



## 15.0 Energy

### 15.1 Introduction

- 15.1.1 The Energy chapter addresses the implications of the energy demand and associated Green House Gas (GHG) emissions arising as a consequence of the proposed development of the Land east of Lodden Lakes, Gillingham, Dorset.
- 15.1.2 This chapter specifically considers the policy background to energy and climate change, sets out an assessment of the baseline environment and highlights the particular energy issues and targets relevant to the development.
- 15.1.3 The proposed development site covers an area of approximately 3.85 hectares and shares a border by Lodden Lakes to the south-west. It consists of approximately 1,800 dwellings and a mixed-use local centre in a self-contained site but will integrate with the wider urban extension plans proposed for Gillingham.

### 15.2 Methodology and Scope

#### Policy Background

- 15.2.1 Carbon reduction is now engrained in planning policy and building regulations and being driven at national and local level agendas. At a national level, the National Planning Policy Framework addresses energy in Chapter 10 'Meeting the challenge of climate change, flooding and coastal change'. National policy sets out that the role of the planning system is to contribute to achieving sustainable development, including mitigating and adapting to climate change. One of its core planning principles is that planning should "support the transition to a low carbon future..." by encouraging "... the use of renewable resources (for example, by the development of renewable energy)". Paragraph 96 of Chapter 10 states that 'In determining planning applications, local planning authorities should expect new development to:
- Comply with adopted local plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and
  - Take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption'.
- 15.2.2 The current local planning policies for NDDC are contained in the NDLP part 1 – policy 1 to 33<sup>1</sup>. Extracts of policies related to energy of potential relevance to the proposed development include:
- Policy 3 – Sustainable Development Strategy; sets out how the council will take planning decisions in accordance with the presumption and provides guidance on how it will be applied in the district. In addition, the policy establishes a core spatial strategy which establishes the Council's overall approach to the distribution of development in the district.

The energy target is to prioritise the reduction in energy demand associated with the development from the outset and ensure that all new dwellings and buildings are as energy efficient as feasibly possible. The promotion of design solutions to incorporate building performance that exceeds the statutory building regulations is necessary.

The key areas identified at the local level where the planning process can influence are:

- Simple building rectangular plan form to be adopted where possible
- A "fabric first" approach with optimum economic levels of insulation
- Low levels of air permeability
- Optimising use of passive heating and ventilation
- Exploiting daylight for illuminance whilst avoiding unwanted solar gains
- Low energy lighting to be adopted where appropriate

All dwellings and mixed-use centre will be constructed in line with the current building regulations (Part L 2013).

#### Key Legislation

- 15.2.3 The Climate Change Act was passed in 2008 and established a framework to develop an economically credible emissions reduction path. It also strengthened the UK's leadership internationally by highlighting the role it would take in contributing to urgent collective action to tackle climate change under the Kyoto Protocol.

The Climate Change Act includes the following:

- 15.2.4 2050 Target. The act commits the UK to reducing emissions by at least 80% in 2050 from 1990 levels. This target was based on advice from the CCC report: Building a Low-carbon Economy. The 80% target includes GHG emissions from the devolved administrations, which currently accounts for around 20% of the UK's total emissions.

#### Scoping Assessment Stage

- 15.2.5 There has been no scoping assessment in terms of energy at this stage.

#### Assessment Methodology

- 15.2.6 This chapter considers energy consumption and climate change in broad terms, with particular emphasis on the energy use of the proposed development and on mitigation measures proposed to minimise energy use and corresponding climate change impacts. Mitigation involves taking action to reduce the impact of human activity on the climate system, primarily through reducing greenhouse gas emissions.
- 15.2.7 The chapter adopts the general approach to the assessment of the effects of climate change. The receptor (i.e. the earth's atmosphere / climate) is categorised as being of Very High Sensitivity, given the potentially global effects of climate change and the UK's legally binding commitments to reduce GHG emissions.
- 15.2.8 The magnitude of impact is categorised as shown in Table 15.1 below. The assessment assumes a  $\geq 1\%$  net development increase in kilo tonnes (kt) CO<sub>2</sub>/year emissions compared to the local authority boundary total emissions is a moderate to substantial adverse impact. Emissions at a lower level than that result in a slight adverse impact. Reductions in emissions as a result of a development are classified on the same scale and are beneficial rather than adverse. There is no widely accepted method for defining the magnitude of impacts in terms of development GHG emissions measured as CO<sub>2</sub>. Therefore the categories proposed in Table 15.1 are based on WYG's professional judgement.



Table 15.1 Determining Magnitude of Impact

| Impact                                                                                       | Magnitude                          |
|----------------------------------------------------------------------------------------------|------------------------------------|
| ≥ 1% increase in local baseline emissions in kilo tonnes (kt) CO <sub>2</sub> /year          | Moderate to Substantial Adverse    |
| > 0% to < 1% increase in local baseline emissions in kilo tonnes (kt) CO <sub>2</sub> /year  | Slight Adverse                     |
| No increase in local baseline emissions                                                      | Negligible / None                  |
| > 0% to < 1% reduction in local baseline emissions in kilo tonnes (kt) CO <sub>2</sub> /year | Slight Beneficial                  |
| ≥ 1% reduction in local baseline emissions in kilo tonnes (kt) CO <sub>2</sub> /year         | Moderate to Substantial Beneficial |

Note: 'local' is defined as the Dorset Council local authority boundary area

Limitations of the Assessment

- 15.2.9 The assessment uses 2012 reference baseline data as the most up to date Government data publically available. Despite the recent important improvements made in the methodology of GHG emissions reporting, DECC state that the estimates are not perfect. They stretch the information available to the limit in order to provide estimates for each authority. Therefore, they should be used as an indication of the relative level of emissions and change.
- 15.2.10 The assessment is not detailed and therefore does not take into account complex issues such as the potential for release of carbon stored in the agricultural soils on the Site.
- 15.2.11 The assessment assumes a ≥1% net development increase in kt CO<sub>2</sub>/year/capita emissions compared to the local authority boundary total emissions results in a Moderate to Substantial Impact, whereas emissions below this level result in a Slight Impact. There is no widely accepted definition in relation to impact magnitude and significance in terms of development GHG emissions measured as CO<sub>2</sub>.
- 15.2.12 It is not expected that any of the above limitations, if addressed at significant extra assessment effort, would change the conclusion of the impact assessment.

15.3 Baseline Environment

Existing baseline

Global, National and Regional Level

- 15.3.1 Global GHG emissions due to human activities are estimated to have grown significantly since pre-industrial times. Carbon dioxide (CO<sub>2</sub>) is the most important anthropogenic GHG and in 2008 it accounted for 85% of the UK's GHG emissions.
- 15.3.2 The UK compiles an annual inventory of its greenhouse gas emissions in order to monitor progress against domestic and international targets such as the Kyoto Protocol. The UK has already met the Kyoto targets, in fact the 12.5% cut was exceeded in the year 2000.

Graphical representations of carbon dioxide emissions and GHG emissions since 1990 are shown in the figure below (Figure 15.1: Emissions of greenhouse gases, 1990-2013 DECC<sup>ii</sup>, March 2014).

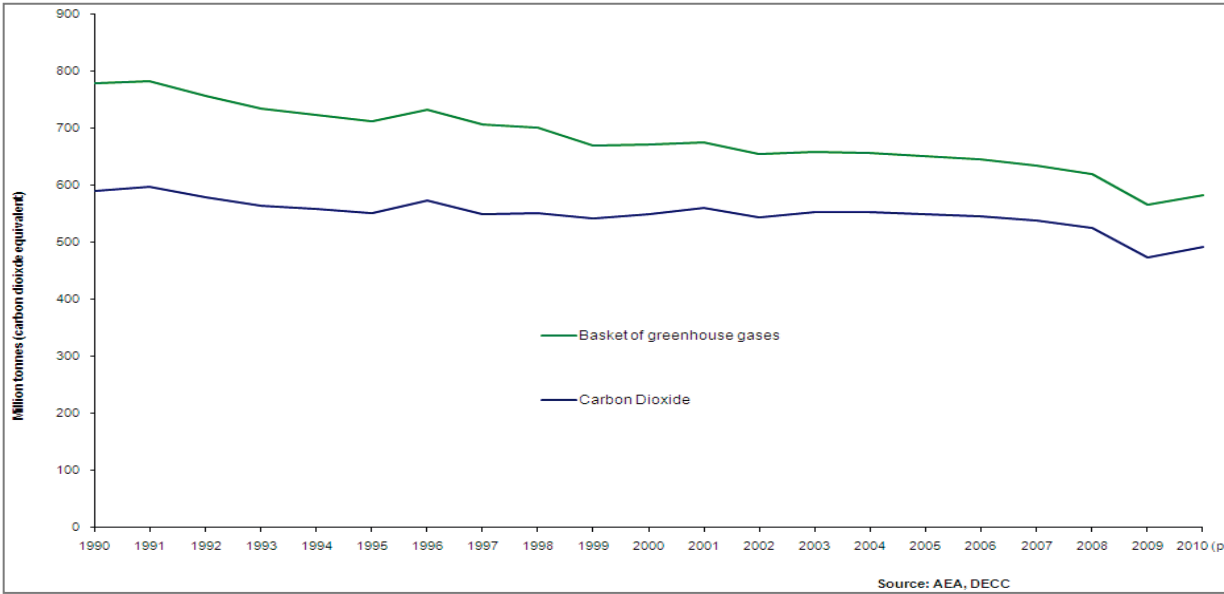
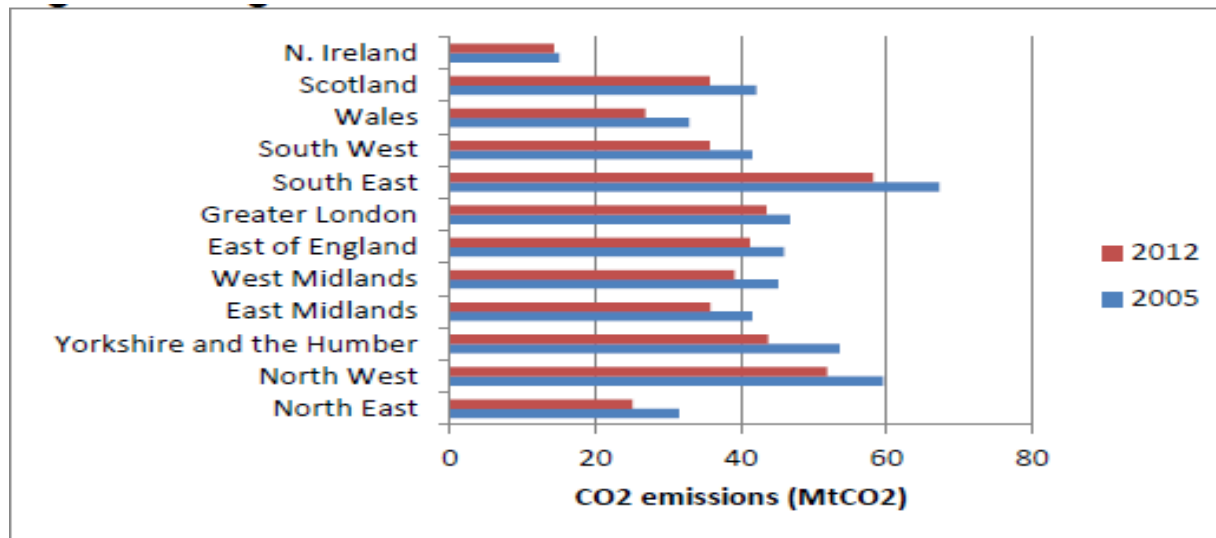


Figure 15.1 Emissions of greenhouse gases, 1990-2013 (provisional) [Mt CO<sub>2e</sub>]

- 15.3.3 The UK's national CO<sub>2</sub> emission picture, according to the DECC data shown in the above graph is one of a general decrease in emissions (DECC, March 2014).



**Figure 15.2 Regional emissions in 2005 and 2012 (Mt CO<sub>2</sub>)**

#### Local Level

- 15.3.4 The 2012 local authority carbon dioxide figures published by DECC on 26<sup>th</sup> June 2014<sup>iii</sup> provide an estimation of the total CO<sub>2</sub> emissions by sector within local authority boundaries in the UK between 2005 and 2012. The DECC UK CO<sub>2</sub> reporting project combines data from the National Atmospheric Emissions Inventory (NAEI) with data from a number of other sources, including local energy consumption data from DECC, to produce a nationally consistent set of CO<sub>2</sub> emissions estimates down to local authority level.
- 15.3.5 The data shows that 53 kilo tonnes (kt) of CO<sub>2</sub> were released in the Dorset Country Council local authority boundary in 2009. In 2014 it is recorded there is little change with 52.5 kt of CO<sub>2</sub> recorded.

### 15.4 Mitigation within the Submitted Design

- 15.4.1 The design features proposed to minimise energy use and carbon emissions during the operation of the development.

#### Sustainable Construction

- 15.4.2 The new development will incorporate energy design measures to reduce energy demand and therefore CO<sub>2</sub> emissions. Both passive and active energy measures are considered within the strategy to reduce energy demand. A new build development signifies the building regulations approved document Part L1A 2013 will be referred to with regards to the relevant legal requirements and general guidance. In response to the planning policy, new homes will be required to achieve compliance with L1A: Conservation of fuel and power in new dwellings of the building regulations.
- 15.4.3 Keeping in line with the Local planning policy, a SBEM energy model has been produced for the Standard Assessment Procedure (SAP) to determine compliance with Part L1A. The SAP methodology provides the CO<sub>2</sub> emission rates as a Target Emission Rate (TER) forming a notional building. To achieve compliance the Dwelling Emission Rate (DER) needs to improve upon the TER. JPA Design 990 software is industry standard

approved software used to perform the Part L1A carbon emissions calculation for dwellings. The software is certified for compliance with the Building Regulations and Energy Performance Building Directive (EPBD) in the UK.

- 15.4.4 The following design parameters have been included within the energy model to ensure sustainability features and energy efficient methods are considered for the development;

#### Passive Design Measures

- **Increased fabric performance;** improving the fabric performance to give a significant improvement on the notional fabric.
- **Reduced Air Permeability;** A target air permeability rate of 5m<sup>3</sup>/hr/m<sup>2</sup> @ 50Pa has been set for the dwellings.
- **Natural Daylighting;** the proportions and distribution of glazing are expected to ensure good levels of daylight, helping to reduce electricity consumption through artificial lighting.
- **Natural Ventilation;** the scheme will be designed and built to minimise the risk of summer overheating without the use of comfort cooling via natural ventilation, solar controlled glazing and effective external shading. The dwelling will be naturally ventilated with intermittent extract fans in the kitchen and WC/bathrooms.

#### Active Design Measures

- **Energy efficient lighting;** the dwellings will be fitted with 100% dedicated energy efficient light fittings to reduce energy consumption.
- **Highly efficient gas-fired boilers;** central gas boilers fitted to individual dwellings will aim to be as efficient as feasibly possible and aim to have a seasonal efficiency of at least 95%. This will help to reduce gas consumption for space heating and domestic hot water loads.
- **Local heating control;** the dwellings will be controlled with thermostatic sensors. The meters will record heating consumption rather than a flat rate charging system. These are important measures to optimise heating demand and ensure that building services are not in operation when they are not needed.
- **Enhanced pipework thermal insulation;** the thermal distribution network will be insulated beyond the requirements of the relevant standards to reduce distribution losses
- **Energy metering;** will be provided in all units.

#### Unregulated Energy

- 15.4.5 Overall there is very limited design control over the un-regulated energy use at the development. Un-regulated energy consumption is not considered in the building regulations part L1A. However an effort will be made to reduce the un-regulated energy uses (e.g. small power, security lighting etc) through the following measures:

#### Energy-efficient white goods;

Where provided, white goods and kitchen equipment are to be energy efficient:

Minimum of A+-rating for fridges and freezers or fridge-freezers;

Minimum of A rating for washing machines and dishwashers;

Minimum of A rating for washer-dryers or tumble dryers.



**External Lighting;** All external lighting will be energy efficient and will incorporate the relevant controls i.e. passive infra-red, timers etc. to ensure that these are not switched on when they are not required.

## 15.5 Likely Significant Environmental Effects of the Scheme

### Construction Phase Effects

- 15.5.1 The construction works themselves are temporary and long term in nature (long term is defined as over 2 years in duration). Taking the temporary nature of the net impact into account, it is not expected that the construction proposals themselves will result in any more than a Slight Impact at the local, regional, national or global level.
- 15.5.2 It is recognised that GHG emissions will be generated during the construction phase from the following sources:
- Use of fuel in transportation of people associated with the construction and materials around the Site and off-site.
  - Use of light and other power in the welfare facilities, construction compound, and in the use of machinery around the Site.
  - Use of quantities of other resource materials during the construction.
  - The removal, disturbance and disposal of embodied energy that is locked up within the existing materials present on the Site (e.g. soils and living vegetation etc.).
- 15.5.3 A fully detailed and quantified assessment was not undertaken due to the professional opinion that relatively short term temporary release of GHGs associated with construction, are expected to be minimal in terms of the contribution to climate change effects. Also, at this stage of the proposed development only indicative details of the proposed construction methods and materials are available, rendering accurate predictions of GHG emissions very difficult, however estimates have been made.

### Operational Phase Effects

- 15.5.4 The semi-quantitative analysis undertaken suggests that the carbon footprint of the Proposed Development will be very low when compared with emissions scenarios at different geographic scales, including regional, national and international scales. In relation to climate change effects these mainly manifest themselves at a national and global scale. However, regardless of this, it is reasonable to conclude that the project in accumulation with all the other developments proposed in the locality, region, nationally and internationally could, in combination with the other projects, give rise to significant environmental effects at those scales.

This is an unfortunate consequence of human activity and will continue to be the case with the majority of development until the life cycle is carbon neutral.

- 15.5.5 This is also the message endorsed by The Institute of Environmental Management and Assessment's Principles Series: Climate Change Mitigation and EIA guidance (IEMA, 2010). This states that when evaluating significance, *all new greenhouse gas emissions contribute to a significant negative effect on climate change.*
- 15.5.6 Given the above, it is assumed for the purposes of this assessment, and based on the methodology outlined in the Energy Statement of this ES, that for both the construction and operational phases:
- The receptor (i.e. the earth's atmosphere / climate) is of Very High Sensitivity
  - The impact of the GHG emissions from the Proposed Development is 'Slight'
- 15.5.7 The Effect is therefore of a 'Major/Intermediate' level, which would be a significant effect. The effect would be adverse, permanent, long-term, irreversible and cumulative. It would be both direct (e.g. due to emissions from heating/cooling/lighting equipment) and indirect (e.g. due to embodied carbon).

## 15.6 Additional Mitigation, Compensation and Enhancement Measures

- 15.6.1 No additional mitigation, compensation or enhancement measures are proposed for the design, construction or operational phases above and beyond those features discussed in the design mitigation section of this chapter.

## 15.7 Assessment Summary and Likely Significant Residual Environmental Effects

- 15.7.1 As no additional mitigation, compensation or enhancement measures are proposed for the design, construction or operational phases, the residual environmental effects will be the same as the effects described in Section 15.6 above.

## 15.8 Cumulative impacts

- 15.8.1 The Energy Statement identifies developments to be included in the cumulative scope. However, because climate change is a global phenomenon, all development taking place across the world resulting in net increases in GHG emissions can be considered to operate cumulatively. This is discussed in Section 15.5 above. Therefore cumulative impacts are assumed to be the same as those already identified above.

## 15.9 References

- <sup>i</sup> NDLP – 2011 to 2016 Part 1
- <sup>ii</sup> DECC (2011) UK Climate Change Sustainable Development Indicator: 2010 Greenhouse Gas
- <sup>iii</sup> Department of Energy & Climate Change (2014) Statistical Release 26<sup>th</sup> June 2014, Local Authority Carbon Dioxide Emissions Estimates 2012 and National Statistics.