

6. Climate Change

Introduction

- 6.1 This chapter addresses the importance of tackling climate change through reducing CO₂ emissions and energy use, and describes the measures proposed to reduce the impact of the development on climate change. These measures will target:
- achieving a significant improvement over the mandatory 25% reduction in regulated CO₂ emissions over Building Regulations Part L 2010 baseline required for Code for Sustainable Homes Level 4 ; and
 - reducing regulated CO₂ emissions by 20% through the use of on-site Low or Zero Carbon technologies as far as feasible and;
 - monitoring and reporting on site CO₂ emissions during the construction phase.
- 6.2 The chapter should be read in conjunction with the Energy Strategy, the Sustainability Statement and the Code for Sustainable Homes Strategy, which are presented as **Technical Annexes 2.1, 2.2 and 2.3** respectively.

Background

- 6.3 With a majority of the world's scientists accepting that climate change is occurring, resulting in increased global temperature and rising sea levels, energy has become a key concern. The carbon we consume on a daily basis mainly comes from non-renewable fossil fuels, which are becoming increasingly expensive as resources are depleted. This use is inherently unsustainable, and alternative energy sources must be sought.
- 6.4 Generating energy from fossil fuels emits greenhouse gases into the atmosphere, in particular carbon dioxide (CO₂), which contributes to pollution and climate change. Reducing carbon consumption and the related greenhouse gas emissions is therefore essential to protect the environment, maintain energy security and reduce the likelihood of fuel poverty.
- 6.5 The Climate Change Act (2008) sets legally binding targets for the reduction of greenhouse gases including carbon. Under this Act, the UK net carbon account for 2050 will be at least 80% lower than the 1990 baseline with the interim target of 2020 at 34%.

Scope and Methodology

- 6.6 Total CO₂ emissions from the development will be reduced by circa 34% over Part L 2010 baseline. As part of this the implementation of Low or Zero Carbon technologies (LZC) are to be implemented to reduce CO₂ emissions by 20% as far as feasible. Setting these targets complies with the London Plan 2011 and Camden Local Development Framework.
- 6.7 Meeting this target is challenging. After a review of opportunities and constraints, an energy strategy was developed in accordance with best practice, planning policy requirements and guidance. Sample Standard Assessment Procedure (SAP) calculations from similar developments were used to demonstrate that the building has been designed to meet these targets as far as feasible.

6.8 SAP calculations model the likely energy usage of dwellings, and therefore the indicative carbon usage, of space and water heating in a dwelling. At the early design stage, SAP calculations were estimated using indicative figures taken from actual SAP calculations which reflect the size, form and configuration of the dwellings. These calculations will be updated as the detailed design is refined, and actual SAP calculations will be produced.

6.9 The energy strategy has been produced in accordance with the (1) be lean, (2) be clean and (3) be green energy hierarchy (set out in the London Plan). The strategy has been built around two main concepts: a Fabric First Approach and a Solar Led Approach.

Fabric First (Be lean)

6.10 In embracing the energy hierarchy a fabric first approach has been adopted. A fabric-first approach means consuming less energy and allowing greater resilience to increasing energy prices and climate change. The methodology ensures that a building will consume less energy over its long lifetime (circa 50+ years). The rationale is that other technologies have much shorter life-spans (by a factor of 2 to 4) and that there is no guarantee that they will be replaced, whereas a high-quality low energy consuming home will be around for many years.

6.11 The fabric specification proposed is compliant with Camden’s CP3 specification guidance with improvements to guidance specifications including improved glazing, floor insulation and implementation of energy efficient services with heat capture. The materials for the development have been selected to ensure that both the embodied carbon and the operational carbon of the buildings will be minimised over their lifespan.

Heat Recovery (Be Clean)

6.12 The specification proposed incorporates highly efficient heat recovery units to recycle the heat in the dwellings to further reduce heat demands from fossil fuels.

Solar Led (Be Green)

6.13 This approach involves the use of photovoltaic (PV) panels. As a renewable Low or Zero Carbon (LZC) technology, they generate electricity from sunlight in sunny, cloudy and overcast conditions, although more electricity can be generated in direct sunlight.

6.14 The advantages of this approach include low maintenance costs, as panels are usually cleaned by rainwater and many are guaranteed for 20-25 year lifetime, but are expected to last longer. PV panels will be placed on roofs; based on the indicative SAPs, around 60 panels will be needed to meet the target. The associated energy and carbon savings have been calculated using SAP 2009 methodology taking into account actual irradiance, orientation and pitch of the PV array. The CO₂ savings from the strategy are as follows:

Technology	Details	tCO ₂ saved	London Plan target met?
Enhanced building fabric	Highly energy-efficient building fabric and services with additional energy-saving devices	9.30	No
Photovoltaic panels (PV)	Approx 15.9kWp PV system* (e.g. 60 x 265 Wp PV panels)	8.48	No

	Total	17.7	Yes
--	-------	------	-----

* SAP 2009 methodology accounting for actual orientation, pitch and local irradiance.

- 6.15 In developing the energy strategy, the analysis has used indicative SAP calculations, since the detailed design has yet to be finalised. The strategy has therefore considered the use of supplementary renewable technologies such as hybrid PV panels or air-source heat pumps if required. The final solution will be submitted for approval during detailed design.

Policy Context

- 6.16 Government White Papers including ‘*Our Energy Future – Creating a Low Carbon Economy*’ (published 2003) and ‘*The Carbon Plan*’ (published 2010) and the Climate Change Act (November 2008) have shaped a vision for the UK’s response to climate change and inform practice in the construction industry and in planning policy at the national, regional and local level.

- 6.17 The following London-wide and borough-wide planning documents are relevant:

- The London Plan (July 2011);
- London Sustainable Design & Construction Supplementary Planning Guidance (May 2006);
- Camden Core Strategy (November 2010);
- Camden Development Policies (November 2010);
- Sustainability Camden Planning Guidance 3 (2011);
- London Housing Design Guide INTERIM EDITION (Aug 2010); and
- Draft London Housing Sustainable Design Supplementary Planning Guidance.

Baseline Conditions

- 6.18 The site is currently vacant brownfield land. The only carbon emissions it produces are associated with natural releases from soils and with occasional maintenance activities (grass cutting etc). No on-site sources of ground gas (e.g. methane) have been identified.

Predicted Effects

- 6.19 The dwellings will comply with Building Regulations 2010 Part L, Code for Sustainable Homes ‘Level 4’, which seeks a 25% improvement in DER/TER and a 20% reduction in CO₂ emissions from on-site LZC technologies. They will be orientated to face east and west, allowing each unit to benefit from solar gain, particularly through the summer months when the angle of the sun and window is closer to 90 degrees. Houses will benefit from being dual aspect, thereby increasing the amount of natural light penetrating into the homes.
- 6.20 Surrounding trees will not provide substantial shading of PV panels. Balanced mechanical ventilation with heat recovery has been modelled, as this is in line with the London Plan energy hierarchy to use heat efficiently and recycles warm air that would otherwise be lost.
- 6.21 On-site construction emissions will be monitored and minimised. Materials used in the construction process, for products such as windows, will be selected where they

demonstrate low embodied energy (or carbon) so that the energy used in the production, processing use and disposal is accounted for.

6.22 Technologies built into the dwellings during construction will also achieve reductions in the amount of energy and carbon emitted from the operational development, including:

- the “fabric first” approach (outlined previously);
- high efficient individual gas-fired boilers;
- air permeability standard of 3m³/hr/m²
- accredited construction details;
- 100% low energy light fittings;
- mechanical ventilation with space heat recovery (MVHR);
- flue gas heat recovery (FGHR); and
- weather/load compensator as appropriate

6.23 These technologies will ensure a high level of energy efficiency across the development as demand for energy and CO₂ emissions are reduced. The remainder of the required reduction in CO₂ emissions, and the demand for energy from on-site renewable technologies, will be met through the use of photovoltaic (PV) cells.

		Be Lean	Be Clean	Be Green	
Regulated CO ₂ Emissions	Baseline (Part L 2010 TER)	Proposed Gas Baseline (DER)	Proposed Building (DER)	Proposed Building (DER)	Final %age Reduction over Part L 2010 Baseline
		<u>no LZC or Energy Efficiency Measures</u>	<u>With Heat Recovery Systems (HR)</u>	<u>With HR & PV</u>	
Total Regulated (tCO₂/yr)	47.64	44.14	38.34	31.12	34.67%
%age Reduction over Part L 2010	N/A	7.34%	19.51%	34.67%	N/A
% age Reduction from Energy Efficiency Services & LZC	N/A	N/A	13.14%	22.11%*	N/A

*SAP 2009 methodology accounting for actual orientation, pitch and local irradiance

6.24 Once the development is occupied, the residents will be responsible for reducing CO₂ emissions. The behaviour of residents will vary from home to home, depending on factors such as the number of users inhabiting a home. Residents will be provided with a Home User Guide which sets out ways in which they can use their home in an energy-efficient manner.

Residual Effects

- 6.25 The proposed development will meet Building Regulations Part L 2010 CO₂ Target Emission Rate (TER). The actual Dwelling Emission Rate (DER) will be circa 34% better than this, providing a significant saving in CO₂ emissions.
- 6.26 The incorporation of enhanced building fabric, energy efficient services and a PV system will ensure that the London Plan 25% reduction in CO₂ emissions over Part L is achieved. Further to this, the implementation of PV to cover all available non shaded roof space technologies will reduce the total CO₂ emissions as measured by the indicative SAP calculations of the site by 20%.