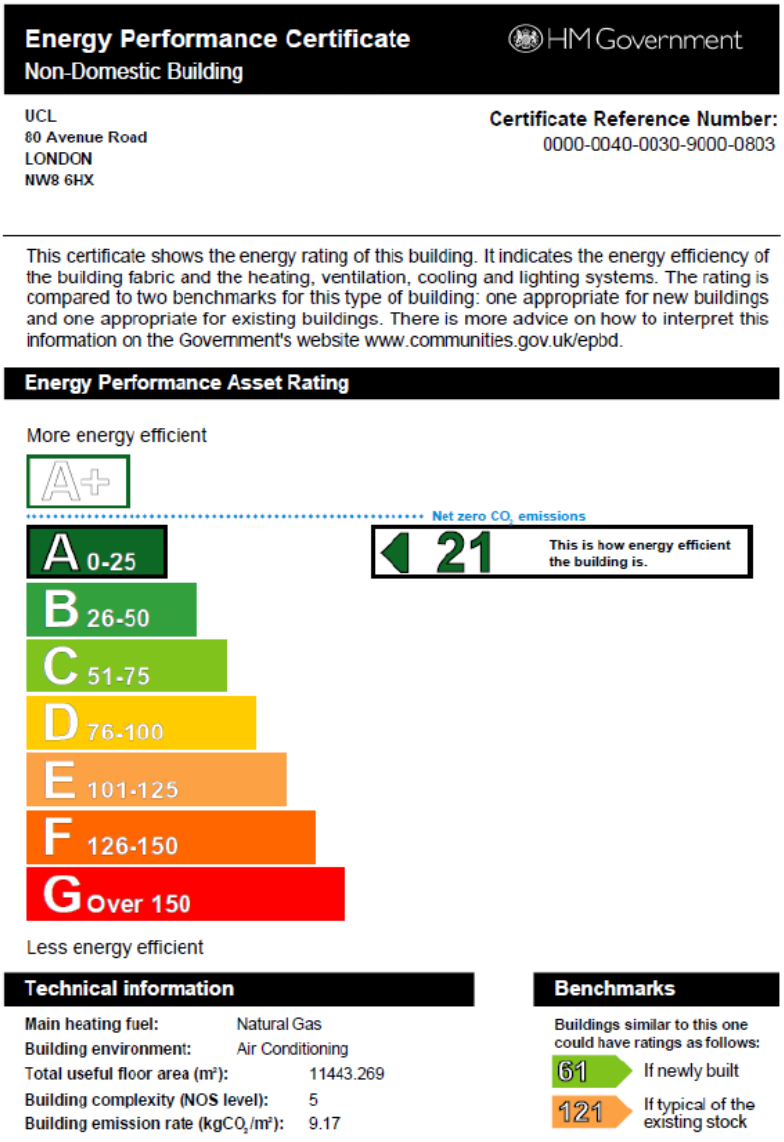
Ventilation system efficiency currently limits the energy consumption of all the system fans per volume of air supplied in a system (Specific Fan Power). The proposed new regulations have more onerous limits and have introduced a limit to the maximum allowed ventilation system pressure drop. This will not only reduce maximum air handling unit coil and ductwork velocities, it will place limits on the maximum length of ductwork in a system. The current design proposal utilises energy efficient fans and variable speed drives to significantly exceed the minimum standards proposed.

3.5 Control of solar gains

Previously 'Criterion 3 – Limiting solar gains in summer' only applied to naturally ventilated buildings. The 2010 regulations extend the criterion to include air conditioned buildings with the intention to reduce the need for air conditioning and reduce the installed capacity of any air conditioning system installed. The design proposals exceed the likely minimum standard.

3.6 Energy Performance Certificate

The predicted EPC rating based on the design proposals was found to be 21 for UCL giving an A rating as illustrated in the figure below.



Energy Performance Certificate
Non-Domestic Building

HM Government

UCL
80 Avenue Road
LONDON
NW8 6HX

Certificate Reference Number:
0000-0040-0030-9000-0803

This certificate shows the energy rating of this building. It indicates the energy efficiency of the building fabric and the heating, ventilation, cooling and lighting systems. The rating is compared to two benchmarks for this type of building: one appropriate for new buildings and one appropriate for existing buildings. There is more advice on how to interpret this information on the Government's website www.communities.gov.uk/epbd.

Energy Performance Asset Rating

More energy efficient

A+

Net zero CO_2 emissions

A 0-25

B 26-50

C 51-75

D 76-100

E 101-125

F 126-150

G Over 150

21 This is how energy efficient the building is.

Less energy efficient

Technical information

Main heating fuel:	Natural Gas
Building environment:	Air Conditioning
Total useful floor area (m^2):	11443.269
Building complexity (NOS level):	5
Building emission rate ($kgCO_2/m^2$):	9.17

Benchmarks

Buildings similar to this one could have ratings as follows:

61 If newly built

121 If typical of the existing stock

The design has been developed to comply with the total Carbon Dioxide Emissions Target of 27kgCO2/m2/annum

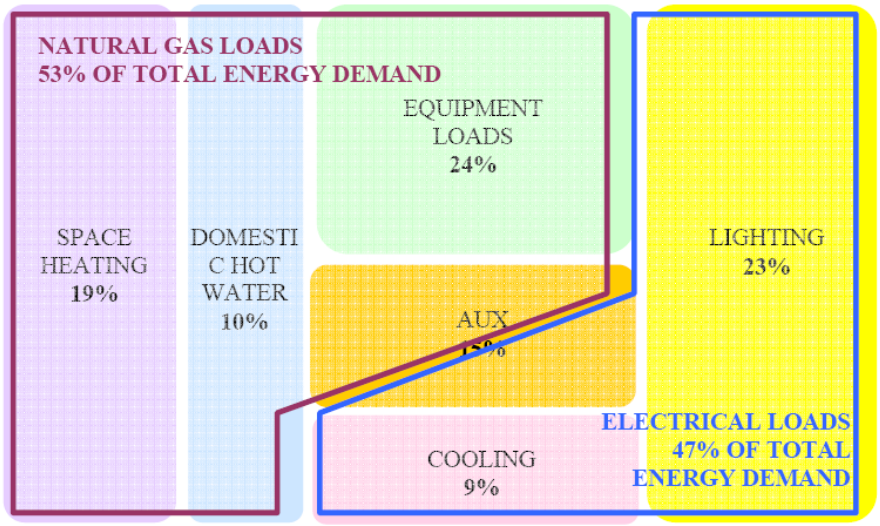
3.7 Predicted Annual Energy Consumption

The table below shows our predicted annual energy usage for both IT and none IT equipment. This is based on the Schools core hours but also takes into account out of hour' s energy requirements.

	Predicted annual energy consumption (kWh/year)	Assumptions	Calculation Methodology
Non-IT equipment	21864	NCM equipment loads diversified to NCM occupancy profiles	Hourly calculation over school core hours plus out of hours refrigeration loads
User IT equipment	39812	RM equipment loads diversified to NCM occupancy profiles	Hourly calculation over school core hours
IT infrastructure	66154	RM equipment loads undiversified	Hourly calculation over school core hours plus out of hours IT loads

3.8 Energy consumption breakdown

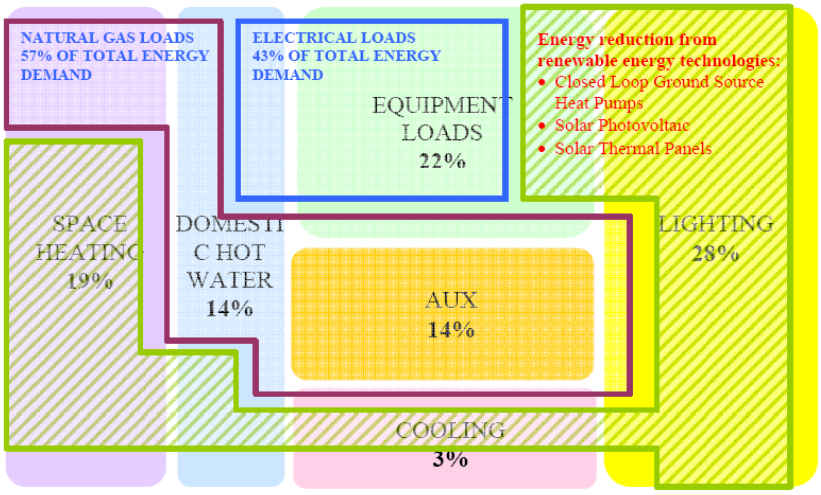
An analysis of the predicted energy uses via this energy modelling was carried out. The outcome of this is detailed in the energy diagram below.



Categorical building energy loads

From the above model, we can conclude that natural gas accounts for approximately 53% of the fuel used, with fossil fuel electricity counting for approximately 47%. This gives an energy consumption of 48.3kWh/m2/a for electricity and 52.7 kWh/m2/a for gas. These figures assume application of passive and active energy efficiency measures but do not assume any contribution from renewable energy sources.

Introducing carbon neutral renewable technologies we have been able to make substantial reductions in the Academy' s demand for fossil fuel energy.



Reducing energy consumption through renewable energy technologies

After contribution from renewable energy, we can conclude that natural gas accounts for approximately 57% of the fuel used, with fossil fuel electricity counting for 43%. This gives a reduced energy consumption of 17.09 kWh/m2/a for electricity and 22.5 kWh/m2/a for gas.