ROYAL CENTRAL
SCHOOL OF SPEECH & DRAMA
UNIVERSITY OF LONDON

The Royal Central School of Speech and Drama

‘Phase 5’ – Studio 1 Redevelopment

Energy Statement

Max Fordman

November 2014

The Royal Central School of Speech & Drama

Sustainable Energy Statement

Rev A

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1.0 EXECUTIVE SUMMARY

The proposed Studio 1 Phase 5 building has been assessed for compliance with the Camden Core Strategy Section 3 *The Attractive and Sustainable Camden*, Camden Supplementary Planning Guidance *Sustainability*, Camden Development Policy (particularly DP22) and requirements outlined in the London Plan 2011. The modifications proposed in the *Draft Further Alternations to the London Plan 2014* (FALP 2014) were also considered.

Due to the highly specialised nature of the proposed building (primarily studio, rehearsal and performance spaces) and very high noise levels in the immediate surroundings it was particularly challenging to create a base design which would comply with Building Regs Part L without introducing any additional lean, clean or green measures. Studios need to be ventilated and attenuated to a certain level to achieve high expectations of the School; NCM (National Calculation Methodology) profiles used in compliance calculations do not make an allowance for specialist design of such spaces.

To comply with the London Plan and Council's requirements passive measures of reducing the energy demand have been introduced in the first place. These include increased level of insulation to building envelope and piped services, low energy lighting and electrical appliances, high spec lighting control, water saving appliances wherever possible and low air permeability of the building. Noise attenuated mixed mode ventilation was introduced in high proportion of the building area.

At the same time 150m2 of high efficiency solar panels will be used to offset 26% of carbon emissions of the building.

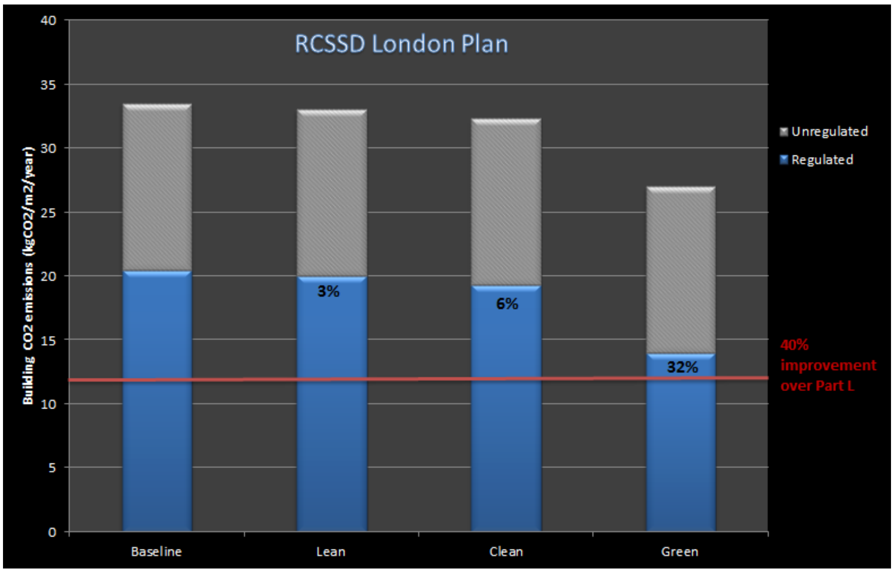

Figure 1 The building's emissions rate percentage improvement over Part L 2013

The calculations suggest that the Studio 1 Phase 5 redevelopment will fall slightly short of achieving the current London Plan requirement of 40% improvement over Part L 2013 building emissions.

However, with the challenging site restrictions within the site of Central, we established an energy strategy which offers the best performance in practical terms. Our main aim is to introduce robust solutions that can work successfully within the constraints of the site and usage profile of the building. The proposed strategy utilises the full potential of the site and the technologies that are being used.

The energy saving and onsite generation technologies that are being proposed will be able to achieve a 28% baseline improvement over Part L as predicted by the accredited calculation tools. This saving is increased further to 32% when the office lighting savings are fully accounted for.

2.0 INTRODUCTION

2.1 Building Regulations and design criteria

Building regulations – Part L2A:2013
Phase 5 is a new building, developed within the context of an existing site.

As such, it will be assessed under the Building Regulations Approved Document Part L2A: "Conservation of fuel and power in new buildings other than dwellings". The scheme will be assessed under the 2013 release of the Building Regulations, which came into force in April 2014.

The 2013 regulations are fundamentally the same as the 2010 revision, with the following key differences:

- Part L 2013 for new buildings has been strengthened to provide an overall CO2 emissions reduction of 9% across the mix of non-domestic buildings covered by the approved document, when compared to 2010 standards;
- Stricter efficiency requirements for heating and lighting systems;
- Stricter control of specific fan power in terminal units;
- A requirement to undertake a feasibility study to determine the suitability of "high efficiency alternative systems", such as co-generation or district heating, prior to commencement of construction on site.

The assessment method for the Building Regulations Part L takes a holistic approach to energy use by requiring a carbon dioxide emission calculation to be performed for the building and its engineering systems (heating, hot water, cooling, ventilation and electric lighting).

There are several tools available to help estimate the buildings emissions. Dynamic thermal simulation software such as IES is found to be most appropriate for the purpose of Part L analysis, since it calculates both carbon emissions and also models summertime temperatures in occupied rooms without mechanical cooling.

Part L assessment has become relatively complex in recent years, with a number of acronyms to further confuse and mystify. However, in high level terms, the compliance software produces two key parameters:

TER – Target Emissions Rating (CO2 emissions asset rating)

BER – Building Emissions Rating (CO2 emissions asset rating)

Target Emissions Rating is calculated using a "notional building" of the same size and shape as the actual building, but with a set of specified design parameters, as given in "Table 5" of the Approved Document.

Table 5 Summary of concurrent notional building specification

Element	Side lit or unlit (where HVAC specification is heating only)	Side lit or unlit (where HVAC specification includes cooling)	Toplit
Roof U-value ($W/m^2.K$)	0.18	0.18	0.18
Wall U-value ($W/m^2.K$)	0.26	0.26	0.26
Floor U-value ($W/m^2.K$)	0.22	0.22	0.22
Window U-value ($W/m^2.K$)	1.6 (10% FF)	1.6 (10% FF)	N/A
G-Value (%)	40%	40%	N/A
Light Transmittance (%)	71%	71%	N/A
Roof light U-value ($W/m^2.K$)	N/A	N/A	1.8 (15% FF)
G-Value (%)	N/A	N/A	55%
Light Transmittance (%)	N/A	N/A	60%
Air-permeability ($m^3/m^2/hour$) Gross Internal Area less than or equal to $250m^2$	5	5	7
Air-permeability ($m^3/m^2/hour$) Gross Internal Area greater than $250m^2$ and less than $3,500m^2$	3	3	7
Air-permeability ($m^3/m^2/hour$) Gross Internal Area greater than or equal to $3,500m^2$ and less than $10,000m^2$	3	3	5
Air-permeability ($m^3/m^2/hour$) Gross Internal Area greater than or equal to $10,000m^2$	3	3	3
Lighting Luminaire (lm / circuit watt)	60	60	60
Occupancy control (Yes/No)	Yes	Yes	Yes
Daylight control (Yes/No)	Yes	Yes	Yes
Maintenance Factor	0.8	0.8	0.8
Constant illuminance control	No	No	No
Heating efficiency (Heating and hot water)	91%	91%	91%
Central Ventilation SFP (W/L/s)	1.8	1.8	1.8
Terminal Unit SFP (W/L/s)	0.3	0.3	0.3
Cooling (air-conditioned) (SEER / SSEER)	N/A	4.5 / 3.6	4.5 / 3.6
Cooling (mixed mode) (SSEER)[1]	N/A	2.7	2.7
Heat recovery efficiency (%)	70%	70%	70%
Variable speed control of fans and pumps, controlled via multiple sensors	Yes	Yes	Yes
Demand control (mechanical ventilation only). Variable speed control of fans via CO_2 sensors	Yes	Yes	Yes

Note 1: Mixed mode assumed to be cooled by DX unit where SSEER includes indoor and outdoor units and fans, pumps and losses

Figure 2 Summary of notional building specification for Part L 2013

The actual building emissions rating (BER) should be better than or no worse than the TER. This provides some flexibility in how the building is constructed, since proportional emissions can be balanced within the context of the overall Building Emissions Rating.

However, it should be noted that for both BREEAM "Excellent" and under the London Plan, there is a target to reduce CO2 emissions from the actual building by 40% over the notional building TER when compared to 2010 levels of Carbon Emissions.

In addition to the requirement to limit CO2 emissions, there is a further requirement to prevent summertime overheating by limiting solar gains. Once more, the notional building is used to create a "base" assessment case with specified glazed area, orientation and glass performance.

Each occupied room (excluding circulation and intermittently occupied spaces such as toilets) is then assessed against the notional building and should receive solar gains no more than or equal to the notional case.

It should be noted that compliance with this criteria does not necessarily mean that the room will be comfortable for occupants since this is also related to internal heat gains from lighting, equipment, activities etc.

Planning Policy Context

Camden planning policy

The Council's primary planning policy guidance is the Core Strategy. Most of the issues regarding energy use in the buildings are contained within part 3 of the document, *The Attractive and Sustainable Camden. Tackling climate change and improving and protecting Camden's environment and quality of life*. CS13 policy outlines the main points that should be followed during development of the design.

The assumptions of the Camden Core Strategy are tackled in detail in Camden's Development policies, which outline planning policies used to assess proposed schemes. The majority of building energy issues are tackled by DP22 "Promoting Sustainable Design and Construction" and DP23 "Water" policies.

A key element of DP22 is the expectation that developments should achieve a BREEAM score of "very good", increasing to "excellent" by 2016.

Furthermore, the Council will expect the project to achieve 60% of the energy and water credits and 40% of the materials credits required under BREEAM.

CPG 3 Sustainability guidance is another important document to consider. It outlines methods of achieving compliance with the standards set out by council. The important points to consider include:

- targeting a 20% reduction in Carbon dioxide emissions through the use of onsite low or zero carbon technologies
- Connecting to a decentralised energy network or use Combined Heat and Power where appropriate and feasible
- Incorporating green or brown roofs and walls where appropriate

London Plan 2011 and Further Alterations to the London Plan (FALP) 2014

The London Mayor is responsible for strategic planning in London, with requirements set out within the London Plan. All policies within the plan promote sustainable development, including mitigating and adapting to the impacts of climate change, as well as promoting health and equality within London.

A number of policies directly related to energy use within buildings and energy generation have been developed, which form an integral part of the London Plan. These policies are included below, along with a short description of how we have addressed them, where relevant.

Policy 5.1 Climate Change Mitigation: The Mayor seeks to achieve an overall reduction in London's carbon dioxide emissions of 60 per cent (below 1990 levels) by 2025. It is expected that the GLA group, London boroughs and other organisations will contribute to meeting this strategic reduction target, and the GLA will monitor progress towards its achievement annually.

Policy 5.2 Minimising carbon dioxide emissions: Development proposals should make the fullest contribution to minimising carbon dioxide emissions in accordance with the following energy hierarchy:

- *Be lean: use less energy.*
- *Be clean: supply energy efficiently.*
- *Be green: use renewable energy.*

In particular, Policy 5.2 sets a target of a 40% reduction on 2010 Building Regulations Target Emissions Ratings (TER) from 2013. As previously noted, improvements over the TER will be mandatory under BREEAM to varying levels depending on the score that can be achieved.

Policy 5.3 Sustainable Design & Construction: The highest standards of sustainable design and construction should be achieved in London to improve the environmental performance of new developments and to adapt to the effects of climate change over their lifetime.

Policy 5.7 Renewable Energy: The Mayor seeks to increase the proportion of energy generated from renewable sources, and expects that the projections for installed renewable energy capacity outlined in the Climate Change Mitigation and Energy Strategy and in supplementary guidance will be achieved in London.

Policy 5.9 Overheating and Cooling: The Mayor seeks to reduce the impact of the urban heat island effect in London and encourages the design of places and spaces to avoid overheating and excessive heat generation and to reduce overheating due to the impacts of climate change and the urban heat island effect on an area wide basis.

In practice, the design of all new buildings in London must where possible adhere to the following hierarchy;

- using less energy, in particular by adopting sustainable design and construction measures,
- supplying energy efficiently, in particular by prioritising decentralised energy generation, and
- using renewable energy
- use less water and generate less waste and surface water

These points go in line with Camden Council policies outlined in the previous section.

The important potential amendment contained in FALP 2014 positions waste heat utilisation as a primary mean of introducing Decentralised Energy to new developments.

2.2 Modelling methods

To assess the energy performance we have modelled the building as designed in IES Virtual Environment 2014 (version 2014.0.0.0) - an NCM accredited Dynamic Simulation Software. The model was checked in VE Compliance module (version 7.0.0.0), running on ApacheSim simulation engine.

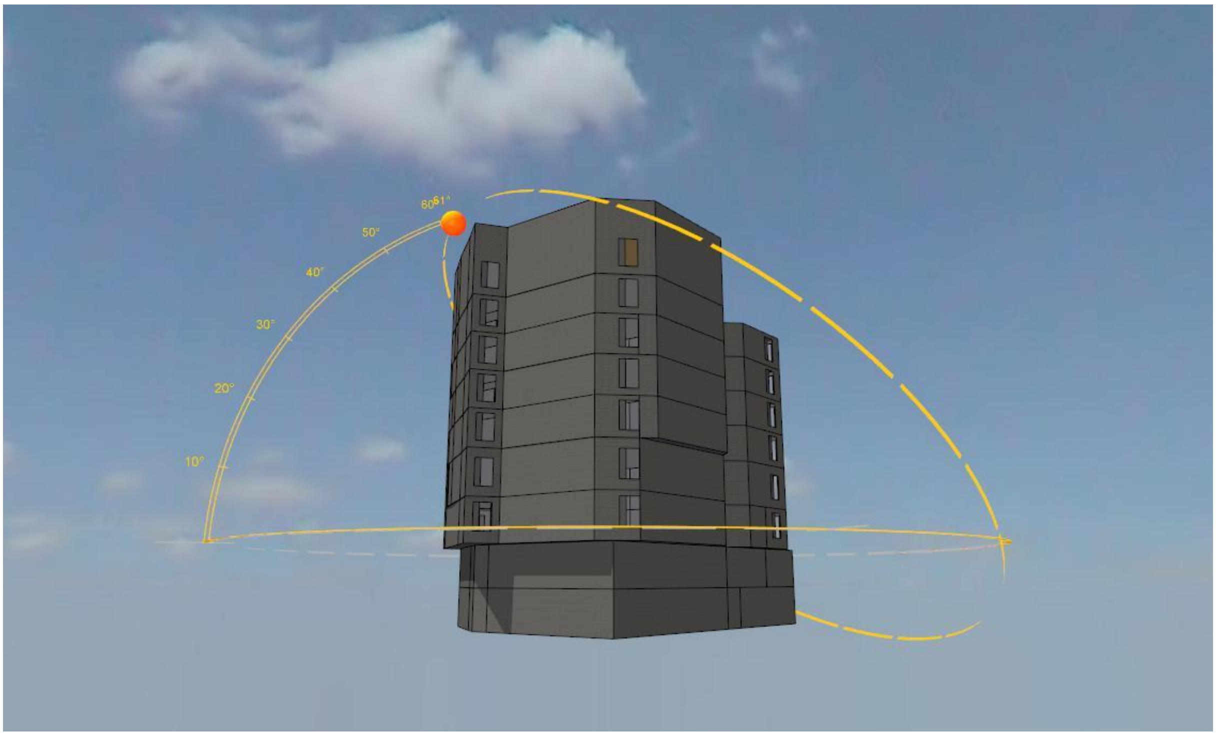

Figure 3 Central's energy model visualisation (illustrative model)

2.3 Model development

The compliance model used to assess the carbon emissions from new buildings makes a number of assumptions about the building type, occupancy patterns and room uses. Given the specialist nature of Central, the use of “standard” room types, such as “teaching space” or “School studio”, is likely to penalise the development unfairly, since the “notional building” would assume normal levels of lighting, acoustic criteria and activities.

The Part L calculation allows some flexibility in that multiple building types can be used in different rooms of the computer model.

We created a building model for the Phase 5 Studio 1 redevelopment which closely matches the expected type of use in the proposed building but includes room types from two different building types.

Below is the breakdown of floor area allocated to each building type within the Phase 5 model:

Building Use

% Area	Building Type
	A1/A2 Retail/Financial and Professional services
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
	B1 Offices and Workshop businesses
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Inst.: Hospitals and Care Homes
	C2 Residential Inst.: Residential schools
65	**C2 Residential Inst.: Universities and colleges**
	C2A Secure Residential Inst.
	Residential spaces
	D1 Non-residential Inst.: Community/Day Centre
	D1 Non-residential Inst.: Libraries, Museums, and Galleries
	D1 Non-residential Inst.: Education
	D1 Non-residential Inst.: Primary Health Care Building
	D1 Non-residential Inst.: Crown and County Courts
35	**D2 General Assembly and Leisure, Night Clubs and Theatres**
	Others: Passenger terminals
	Others: Emergency services
	Others: Miscellaneous 24hr activities
	Others: Car Parks 24 hrs
	Others - Stand alone utility block

Figure 4 Building use types included in the model (based on National Calculation Methodology profiles)

The specialist nature of the Phase 5 development has meant that some of the room types present in the proposed building are not available in the NCM calculation (an example of this is the dressing room). Where the room type could not be matched precisely, an NCM activity has been chosen which most closely resembles the proposed room use.

3.0 SUSTAINABLE DESIGN AND CONSTRUCTION ENERGY HIERARCHY

Due to the highly specialised nature of the building and very high noise levels in the immediate surroundings, coming from the surrounding road traffic, it was particularly challenging to create a base design which would comply with part L without introducing any additional lean, clean or green measures. Studios need to be particularly heavily ventilated and attenuated to achieve high expectations of the school; NCM profiles used in compliance calculations do not make allowance for specialist design of such spaces.

3.1 Lean: means of ensuring the development uses less energy

The proposed passive measures include increased level of insulation to building envelope and piped services, low energy lighting and electrical appliances, water saving appliances wherever possible. The building fabric will be well insulated, with air permeability reduced to $3m^3/m^2.h$ @ 50Pa. This is 40% better than the 2013 Part L building regulations requirement of $5\ m^3/m^2.h$.

Throughout the offices, classrooms and circulation spaces we have decided to use mixed mode, enabling the users to ventilate the spaces naturally through most of the year. No cooling will be used in these spaces. These strategies will help to cut the emissions associated with running fans and cooling plant.

Studios can be naturally ventilated during times when occupancy levels are low.

Lighting load is responsible for 40% of all building's carbon emissions. We have proposed high specification lighting controls to ensure that this load is not increased further. Presence detection as well as daylight dimming will be installed throughout the building.

3.2 Clean: making use of energy from efficient sources

Due to the likely type of use for the building the scope for introducing "clean" technologies is very limited on the Phase 5 project. As required by the policy 5.2D of London Plan and recommended by Camden DP22, during the previous design stage we investigated the possibility of connecting the Phase 5 building to a district heating network (DHN). This option was excluded due to lack of available DHNs in the local area. Figure below shows a snap shot from London Heat Map- neither current nor potential district heating schemes are located in the proximity of the Central site.

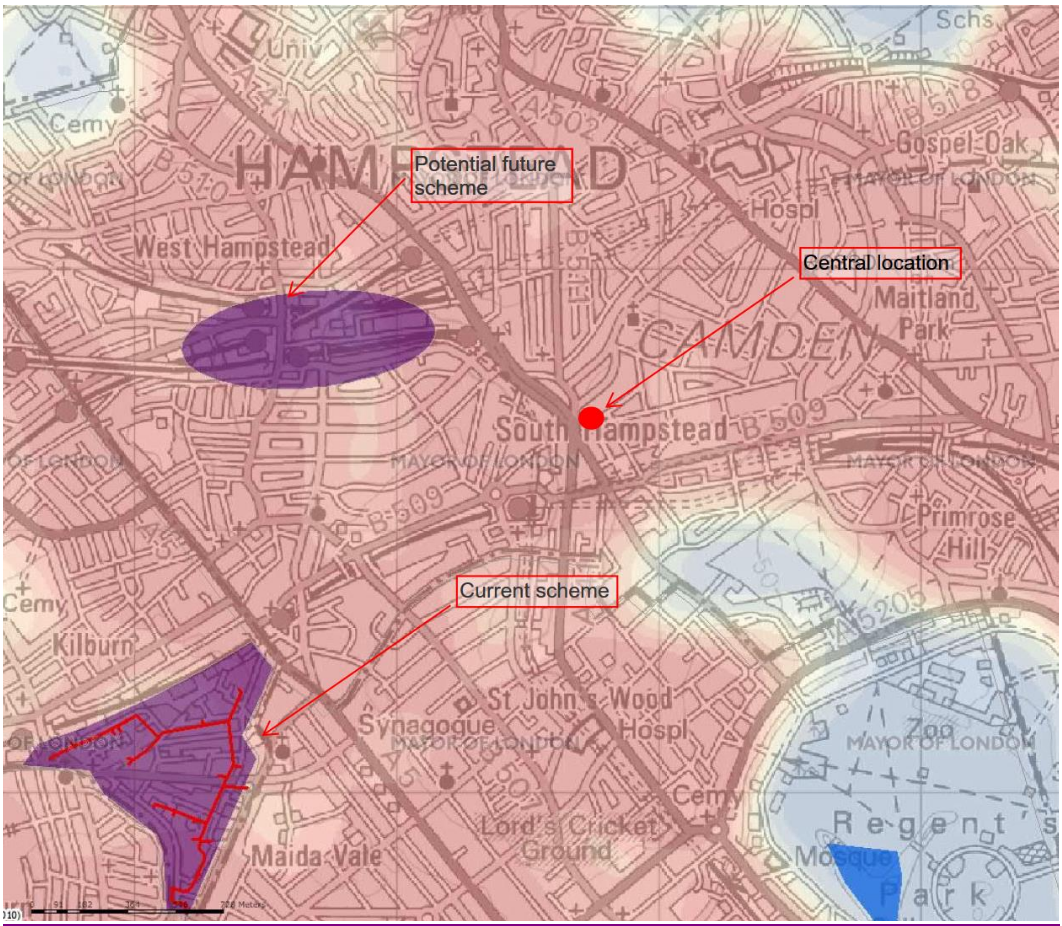

Figure 5 District heating current and potential schemes

At this stage it is proposed that facilities are provided in the proposed building for a future connection to a district heating scheme when such becomes available.

Similarly there is no scope for introduction of CHP as recommended in Camden DP22 and Camden Core Strategy CS13. The heating demand is disproportionally lower than electricity demand and the usage profile of the building does not lend itself very well to the continuous base heating load required by CHP technology.

We have introduced advanced lighting controls, energy efficient plant and natural ventilation solutions to generate lean model of the building. A clean approach introduces further reduction in office lighting power requirements through decreasing background lighting in the offices. Our design approach is to use the background lighting to maintain a lux level sufficient for circulation only. Each desk will be fitted with a proprietary task light used to locally boost the lux level on the working plane. This strategy will ensure that only office areas in use are subject to the maximum office lighting levels. Calculations indicate that this strategy will help decrease the amount of building wide electricity used for electrical lighting by 9%.

3.3 Green: generating renewable energy on-site

As required by the London Plan and Camden Core Strategy, once the passive and clean energy saving measures have been considered, all new developments should investigate renewable energy sources to further reduce the building emissions.

The following sustainable energy sources were considered on the RCSSD project:

- Biomass
- Ground/ Air Source Heat Pump
- Solar thermal
- Wind energy
- Photo-voltaics

Biomass

A typical biomass installation includes a large storage area for the fuel, a hopper to deliver the fuel from the store to the boiler, a boiler, and a buffer vessel to take the excess heat if demand drops off when the boiler is hot and there is no demand for heat. Fuel is delivered weekly or fortnightly and the boiler must be emptied of ash regularly. This imposes significant maintenance and logistical demands on the building operator.

The feasibility of using biomass for heating depends largely on the fuel availability and the heat demand of the building.

With a suitable local fuel source, biomass heating can be a cost-effective way to save significant amounts of CO_2.

However, we expect the development to have a relatively low heating demand and, although schemes exist within London, we are yet to be convinced about the long term role of imported biomass in the urban environment for a number of reasons:

- Imports of fuel from outside of London strip supply from where it can be sensibly used in the regions.
- Transporting fuel by truck has a significant impact on CO2 emissions and impacts air quality in towns
- A large storage area for fuel is required, even for a modest period of heating.
- Ash deposits have to be transported from site.

- Sulphur Dioxide emissions as a result of wood burning systems have in the past lead to problems with Smog in urban environments.

For the reasons given above, biomass heating is not being considered further for this project.

Ground/ air source heat pump
Heat pump systems use electricity and refrigerant to provide space heating. The ratio of heat developed to electricity used is called the "Coefficient of Performance", or COP. The higher the COP, the lower the amount of electricity required to generate heat or cooling.

Ground source heating involves extracting heat from the ground to heat the building, by circulating water through buried pipes. The pipes may run horizontally in trenches (as in the picture), or vertically as U-tubes. On a restricted urban site, the vertical arrangement of ground loops allows a higher output.

The low grade heat extracted from the ground is passed through a heat pump, which provides higher grade heat (in the form of hot water) to the building. The system can also be used in reverse to provide cooling in summer. By coupling the heat pump with the ground, a higher COP (5-7 typical) is achieved when compared to air source heat pumps

The main issue with GSHP is the location and expense of vertical boreholes or a horizontal array. There is no space on site for an effective horizontal array, and a borehole-fed system is expected to attract an initial capital cost of at least 8-10 times more than an equivalent boiler installation (not accounting for possible RHI payments).

Air source heat pumps (ASHP) do not require connection to the ground, however their COP in winter is generally significantly worse than GSHP systems (as less heat is available from cold air than from the ground) and noise and visual planning issues become more significant as well as the structural issues of roof support.

A COP for ASHP heating of 3.0 is realistic for most UK systems (according to BSRIA data) where low flow and return heating temperatures are required.

In reality, the COP in London, where ambient temperatures are elevated due to the heat island effect, may be higher (possibly as high as 4.0), but without full weather based modelling, it would be unwise to use a higher value.

However, because of the structural heights of the Phase 5 building (2650mm floor to floor height), it is not possible to incorporate underfloor heating and optimal flow/return temperatures for air source heat pumps to be realised.

Heat Pump technology does not appear to offer a significant reduction in CO2 emissions in real terms, and for this reason is not being considered for the time being.

Solar thermal array
Like PVs, solar thermal systems require little maintenance and have relatively low visual impact. They are more efficient than PVs at converting solar energy into a useful form, and are therefore more cost-effective. This cost is also potentially offset by the Renewable Heat Incentive (RHI) subject to government decisions on the future of the scheme.

However, hot water represents a small proportion of the buildings energy demand and the potential for making CO_2 savings using solar thermal is limited, and only a domestic scale of system would be appropriate.

For this reason, solar thermal water heating is not going to be investigated further.

Wind energy

Wind turbines are available in a wide range of sizes, from large 'wind-farm' scale turbines to small domestic roof-mounted versions. The output of a turbine is proportional to the area swept by the rotor, and therefore to the square of rotor diameter, so larger turbines can produce a lot more power.

The wind environment in cities is generally poor, with low average wind speeds and intense turbulence. A large-scale turbine in London is expected to run at about 5% capacity factor, whereas a turbine in a commercial wind farm would be at more like 30%. Despite this, wind power is usually the most cost-effective option for generating energy on site.

The installation of wind turbines in the urban environment is still relatively novel. Although available, building mounted turbines are limited by the wind loading imposed on the structure. Free standing turbines require a relatively large amount of land around them to operate efficiently without obstructions.

In addition to the high visual impact of wind turbines (people tend to either love them or hate them), there are a number of issues specific to urban sites which need to be addressed if a turbine is to be installed successfully in a city, including the acoustic concerns with locating turbines close to residential properties.

Given the built up urban environment surrounding Central, we do not believe a wind turbine would be able to operate efficiently for a suitable amount of time or adhere to the background acoustic criteria to warrant inclusion in the scheme.

Photovoltaics

PVs require little maintenance and have relatively low visual impact. They are therefore considered a safe option as a Low/Zero Carbon (LZC) technology for use in urban areas. However, compared to other LZCs they are expensive and therefore not very cost-effective (in terms of £/kWh), leading to long payback times.

The amount of energy produced by solar PV cells remains relatively modest and typically lies in the region of around 5% of total electricity demand for most buildings, even when orientation is optimised.

For optimum performance in the UK the PVs should be facing south and installed at around 30-40º. However other orientations are able to achieve between 70-99% of the optimum performance.

Although it has recently been reviewed and reduced, the Feed-in Tariffs (FITs) could reduce payback times.

In the densely populated, urban context of Central, we believe solar PV cells offer the best solution for offsetting carbon emissions, particularly since the emissions of the Phase 5 building are predominately electricity driven.

3.4 Other means of carbon emissions reduction- water usage

Reduced water consumption will in turn reduce the energy consumption associated with providing domestic hot water, as well as reduce drainage pumping loads.

- Low flow fittings will be specified throughout the building. The current Part L calculation does not have the facility to simulate the benefit of low water usage and hence the figures presented in this report do not take this into account.
- Where suitable, taps and fittings will generally be of the "low flow" type to reduce water consumption. Where such fittings are not available, DEFRA approved flow regulators will be provided to limit water consumption to accepted flow rates.
- Point of use water heaters will be used wherever appropriate (for example in single toilets on upper floors of the building) to cut heat losses associated with secondary circulation and hot water storage
- Water consumption will be integrated into a new intelligent metering system, with end use metering provided as appropriate.
- Water leak detection will be provided as part of the metering package
- Motorised isolating valves will be provided to toilet and welfare areas to enable hot and cold water supplies to be isolated out of occupied hours or when a particular space is unoccupied.

3.5 Calculation results and conclusions

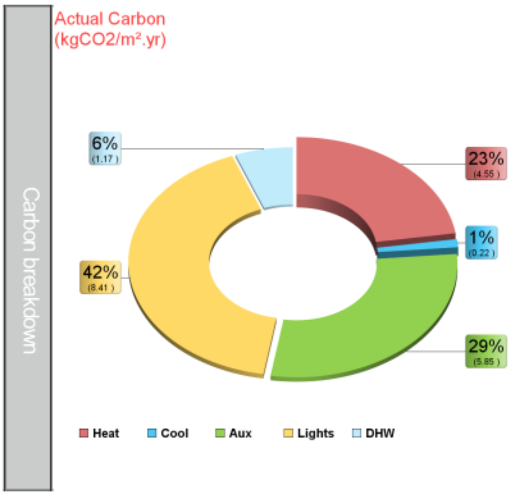

Figure 6 Percentage breakdown of the buildings emissions

IES VE calculates the Buildings Emissions Rate (BER) for the Phase 5 lean model of the building to be 20.2kgCO2/m2/annum with the percentage break down as indicated in figure above.

The baseline emissions are 20.8kgCO2/m2/year, which indicates that the lean model passes the building regulations Part L requirements without the introduction of any Low or Zero Carbon technologies.

The maximum area of PV array that can be installed on the building roof given its current layout is 150m2. We are proposing to cover the whole available area with high efficiency (20.4%) photovoltaic solar panels. Such an array can generate 29kWe- according to the model this will reduce the carbon emissions of Phase 5 by 5.34 kg.CO2/m2/annum. Figure below shows the performance of the green model:

Carbon summary

$kgCO_2/m^2.yr$	Actual	Notional
Heating	4.55	6.87
DHW	1.17	0.60
Cooling	0.22	0.04
Aux	5.85	4.85
Lighting	8.41	8.42
Renewables	(-5.32)	(0.00)
Total	14.88	20.78

Results represent total CO_2 output. BER rating includes applicable adjustment factors.

Figure 7 Detailed breakdown of building's carbon emissions

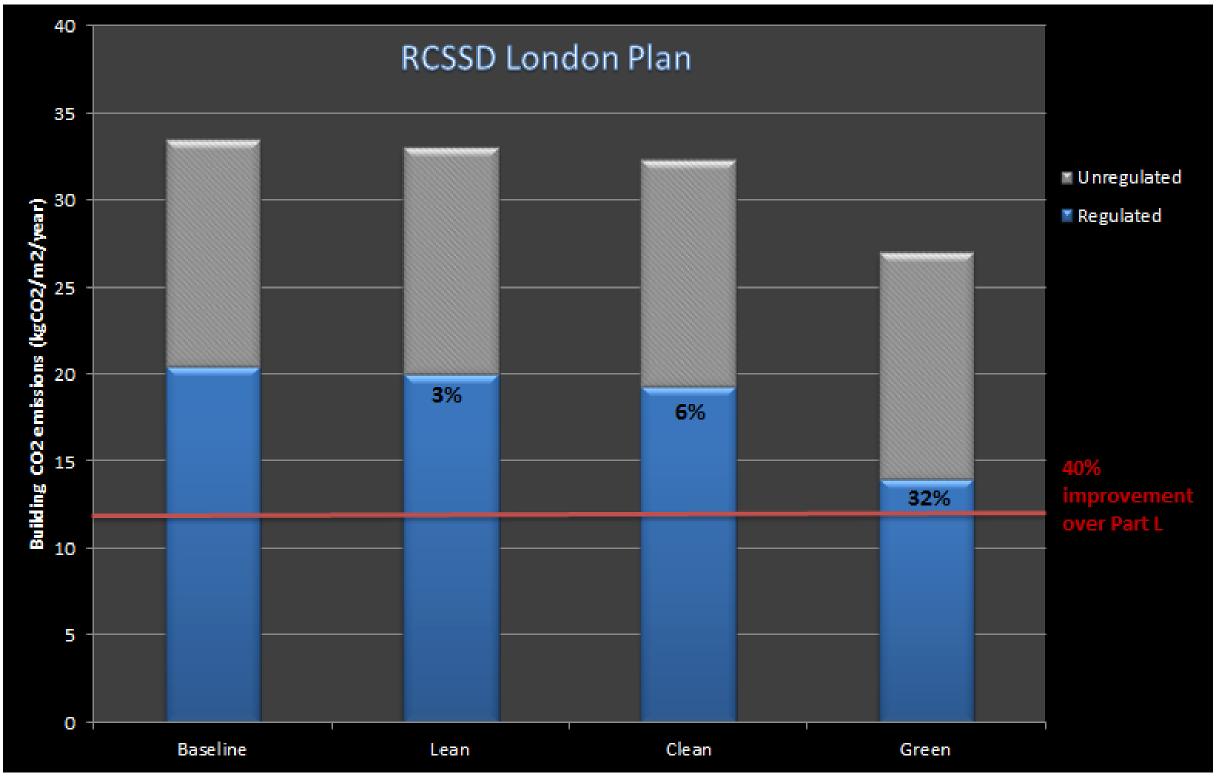

Figure 8 The building's emissions rate percentage improvement over Part L 2013

The figure above shows the predicted emissions for the lean, clean and green building models, as well as the percentage improvement that they achieve in comparison to the baseline model.

The emissions due to the unregulated loads are also included on the diagram for each model for completeness. The London Plan policy 5.15C states that from year 2010-2013 buildings ought to achieve a 25% improvement over the part L baseline and for buildings designed from 2013 onwards the improvement should be 40%.

With the challenging site restrictions within the site of Central, we have established an energy strategy which offers the best performance in practical terms. Our main aim is to introduce robust solutions that can work successfully within the constraints of the site and usage profile of the building. The proposed strategy utilises the full potential of the site and the technologies that are being used.

The energy saving and onsite generation technologies that are being proposed will be able to achieve a 28% baseline improvement as predicted by the accredited calculation tools (IES-VE modelling).

This saving is increased further to 32% once the office lighting savings are fully realised as described in the paragraphs above.

We are proposing to use only energy efficient equipment (A+ class) of everyday use to reduce unregulated loads- this will include kitchenette equipment, as well as task lighting.

The energy simulations suggest that the planned PV array will reduce the building emissions by 26%- therefore the scheme will also comply with Camden Core Strategy Policy 13.11 which states that "(…) Council will expect developments to achieve a reduction in carbon dioxide emissions of 20% from on-site renewable energy generation (which can include sources of site-related decentralised renewable energy) unless it can be demonstrated that such provision is not feasible."

The design is aiming to achieve BREEAM excellent. A large proportion of the BREEAM points that are considered to be achievable are related to building services design.