Communities and Local Government

Feasibility study to examine making the Thames Gateway a low carbon/zero carbon development area

Interim Report

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November 2006
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On 5th May 2006 the responsibilities of the Office of the Deputy Prime Minister (ODPM) transferred to the Department for Communities and Local Government.

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Executive Summary

The main objective of this feasibility study is to understand the magnitude of greenhouse gas emissions within, and as a result of activities in the Thames Gateway and what changes are likely to be required, driven by new policies, in order to reduce the magnitude of emissions and at what cost.

In order to achieve this objective, the following tasks have been undertaken at this interim reporting stage or will be undertaken for the project:

- *Task 1:* To review frequently used definitions such as "carbon neutral", "zero carbon" and "low carbon", to understand the basis for these definitions and how applicable they are to this study.
- *Task 2:* To define baseline greenhouse gas emissions for the Thames Gateway for an agreed reference year, including emissions arising in other geographical locations outside the Thames Gateway occurring due to the demand for services within the Thames Gateway area.
- *Task 3:* To define a "business as usual" (BAU) scenario, in which current and near-future social trends and policy drivers, together with current or likely future technology, are used to define potential greenhouse gas emissions in, and as a result of activities in the Thames Gateway before further interventions are made.
- *Task 4:* To define alternative future scenarios (referred to as Level I, Level II and Level III), that comprise interventions to reduce greenhouse gas emissions as a result of activities in the Thames Gateway over and above those defined for BAU. These interventions may take the form of technological change, use of financial instruments, and behavioural change, driven by new policies. The future scenarios (i.e. Level I, Level II and Level III) are progressively more challenging, either in terms of the measures suggested and/or the timing for these measures to be introduced, and aim to provide a bigger greenhouse gas saving from Level I to Level III. These future scenarios shall be developed for 2016, 2020, 2030, 2040 and 2050.
- *Task 5:* To cost these future scenarios, against the BAU, in order to understand the likely financial implications associated with achieving a defined level of greenhouse gas emissions as a result of activities in the Thames Gateway.
- *Task 6:* To evaluate the future scenarios against the BAU in terms of predicted greenhouse gas emissions, to understand where significant contributions (and savings) can be made.

Following completion of Task 1, we have made the following conclusions:

- The term carbon neutral describes offsetting of carbon emissions through investments in renewable energy projects, often in developing countries. It has also been used to describe developments where carbon emissions are prevented or reduced through sustainable practices on site, leading to some confusion.

- Zero carbon and low carbon definitions typically refer to energy demand and supply in buildings only. The term zero carbon is used when there are no net greenhouse gas emissions from a development through use of on-site renewable energy generation, after taking into account the balance of imports and exports of National Grid electricity. Low carbon developments achieve at least a 50% reduction in emissions.
- Since the scope of the present study extends beyond energy use in buildings, to include waste, water, transport and logistics (including construction associated with each of these key performance areas), the use of these existing literature definitions is not appropriate.

Tasks 2, 3 and 4 are ongoing. Currently, technical teams are developing scenarios for each of the different 'Levels' specific to energy, waste, water, transport and logistics modelling with data requirements identified and relayed to Communities & Local Government ("the Department"). The Department is seeking to provide the consultants with information to populate the 'Integrated Resource Management' (IRM) model. It is anticipated that results generated using the IRM model shall be used to help inform decision making regarding the relative advantages and disadvantages of the alternative scenarios. The latter information will ultimately be used to inform policy setting or other instruments to help deliver improved performance.

This report includes a description of the future scenarios which are documented separately in the technical report. It should be noted these scenarios may change as more data are made available and further information is provided.

1. Introduction

1.1 TERMS OF REFERENCE

As a result of a proposal submitted in August 2006 as part of the OGC Environmental Advice, Supply and Delivery Framework, Communities & Local Government commissioned Turner & Townsend and Arup to undertake a feasibility study to examine the changes that would be necessary to reduce greenhouse gas emissions[1] arising from, or as a result of activities in the Thames Gateway. An integral part of this work addresses the cost of implementing measures to reduce greenhouse gas emissions.

For this commission, Turner & Townsend provide project management and financial modelling services. As an integrated supply team (IST) partner, Ove Arup & Partners Ltd ("Arup") is responsible for developing the approach and for creating the IRM model and using the latter to help inform decision making linked to the major outcomes of the feasibility study.

1.2 BACKGROUND

The Department website provides the following description of the Thames Gateway area, which informs the setting of a baseline for this feasibility study:

"The Thames Gateway stretches for 40 miles along the Thames Estuary from the London Docklands to Southend in Essex and Sheerness in Kent. Its boundary was drawn to capture the riverside strip that hosted many land extensive industries that formerly served London and the South East, and whose decline has left a legacy of large scale derelict sites and relatively depressed local towns and communities.

The area amounts to 2% of the south east of England, but contains some 17% of its brownfield land (3,800 ha), providing excellent opportunities to help meet the increasing demand for housing at the same time as preserving as much of the 65% that is valuable green space land as possible.

The Gateway has 1.6m residents and approximately 700,000 households, averaging 2.4 people per household. It currently supports some 500,000 jobs.

By 2016, Government's targets for the Gateway include:

- *120,000 new homes including affordable units for rent or purchase by first time buyers including key workers, supported by high quality transport infrastructure;*
- *Aiming for 180,000 new jobs through encouraging business and economic investment offering local residents a wider range of career options;*

1 Although the title of this study suggests that only carbon emissions will be examined, a more holistic approach has been adopted where total greenhouse gas emissions will be quantified in terms of carbon dioxide equivalents.

- *Improve education facilities to enhance the local skills base, helping residents to obtain jobs and better prospects;*
- *All residents will have access to high quality healthcare, reducing the existing inequalities across the area;*

Major improvement to the image and environment of the Gateway, including higher quality design and attractive open spaces, with improved green spaces and access to the river. To date, 82% of approved developments have been on brownfield sites."

1.3 OBJECTIVES OF THE FEASIBILITY STUDY

The main objective of this feasibility study is to understand the magnitude of greenhouse gas emissions within, and as a result of activities in the Thames Gateway, and the changes likely to be required, driven by new policies, in order to reduce the magnitude of emissions and at what cost.

In order to achieve this objective, the following tasks have been undertaken at this interim reporting stage or will be undertaken for the project:

- *Task 1:* To review frequently used definitions such as "carbon neutral", "zero carbon" and "low carbon", to understand the basis for these definitions and how applicable they are to this study.
- *Task 2:* To define baseline greenhouse gas emissions for the Thames Gateway in a reference year, including emissions arising in other geographical locations outside the Thames Gateway occurring due to demand for services within the Thames Gateway area.
- *Task 3:* To define a "business as usual" (BAU) scenario, in which current and near-future social trends and policy drivers, together with current or likely future technology, are used to define potential greenhouse gas emissions in, and as a result of activities in the Thames Gateway before further interventions are made.
- *Task 4:* To define alternative future scenarios (referred to as Level I, Level II and Level III), that comprise interventions to reduce greenhouse gas emissions as a result of activities in the Thames Gateway over and above those defined for BAU. These interventions may take the form of technological change, use of financial instruments, and behavioural change, driven by new policies. The future scenarios (i.e. Level I, Level II and Level III) are progressively more challenging, either in terms of the measures suggested and/or the timing for these measures to be introduced, and aim to provide a bigger greenhouse gas saving from Level I to Level III. These future scenarios are developed for 2016, 2020, 2030, 2040 and 2050.
- *Task 5:* To cost the future scenarios against the BAU in order to understand the likely financial implications associated with achieving a defined level of greenhouse gas emissions as a result of activities in the Thames Gateway.
- *Task 6:* To evaluate future scenarios against the BAU in terms of predicted greenhouse gas emissions and to understand where significant contributions (and savings) can be made.

2. Review of existing literature definitions used to describe levels of carbon emissions

2.1 INTRODUCTION

Terms such as “carbon neutral”, “zero carbon” and “low carbon” are currently being used interchangeably to define developments, activities or products. This has led to some confusion about the meaning, scope and basis of such terms.

Carbon neutral is a generic term used to describe the offsetting of carbon emissions through investments in renewable energy projects, often in developing countries. Inconsistencies can occur when the term carbon neutral is also used to describe developments where carbon emissions are prevented or reduced through sustainable practices on-site rather than financing offsets.

Zero carbon developments achieve no net emissions by reducing carbon emissions through use of on-site renewable energy generation, and balancing any imports with exports to the National Grid to achieve a zero balance. **Low carbon** developments are similar to zero carbon developments, the only difference being that they need to achieve at least a 50% reduction in emissions (where this applies specifically to energy use in buildings[2]).

2.2 APPLICATION OF CARBON DEFINITIONS TO THIS STUDY

This study is focused on potential future interventions applied at a national, regional or local level, and their impact on greenhouse gas emissions and associated cost. Offsetting carbon emissions in the Thames Gateway through financing of renewable energy projects in developing countries is not within the scope of this project.

Use of the term in the context of the Thames Gateway is not appropriate as it would imply that emissions arising in, or as a result of activities in the Thames Gateway, are compensated by equal savings in emissions elsewhere. However, prevention and reduction of emissions as a result of more sustainable practices in, and as a result of activities in, the Thames Gateway, will be a feature of this work.

2 LEP; Towards Zero Carbon Developments – Supportive information for Boroughs. London Energy Partnership, London; 2006.

Terms such as zero carbon and low carbon are primarily used in the context of energy use in buildings (LEP, 2006). Whilst low carbon and zero carbon may be terms that could be applied to future developments within the Thames Gateway, they are not applicable since the study boundaries have been expanded to include contributions to climate change associated with:

- Transport;
- Embodied energy of materials;
- Supply chain management;
- Pre-combustion emissions associated with the generation of electricity for the National Grid;
- Water use;
- Waste management;
- Wider industrial systems associated with closed or open loop recycling that may be implied or integrated within a given data set.

This study aims to show what greenhouse gas emissions reductions are possible, and at what cost lined to technological, demographic, social and behavioural change. It will demonstrate the cost of achieving different levels of greenhouse gas reduction, compared to a baseline and "business as usual".

In essence the results of the study will aim to demonstrate emissions reductions according to different stretch scenarios (defined as Level I, Level II and Level III) in order to understand what levels of emissions reductions in time are possible for energy, waste, water, transport and logistics, the summing of which, provides what level of overall greenhouse gas reduction. The aim is to achieve an overall emissions reduction of at least 60% by 2050 (consistent with the UK Government's Energy White Paper[3]), albeit this is likely to be based on the baseline for the study rather than 1990 emissions.

The Thames Gateway Feasibility study aims to quantify and assess greenhouse gas impacts expressed as carbon dioxide equivalents (refer to sections 3.3 and 3.4 for a definition on greenhouse gases) emissions spanning the period 2006 to 2050. Sources of emissions include those activities associated with the provision and use of products and services within the Thames Gateway including emissions associated with supply chain activities that occur outside of the physical boundaries of the Gateway.

3 DTi, Energy White Paper; Our Energy Future – Creating a Low Carbon Economy; February 2003

3. Scope of the feasibility study

3.1 INTRODUCTION

We will use the ISO 14044 standard[4] to help inform the setting of boundaries for the feasibility study, highlighted in this section.

3.2 APPROACH

The Integrated Resource Management (IRM) modelling approach was developed to provide a decision support capability for city and regional masterplanning, particularly where achieving a high level of efficiency and/or sustainability performance is considered a key requirement.

This approach recognises the need for effective **integration** and **coordination** of technical parameters (where these parameters are represented by, for example, waste management, transportation, water supply, etc), in combination with an iterative process of testing and refinement to provide an optimal solution. The links, interactions and feedback loops between different elements of a multi-workstream plan are complex, and consequently it can be extremely challenging to assess the sustainability performance implications (direct and indirect) of the scenarios or options selected.

The IRM model addresses this through a 'systems approach' by integrating the various technical models through their common data interfaces. The model is based on the principle of supply and demand.

At the heart of the IRM model is a software tool that provides a framework for data inputs, and links workstreams so that the data associated with different workstream models are integrated from the outset. The framework has been designed to be flexible in order to be adaptable to variations in the characteristics and requirements of individual projects.

The IRM model addresses greenhouse gas emissions and climate change impact as one of the key impacts of activities associated with resource flows on a life cycle basis.

3.3 GREENHOUSE GASES INCLUDED IN THE STUDY

The scope of greenhouse gas emissions comprises those arising from combustion processes such as carbon dioxide (from fossil fuels), methane and nitrous oxide. Other greenhouse gas emissions, such as perfluorocarbons (PFCs), hydrofluorocarbons (HFCs) and sulphur hexafluoride will also be included where emissions contribute significantly to the global warming impact (on a global warming potential (GWP[5]) basis).

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4 ISO 14044 (2006) Environmental management – Life cycle assessment – Requirements and guidelines; part of the ISO 14000 Environmental management standards.

5 Impact on climate change is most commonly measured using global warming potentials (GWPs). GWPs reflect the ability of different greenhouse gases to absorb heat as well as the length of time these gases remain in the atmosphere before they naturally break down. Please refer Appendix A1 of the technical report for more detail.

3.4 TEMPORAL SCOPE OF THE STUDY

Greenhouse gas emissions will be calculated for a baseline year and six discrete points in time, these being 2016, 2020, 2030, 2040 and 2050.

For each of these points in time, alternative greenhouse gas emissions profiles are being developed, according to the following definitions:

- Business as Usual (BAU) which includes current and expected/predicted near-future social, demographic and technological trends, either reported or predicted as a result of changes to policy.
- Future alternative scenarios, which incorporate further interventions that impact on technology and behaviour, and recognising that there may be several alternatives for achieving each Level for each technical discipline:
  - **Level I:** Least demanding, potentially assuming smaller interventions introduced over longer periods and development of less contentious policies/measures to engineer change in behaviour.
  - **Level II:** More demanding scenario, with more imposing policies/measures and technological changes.
  - **Level III:** Most demanding scenario, with more 'blue sky' thinking, especially in the longer term.

3.5 BOUNDARIES OF THE STUDY

We are addressing greenhouse gas emissions under five key performance areas, these being:

- **Energy** supply to and use in buildings, including pre-combustion emissions[6];
- **Waste** separation, treatment and disposal;
- **Water** including treatment and supply of potable water and treatment of foul water;
- **Transport**, both public and private, including pre-combustion emissions;
- **Logistics** including movement of goods & services, as well as wastes.

We will also look at greenhouse gas impacts associated with embodied energy in materials and construction of buildings and infrastructure in the Thames Gateway. Since use of materials and construction will occur over the entire period of the study, we will evaluate the contribution in a typical year (compared to "operational" emissions), for significance.

These key performance areas have been selected based on the following criteria:

- They are within the control of masterplan objectives for the Thames Gateway;

6 Pre-combustion emissions are those associated with 'delivery' of electricity associated with the National Grid (eg linked to extraction of raw materials, processing, distribution, etc)

- In combination, these components take into account the range of greenhouse gas emissions sources that are likely to arise from, and as a result of activities in, the Thames Gateway. Definitions of zero carbon, as provided by the London Energy Partnership (for example), are restricted to consideration in buildings only (excluding pre-combustion emissions) and are not necessarily applicable to other contributors such as transport and waste.

3.5.1 Energy

Included within this key performance area are the following:

- Thermal energy demand associated with existing buildings and predicted development of buildings, services and industry in the Thames Gateway.
- Electricity demand associated with existing buildings and predicted development of buildings, services and industry in the Thames Gateway.
- Supply of thermal energy to meet demand in the Thames Gateway, including pre-combustion processes (where applicable).
- Supply of electricity (via the National Grid and dedicated sources, where appropriate), taking into account distribution losses and pre-combustion processes.

3.5.2 Waste

Included within this key performance area are the following:

- Waste production due to activities in the Thames Gateway, and outside the Thames Gateway, but as a result of demand for goods and services within the Thames Gateway.
- Waste avoidance.
- Separation of waste eg. at a materials reclamation facility (MRF).
- Recycling of waste.
- Energy recovery.
- Waste treatment eg. incineration without energy recovery.
- Landfill processes (where these produce greenhouse gas emissions).

3.5.3 Water

Included within this key performance area are:

- Potable water treatment and supply to buildings in the Thames Gateway.
- Wastewater treatment and removal due to use in the Thames Gateway.
- Removal and disposal of wastes arising from water treatment.
- Water losses due to leakage in pipes, for example.

3.5.4 Transport

Under this key performance area, we include:

- Commuting of the Thames Gateway population, using different modes (walking, cycling, flying, motorcycles, cars, taxis, buses, and trains).
- Pre-combustion emissions associated with getting transport fuels to the Thames Gateway.

3.5.5 Logistics

Under logistics, we include the following:

- Transport of goods and services into the Thames Gateway in order to meet demands created by the resident population, industry, etc.
- Removal of wastes for treatment and/or disposal.
- Pre-combustion emissions associated with fuel used to meet the above requirements.

3.6 DATA SOURCES

Data will be drawn from a variety of sources and encompass existing statistical information, strategy and policy documents that will determine future scenarios, and technical inputs capturing technical options and scenarios. Reference will be made to sources of information in order to provide transparency.

An initial review of policy documents has been carried out in order to help inform the baseline and BAU.

3.7 REPORTING & REPORTING FORMAT

The outputs of the model are envisaged to be as follows, using a common baseline, and comparing the BAU scenario with the Level I, II and III alternative future scenarios:

- Emissions of individual significant greenhouse gases, expressed as masses (tonnes).
- Calculation of the climate change impact, based on GWPs, expressed as mass equivalents (tonnes CO_2e).
- Breakdown of the climate change impact, in terms of contributing greenhouse gas.
- Breakdown of the climate change impact, in terms of contributing key performance area – energy, waste, water, transport and logistics – being developed by our technical teams.
- Analysis of the effectiveness of proposed interventions in terms of the associated greenhouse gas reduction and cost.
- Sensitivity analysis and scenario analysis, to understand the impact on results of key uncertainties.

4. Overarching assumptions that will be used to inform the baseline

4.1 TASK 1 – SCOPE AND DEFINITION

The task set for this stage of the work was to review local policies and technical evidence to identify metrics, standards and targets likely to impact on the determination of a baseline and scenarios for the IRM model.

4.2 THE KEY PERFORMANCE INDICATORS

The work involved assessing documents in relation to the five key performance areas to be used within the IRM:

- Energy
- Waste
- Water
- Transport
- Logistics

4.3 REVIEW DOCUMENTS

The documents examined included:

- Regional Spatial Strategies;
- Saved Structure Plans;
- Saved Local Plans;
- Draft Local Development Frameworks;
- Non Statutory Frameworks (Regeneration, Environmental, RSDFs);
- National Planning Policy Statements;
- National Policy Guides;
- Technical evidence related to the above.

4.4 ISSUES

The planning system is in state of transition following the passage of the Planning and Compulsory Purchase Act 2004. Old style land use plans are being transformed into “spatial” plans. The Development Plan operates at 2 levels: Regional Spatial Strategies and Local Development Frameworks.

Site specific policies are to be set within Local Development Frameworks only. Regional policies can only establish broad areas of search and criteria. Both levels set targets, compile evidence and contain policies relevant to the key performance areas. Consistency is to be ensured by applying a "general conformity" test on plans produced as part of local development frameworks.

The "general conformity" test means that a local plan can be considered consistent with the regional level as long as it is not sufficiently different to materially affect the delivery of the RSS overall. This test is meant to enable local plans to reflect local circumstances better. In practice, this means that not all the policies contained in an RSS have to be reflected verbatim in the local plans as such variations in the weighting attached to certain policies. In practice, failure to deliver housing or, more rarely, employment targets would be considered to be mission critical.

There is also a burgeoning non-statutory field of policy that affects the KPI areas of interest. The Government has encouraged the development of Integrated Regional Strategies, Regional Sustainable Development Frameworks and Regional Energy Strategies (through the Energy White Paper 2003). However, the role of these strategies is principally one of "influencing" other strategies, plans and programmes with statutory power or changing the way the issuing authority behaves (e.g. Local Agenda 21 programmes usually contain policies cover the way a Council does business). These frameworks do exercise influence on the planning process through the statutory requirement for sustainability appraisals to be undertaken (including Strategic Environmental Appraisal). The objectives, criteria and contextual indicators contained within the non statutory plans will normally form part of the assessment criteria used to judge whether a development plan is proposing sustainable actions.

4.5 THE IMPACT OF LOCAL POLICIES ON KEY PERFORMANCE AREAS

Localities can influence the key performance areas through the implementation of policies set elsewhere usually at the national level like Building Regulations where the locality has no input into setting the policy (these have not been considered).

Localities can also set their own policies through mechanisms such as the Development Plan. These have been the main focus of the review.

4.6 PLANNING SYSTEM

The planning system impacts across the five key performance areas of this study in the following ways:

- **Direct** – By shaping the levels of waste, renewable energy consumption, etc through the setting of standards within policies or supplementary planning guidance/documents to promote "sustainable buildings";
- **Indirectly** – By setting house building rates and jobs growth which have a downstream implication for each key performance area;

- **Indirectly** – Through technical evidence that assists converting key inputs into a form that can be used to project trends in each key performance area.

4.6.1 Results Impacting Directly on Key Performance Areas

The Thames Gateway area is covered by three authorities that have developed quite detailed policies concerning sustainable construction. These authorities are the Greater London Authority; Essex County Council and Kent County Council. All three have set in place extensive design guidance (or are in the process of doing so for Essex CC). Most of these guides require development to adopt the EcoHomes Standard of Very Good or Excellent.

However, some of the guides are requiring development to secure a certain score within a specific category. The Essex Design Guide is also differentiating their policies by type of urban form – "Compact City", Urban Extension, Infill, etc. Using these definitions, Essex CC has specified certain types of design outcomes like minimum/ maximum densities and so forth.

On-site generation using renewables are also featured in these guides. Here development over a certain threshold is required to generate a proportion of their additional energy demand from renewable power sources within the development – microgeneration. Typically, the threshold is set as 10 houses or above and 1,000 mÇ non-domestic. The renewables contribution is usually 10% however London is consulting on 20%. Future scenarios may consider higher contributions still.

Whilst some of the documents are called "guides" they include phraseology that is explicitly setting forth a policy requirement from the authority concerned. The weight in the planning process may, however, vary dependent upon the position within the plan hierarchy e.g. supplementary planning documents are not part of the formal development plan. It should also be noted that two of the three guides come from County Planning Authorities which have the status of strategic authorities under the new planning system. The Counties have however lost their role in the development plan with regard to the structure plan. As such the guides depend on the level of adoption by local planning authorities within their area. The Kent Guide appears to have a wide buy in from their LPAs.

Energy	Widespread use of on-site generation policies. Mainly 10% but also moved to 20%. Adoption of standards policies particularly under the banner of "sustainable construction".
Waste	Metrics available for municipal waste; less information on C&D and C&I; Adoption of standards policies particularly under the banner of "sustainable construction".
Transport	Most transport policies concern specific project priorities; Some technical studies on projected commuter flows; Some standards related to distance from public transport services or a certain frequency.
Logistics	Some policies and metrics on transport
Water	Policies promoting SUDS. Adoption of standards policies particularly under the banner of "sustainable construction".

4.6.2 Results with an Indirect Impact on the Key Performance Areas

By setting targets for house building, the two RSSs and the London Spatial Plan are collectively determining the scale of future material consumption. A Joint Statement by the Planning Authorities covering the Thames Gateway have summarised the house building and job generation rates that are supposed to run until 2016.

An intermediate step would be needed to convert these targets into quantities relevant to the key performance areas:

House Building	The Joint Planning Statement provides numbers of houses to be built in the Thames Gateway to 2016. PPG3 and its successor PPS3 determine minimum densities for new house building. These could be applied to determine the amount of land required. There is no specific national guidance on plot ratios or house types. However, there are specific targets for affordable housing which would infer a certain type of household form. *Extracts from the relevant density standards are contained in the schedule.*
Employment	The Joint Planning Statement gives a number of jobs forecast for the Thames Gateway. The former ODPM published Employment Land Review Guidance in 2004. This sets out possible methodologies for converting jobs into quantities of floorspace and land consumption. The use of these methods should offer a reasonably robust method to producing defendable figures. Most new job growth can be expected in the services sector so it would be useful to convert the broad jobs targets into sector based figures. *Extracts from the relevant density standards, plot ratios and use classes are contained in the schedule.*
Waste	Each Region has developed their own strategies for waste. The greatest depth of information is available for municipal waste despite it being one of the smallest. The schedule includes an extract from a report produced to look at all three region's waste strategies given the interdependencies involved – particularly in receiving imports from London. The report highlights differences of approach and assumptions used.
Infrastructure	Every additional unit of housing or employment has an infrastructure consequence. The Essex County Assessment of Infrastructure has been identified which details a whole range of assumptions related to new housing growth in terms of the amount of additional community, leisure, police stations, etc needed. There may be a need to condense this into a single variable per household for projection work.
Transport	Transport policies are mainly expressed in terms of general principles (e.g. minimising use of the private car) and the prioritisation of specific projects. Some documents have been identified that are aimed at forecasting future growth. Over the time frame being considered road user charging is likely to take effect.

5. Next steps/programme to completion

Following on from the initial literature review and data collection, each of the key performance areas (energy, waste, water, transport and logistics) will define their baseline, BaU and stretch scenarios. These will be tested using the IRM model and through an iterative process appropriate changes will be made to achieve overall reductions in greenhouse gas emissions.

Turner & Townsend will cost each of the proposed solutions in terms of: initial capital cost, operating and maintenance, energy and asset replacement costs.

A final report with recommended solutions is to be delivered to the Department by February 2007.

For further information and to be involved in the stakeholder engagement dialogue please contact lowcarbongateway@communities.gsi.gov.uk.