# **ENERGY STRATEGY**

# UK Centre for Medical Research & Innovation

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EXECUTIVE SUMMARY

# ES 1.

## **Executive Summarv**

This Energy Strategy has been prepared in support of a detailed planning application for the UK Centre for Medical Research and Innovation (UKCMRI) (herein referred to as the 'Proposed Development'). The Proposed Development provides a biomedical research centre including laboratory and research space, lecturing and teaching space, exhibition space and a community facility; landscaped public open spaces; a new pedestrian route between Midland Road and Ossulston Street; and new vehicular access from Midland Road.

# ES 2.

In compliance with the Greater London Authority (GLA) and the London Borough of Camden (LBC) guidance, UKCMRI intend to achieve energy consumption reductions for the Proposed Development through the implementation of passive design and energy efficiency measures and meeting part of the remaining energy demand through the incorporation of low and zero carbon (LZC) technologies.

# ES 3.

The proposed energy strategy demonstrates how the Proposed Development considers the aspirations set in the London Plan by following the Mayor's energy hierarchy and the detailed guidance provided in the GLA Energy Team Guidance on Planning Energy Assessments, and including:

- Passive design and energy efficiency (i.e. use less energy 'be • lean'):
- Energy efficient supply of services (i.e. 'be clean'); and
- On site renewable energy technologies to provide energy (i.e. use • renewable energy – 'be green').

## ES 4.

The Proposed Development will meet its heating, cooling and electrical demands by reducing energy consumption and associated CO<sub>2</sub> emissions to the atmosphere to realistic minima. In particular, UKCMRI is being designed to comply with Building Regulations Approved Document L2A (ADL2A) 2010. ADL2A 2010 requires an aggregate 25% reduction in CO2 emissions over the current Building Regulations ADL2A 2006.

## ES 5.

Additionally, the Proposed Development seeks to achieve a Building Research Establishment Environmental Assessment Methodology (BREEAM) Excellent rating, which includes a mandatory requirement for an Energy Performance Certificate (EPC) rating of less than 40.

# ES 6.

Baseline The baseline scheme is defined as meeting the requirements of Building Regulations ADL2A 2006. Baseline energy consumption and CO<sub>2</sub> emissions have been calculated on a 'whole energy' basis and include

both regulated and non-regulated loads.

# ES 7.

The CO<sub>2</sub> emissions of the baseline scheme are 32,000 tonnes CO<sub>2</sub>/year. The energy consumption and CO<sub>2</sub> emissions of the baseline scheme for the Proposed Development are shown in Table ES-1.

# ES 8.

Be Lean It is proposed to reduce the energy demand of the Proposed Development by incorporating passive design measures, including:

- Improved insulation in order to achieve an enhanced U-value performance for the building fabric;
- Incorporation of the necessary construction details to reduce the air infiltration rate below the requirement of ADL2A;
- Integration of facade shading features to minimise solar heat gains in • summer in order to reduce the need for cooling; and
- Incorporation of high performance glass throughout the building.

## ES 9.

It is proposed to achieve a further reduction in the energy demand of the Proposed Development by providing energy efficiency measures, including:

- Energy efficient lighting and lighting controls;
- Optimisation of fresh air supply rates in laboratory areas;
- Variable volume flow, allowing variable speed drives to be fitted to fans to reduce power consumption;
- Heat recovery systems wherever feasible (Atrium, Biological Research Facility (BRF), laboratory areas, lecture theatre, etc.);
- Variable Flow Hydronic Systems;
- Economisers on steam and Low Temperature Hot Water (LTHW) boilers;
- Reverse Osmosis (RO) steam boiler feedwater treatment;
- Energy efficient cold storage systems, fume cupboards and vertical transportation;

- buildina.

ES 10.

ES 11.

ES 12. Be Clean

# ES 13.

baseline ('be lean') scheme.

ES 14.

ES 15. use of CHP

ES 16. shown in Table ES-1.

Energy metering of all major equipment and sub-circuits;

• Power factor correction equipment as necessary;

• Low water consumption sanitary appliances, such as dual flush WC cisterns, and low flow showers and taps;

Energy efficient laboratory instruments;

 Building Management System (BMS) to ensure an energy-efficient operation of the systems; and

• Building Users Guide giving the facility managers and occupiers information on energy-efficient features and strategies relating to the

The resulting savings in CO<sub>2</sub> emissions due to incorporation of passive design and energy efficiency measures are approximately 5,400 tonnes CO<sub>2</sub>/year, which corresponds to a 17% reduction.

The energy consumption and  $CO_2$  emissions of the enhanced ('be lean') baseline scheme, which includes the energy consumption reductions and CO<sub>2</sub> emissions savings from energy efficiency and passive design measures, are shown in Table ES-1.

It is proposed to incorporate a Combined Heat and Power (CHP) unit in the energy centre, located at basement level -1. The proposed CHP unit has 1,822kW electrical output and 1,463kW heat output.

The CHP plant's heat output will meet part of the space heating, LTHW and steam demand. Operation of the CHP plant will result in CO<sub>2</sub> emissions savings of about 4,400 tonnes CO<sub>2</sub>/year. This equates to approximately a 17% savings in CO<sub>2</sub> emissions over the enhanced

It is anticipated that the electrical power output will meet approximately 50% of the electrical demand of the Proposed Development.

The use of Combined Cooling Heat and Power (CCHP) in the Proposed Development has been assessed but found to be less feasible than the

The energy consumption and CO<sub>2</sub> emissions of the 'be clean' scheme, which includes the CO<sub>2</sub> emissions savings from CHP technology, are

### ES 17. Be Green

To further reduce CO<sub>2</sub> emissions an analysis of the use of renewable energy technologies for the Proposed Development has been undertaken and Photovoltaic (PV) arrays have been identified as feasible.

# ES 18.

PV arrays will be installed on the roof of the building. The Proposed Development has an architectural structure which encloses the upper plant levels. It is proposed that all of the PV arrays are located on the roof structure. The PV arrays will be facing south.

## ES 19.

1,700 m<sup>2</sup> PV arrays will provide part of the Proposed Development's electricity requirements thereby displacing a total of 125 tonnes  $CO_2$ /year. This equates to approximately 0.6% savings in  $CO_2$  emissions over the 'be clean' scheme.

# ES 20.

Incorporation of the proposed energy strategy will result in approximately a 31% saving in the total  $CO_2$  emissions over the baseline scheme. This corresponds to 9,950 tonnes  $CO_2$ /year savings. The energy consumption and  $CO_2$  emissions of the baseline, 'be lean', 'be clean' and 'be green' scheme, including the  $CO_2$  emissions savings from on site renewable energy technology, are shown in Table ES-1 and Figure ES-1. Figure ES-2 shows the improvement in  $CO_2$  emissions of the regulated energy uses of the Proposed Development.

	CO Emissions (toppos CO (year)					
	CO <sub>2</sub> Emissions (tonnes CO <sub>2</sub> /year)			Energy (wwwn/year)		
	Regulated	Non-Regulated	Total	Regulated	Non-Regulated	Total
Baseline	2,714	29,356	32,070	8,289	114,711	123,000
LEAN	2,441	24,247	26,688	7,488	98,085	105,573
CLEAN	1,507	20,739	22,245	8,499	101,865	110,365
GREEN	1,381	20,739	22,120	8,278	101,865	110,144

Table ES-1. Energy consumption and CO<sub>2</sub> emissions for the Energy Strategy stages – for regulated and non-regulated energy



Figure ES-1. Total savings in CO<sub>2</sub> emissions for the Energy Strategy stages



Figure ES-2. Regulated (ADL2A 2006) savings in CO<sub>2</sub> emissions for the Energy Strategy stages

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