

**ENERGY EFFICIENCY AND SUSTAINABILITY**  
**STATEMENT**  
**REVISED**

**Land at**  
**Bicester KME**

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## INTRODUCTION

Bovis Homes have been requested to provide a report showing its approach to reducing CO<sup>2</sup> emissions by 19% per plot through the “Fabric First” approach and the use of renewable energy.

# **ENERGY STRATEGY FOR RESIDENTIAL DEVELOPMENT AT Bicester KME**

## **Executive Summary**

This document has been prepared on behalf of Bovis Homes in order to confirm the energy strategy for the residential development at Bicester KME

Essentially the proposal is to follow the latest Government guidance to reduce carbon dioxide emissions, by providing a ‘fabric first’ approach with a limited use of renewables (i.e. PV). This approach (i.e. increasing insulation, reducing the effects of thermal bridging, effective air tightness and improved controlled ventilation) is ‘Future Proof’.

This approach will produce a reduction in the region of 19% of the projected CO<sup>2</sup> emissions for the development. This is based on calculations produced using SAP 2012 and 2013 Building Regulations for which the site has been registered under for Building Regulation approval. These calculations assume a 6 % improvement over the 2010 Regulations and are in accordance with the LA Local Plan which is based on 2010 Part L1a Building Regulations and by using 2012 SAP software the need is to prove a further 13% improvement.

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## **1.0 Energy Strategy for Residential Development**

Studies have proved that it is more beneficial to the environment to reduce carbon emissions and atmospheric pollution by improving the fabric of new buildings, to reduce heat losses from the buildings external materials (therefore reducing the heating required), by improving the insulation and air tightness of the building (e.g. enhanced detailing at thermal bridges). This can be proved by predicted energy assessments (PEAs) based on the construction detail drawings at design stage.

The Government Guidelines were amended in November 2013 to place significantly more emphasis on the building fabric rather than renewables. This is because the Government of England and Wales have recognised that renewable energy may require maintenance or replacement in time, and because of the technical nature of most forms of renewable energy this could be a costly and difficult exercise.

The building fabric, however, has a much longer and more sustainable lifespan. The energy savings in making sure the external fabric of a building is carefully detailed, well insulated and air tight is considerable. Improved building fabric can save on the energy required to heat a property and provide a substantial reduction in carbon emissions.

The purpose of the Energy Hierarchy is to provide the principled approach to designing a building with sustainable energy performance in mind. The Hierarchy is being embedded to policy and practice through DCLG's ongoing work on Low and Zero Carbon Buildings, building regulations, and through planning policy.

1. The first approach to designing and constructing sustainable buildings should be to reduce the energy demand. This can be achieved by improving the insulation of the external fabric of the building and by reducing the air leaking through the building by careful detailing of the external junctions. This will reduce the quantity of energy required for heating. Also rooms with more natural daylight will reduce the energy requirement for electric lighting.
2. The next step is to provide improved energy efficiency. This can be achieved by the use of energy efficient lighting and other energy efficient electrical items, such as kitchen white goods. High efficiency boilers will also contribute towards energy efficiency, as will better controls on all above items. Please refer to section 5 of this report for more details.
3. The third approach is to consider the use of renewable energy solutions, such as pv and waste water heat recovery systems.

## **2. Energy Efficient Construction and Air Tightness**

The construction specification below has been enhanced above 2013 Building Regulation standards, this improvement provides energy efficient construction and utilise green guide rated materials, as mentioned in the materials section below:-

Ground floor – Jetfloor beam and insulated block, 70mm sand/cement screed – U value 0.14/0.15. Green guide A+ rated

External walls – 100mm aircrete block work (density 6-80 kg/m<sup>3</sup>) 3.5N/mm<sup>2</sup> and a thermal conductivity of 0.11W/mK to inner leaf (U-Value of 0.23W/m<sup>2</sup>K). Green guide A rated

Party walls – 100mm Blockwork with 150mm insulated cavity and 100mm inner blockwork. –U Value of 0.0W/m<sup>2</sup>K

Roof – 100mm Glass mineral fibre insulation roll (0/044W/mK) laid between ceilings ties and 2 layers of 150mm cross laid over the top (U-Value 0.11W/m<sup>2</sup>K) Green guide A rated.

Window – Double glazed UPVC – U value 1.2. Green guide A rated.

In order to further reduce heat losses through the external building fabric, the dwellings will be built to have a design air permeability on tested properties of 5 m<sup>3</sup>/m<sup>2</sup>/hr@50Pa, or less ,which is a vast improvement over the maximum of 10 m<sup>3</sup>/m<sup>2</sup>/hr@50Pa required by the Building Regulations.

## **3. Other Fabric First Inclusions**

### **Internal Lighting**

To encourage the provision of energy efficient internal lighting, thus reducing the carbon dioxide emissions from the dwellings, 100% of the internal lighting will be energy efficient lighting, i.e. the fittings are dedicated fittings only capable of accepting lamps having a luminous efficacy greater than 40 lumens per circuit Watt . This is in excess of the requirement under the Building Services Design Guide of 75%

### **Drying Space**

To reduce energy used to dry clothes by tumble dryers, areas for drying lines will be provided, thus allowing clothes to dry naturally. Those will be provided by allowing space for the use of the rotary airers in the rear gardens to the house.

### **Energy Labelled White goods**

To encourage the provision of energy efficient white goods, thus reducing carbon dioxide emissions from kitchen appliance use in dwellings, any white goods provided will have the appropriate A + energy rating. Dwellings that are not supplied with kitchen appliances will be provided with an information leaflet giving guidance on the EU energy labelling scheme.

## **External Lighting**

To encourage the provision of energy efficient external lighting, thus reducing carbon dioxide emissions associated with the dwellings, all of the external lights where provided will have a maximum wattage of 100W and will be fitted with PIR movement detecting control devices, or daylight cut off sensors, or timers.

## **Materials**

To reduce the use of materials with lower environmental impacts over their lifecycle, building materials specified in the construction of the roofs, external walls, internal walls, floors and windows, to all dwellings, will have a favourable rating from the Green Guide. The development drawings indicate traditional external materials, which would have a good (D – A+) rating.

To recognise and encourage the specification of responsibly resourced and recycled building and finished materials suppliers' certificates will be provided to prove the building materials have come from a legal source with a responsible chain of custody and key process. Certificates include FSC (Forest Stewardship Council), EMS (Environmental Management System) and EMAS (ECO-Management and audit Scheme). These would come from the supplier's during the construction stage.

The use of these lower impact materials also has a great influence on the more global footprint.

## **Pollution**

To reduce global warming from the manufacture and installation of insulating materials the developer will ensure that all insulating materials used a global warming potential of less than 5. The insulation supplier can provide this information for all dwellings.

To reduce the emission of nitrogen oxides into the atmosphere the space heating and hot water systems to all dwellings the boilers installed will have reduced dry NOx levels. Nitrogen oxides contribute to acid rain, global warming and produces ozone and the use of low NOx boilers helps reduce these environmental impacts. The installed boilers will therefore have a dry NOx level of less than 32mg/kWh.

## **WATER CONSERVATION**

All private for sale properties have been designed, by using the BRE Water Calculator in accordance with Part G will have a usage of less than 110 litres/ person/ day.

All social/affordable properties have been designed, by using the BRE Water Calculator in accordance with Part G will have a usage of less than 105 litres/ person/ day.

## **RENEWABLE ENERGY SYSTEMS**

All properties apart from P5011,P5012, P503 and P504 will be fitted with waste water heat recovery systems.

The P5011, P5012, P503 and P504 will be fitted with 3kw of PV, aspect and location of property permitting.

## **CONCLUSION**

The results from the Sustainability Appendix tables show a reduction against Building Regulations Part L1a 2013 TER values. The 2013 Building Regulations Part L1a show an improvement of 6% against 2010 Part L1a calculations. Thus the appendix schedule shows as far as economically possible a further reduction in the region of 13%.

This demonstrates the advantage of a Fabric First strategy. This approach is a Lifetime Approach enabling this efficient reduction of CO2 to be maintained without major maintenance to the owner/ occupiers of the properties, along with a limited amount of renewable energy.

#### 4: SUSTAINABLE APPENDIX.

#### CO2 reduction calculation

### APPENDIX

#### Bicester KME

19% reduction based on 2010 Part L1a Building Regulation  
Including 6% improvement from 2010 to 2013 Regulation.

	2013 Base Line Calculations		Based on 2013 Building Regulations Part L1a		% Difference per plot	
	TER	Total TER	Standard Specification DER	Total DER		
<b>Private House Types</b>	<b>No.s</b>					
P504 PV	9	14.46	130.14	6.53	58.77	55
P503 PV	6	16.76	100.56	7.8	46.8	53
C5011 PV	3	13.99	41.97	6.66	19.98	52
C5012 PV	1	14.99	14.99	5.89	5.89	39
C4006	12	14.25	171	12.4	148.8	13
P409	28	15.19	425.32	13	364	14
P408	10	15.17	151.7	13.12	131.2	14
P404	26	15.64	406.64	13.61	353.86	13
P403	8	16.54	132.32	14.24	113.92	14
C3003	9	16.54	148.86	14.46	130.14	13
P308	16	16.27	260.32	13.77	220.32	15
P306	12	18.78	225.36	16.36	196.32	13
<b>Affordable Housing</b>						
SB Bungalow	2	20.89	41.78	17.42	34.84	17
S4 P408	5	15.17	75.85	13.12	65.6	14
S3 P308	12	16.27	195.24	13.77	165.24	15
S241	26	19.2	499.2	16.68	433.68	13
S7 apartment	8	19.04	152.32	16.5	132	13
S8 apartment	6	18.78	112.68	16.15	96.9	14
S10 – 1 Bed	3	20.48	61.44	17.6	52.8	14
S10 – 2 Bed	1	18.98	18.98	16.4	16.4	14
S9/S11 AF05	4	22.08	88.32	19.56	78.24	12
<b>Total</b>	<b>207</b>					