

Teignbridge District Council

Renewable Energy and Sustainable Construction Study

Executive Summary
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Executive summary

1) Introduction

New development and energy infrastructure are areas where much can be done to combat and prepare for the impacts of climate change and local authorities are best placed to understand the opportunities and constraints specific to their areas. Local planning systems can therefore be used as an effective tool to legislate and encourage effective climate change mitigation and adaptation measures in the design of new buildings and energy supply systems. The Government's Planning White Paper, 'Planning for a sustainable future' published in May 2007, sets out detailed proposals for the reform of the planning system and makes it clear that local planning authorities have a crucial role to play in tackling energy efficiency and climate change.

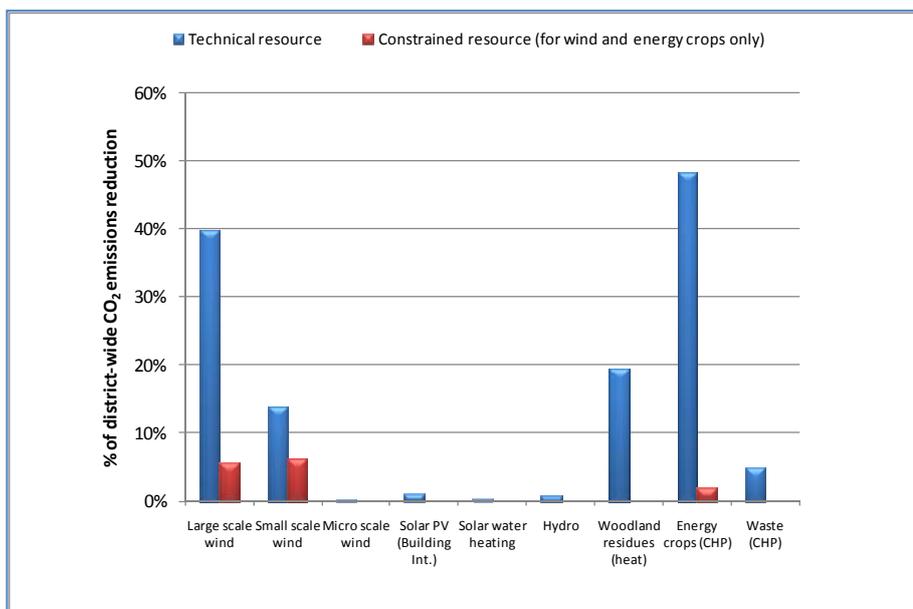
This study therefore aims to provide planning evidence for renewable energy and sustainable construction policies in Teignbridge District Council. A comprehensive range of planning evidence has therefore been drawn together in this report to provide technical expertise and support in generating locally specific evidence related to the potential for sustainable energy generation in Teignbridge, current and future energy demand and the development of sustainable construction policies.

2) Sustainable energy resources in Teignbridge

In assessing the existing installed renewable energy capacity in Teignbridge District, it was found that the total estimated capacity currently installed is approximately 6.2MWe of electricity, 96% of which is comprised of landfill gas at Heathfield, and 0.015 MWth of heat. In terms of annual energy supply, these totals represent around 3% of Teignbridge's total annual gas and electricity use during 2008.

To establish the remaining potential for sustainable energy generation, renewable and low carbon energy resources across Teignbridge District have been assessed by applying a set of constraints specific to each type of resource or technology. By sequentially applying layers of constraints, using GIS techniques where possible, a theoretical resource followed by a more limited 'accessible' resource can be quantified. The categories considered are generally based on government guidance for assessing regional renewable and low carbon energy capacity, but exclude those resources specifically related to transport (biofuels), deep geothermal energy, off-shore wind, marine renewables and fuel cells.

The following chart summarises the assessed renewable energy capacity in terms of the potential impact on reducing district-wide carbon dioxide emissions.



Summary of resource assessment for study area showing the potential proportional contributions from each technology to savings of district-wide carbon emissions. Also shown is the emissions reduction from the constrained resource for wind and energy crops.

An estimate of the potential resource specifically linked to future housing development has also been estimated using a database model and data from the Strategic Housing Land Availability Assessment (SHLAA). A number of target scenarios relating to Building Regulations were drawn up and the least-cost technology mix was identified for each. The analysis found that photovoltaics were likely to be the predominant technology for the lower, earlier targets considered, and that biomass combined heat and power would tend to feature most for the later, more demanding targets, such as that for ‘zero carbon’ homes.

3) Potential for district heating

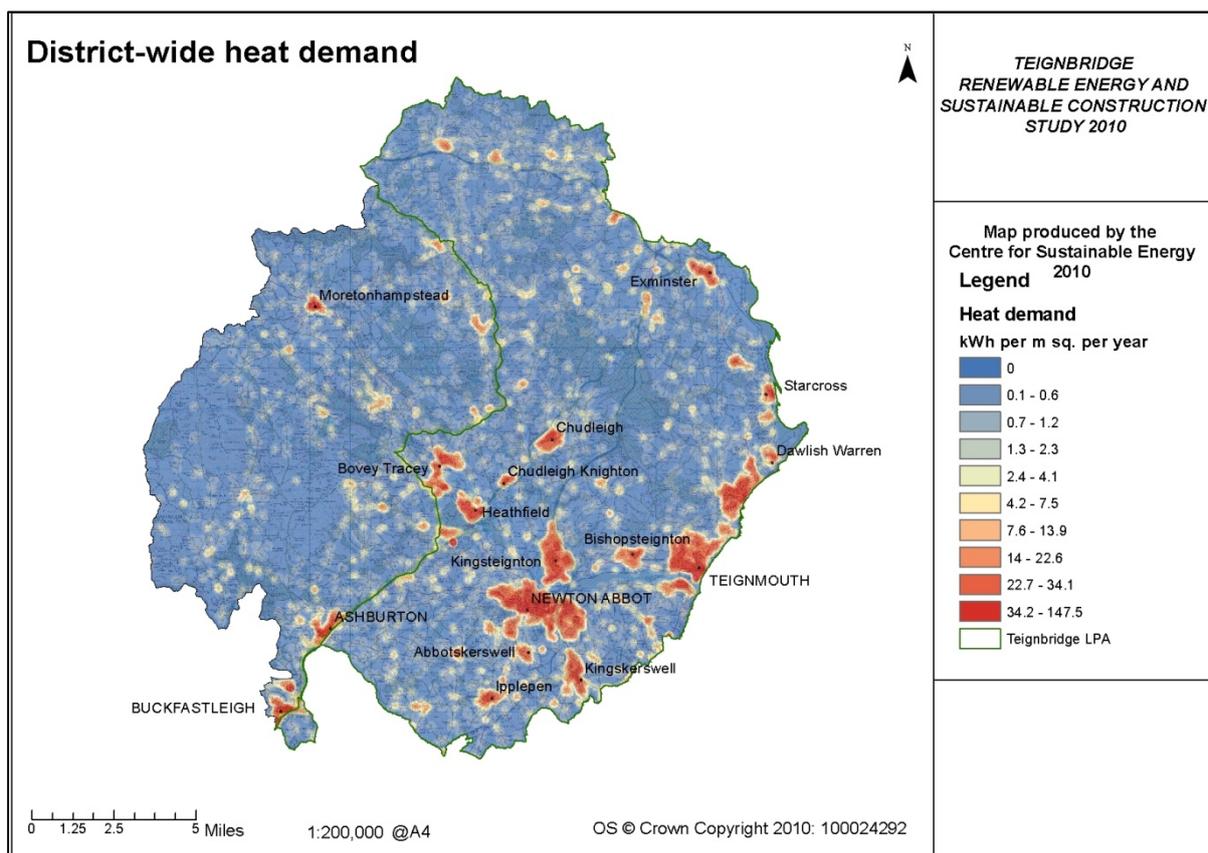
District heating is an infrastructure for delivering heat to multiple buildings from a central heat source through a network of pipes to deliver heating and hot water. In this way heat can usually be generated and delivered more efficiently than with multiple individual systems. There is generally believed to be significant potential for district heating in the UK, although the size and complexity of schemes tend to act as a significant constraint along with the cost and associated risk. The technology itself is less of a constraint as demonstrated by the many successful installations outside of the UK.

One of the main constraints to district heating is the need to identify a sufficient heat demand density. Heat demand density is a spatial characteristic that indicates the degree to which building heat loads are concentrated in a particular area and can be used as a broad indication of areas with potential for district heating. Urban areas with high population density offer most potential for district heating schemes.

The phasing of large developments can present challenges to district heating schemes as the system needs to be able to adapt and accommodate future heat loads as they come on line. Existing buildings situated within or close to new developments which are considering district heating can offer significant benefits in that they can act as district heating ‘anchor’ points around which new systems could be established. As these heat loads already exist, incorporating them into the network would

provide a stimulus for early implementation of the scheme. The inclusion of large public sector ‘anchor load’ sites such as social housing schemes, universities and local authority buildings can be particularly beneficial.

To identify areas of potential for district heating, data from the heat demand map of the South West of England (an address-level model of annual demand for space and water heating) was used to prepare a heat map (see below) for Teignbridge District showing annual heat demand per square metre. Heat Priority Areas can then be identified for further investigation.



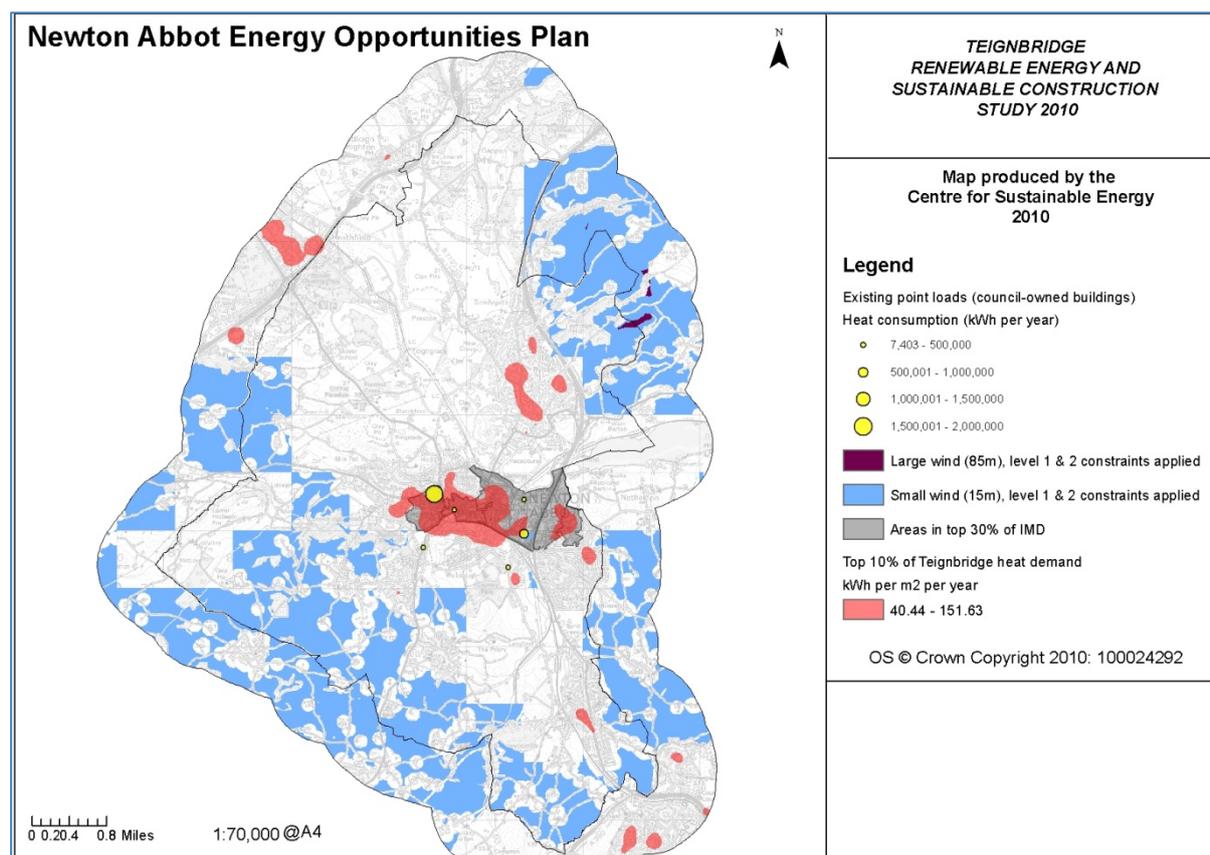
4) Energy Opportunities Plans

Certain areas in Teignbridge are expected to experience significant growth in future years in terms of housing and associated infrastructure. The Teignbridge Core Strategy Issues and Alternative Options (2010) document puts forward four spatial options for housing growth, based around the need to provide around 740 dwelling per year. This indicates that the most significant housing growth is expected to be located around the area of Newton Abbot and Kingsteignton. These are the types of areas that should be strategically considered for specific renewable and low carbon energy opportunities at the master-planning stage.

Due to the early stage of housing development planning in regard of the Core Strategy and the SHLAA, the degree of analysis and modelling that would normally be required to inform the development of specific energy policies and targets for these areas is limited. However, key

opportunities for strategic sites can initially be assessed by considering the outputs of the resource assessment, heat mapping and issues such as development scale and form.

Energy Opportunities Plans (example for Newton Abbot shown below) aim to pull together an initial set of information in order to assess the combined opportunities and constraints for renewable and low carbon developments. These, and similar maps of other areas where there is likely to be significant growth can be further developed with additional data and be useful in exploring the potential for setting site-specific targets on sustainable construction.



5) Cost of zero carbon development

For new residential development expected in Teignbridge, the additional costs modelled for the sustainable energy scenarios considered (compared to a 2006 Building Regulations baseline) ranged from 12–20%. Previous research commissioned by the Government has indicated that the average construction cost premium for delivering zero carbon homes entirely within the development site could be between 17 – 24% over current build costs by 2016, but would decrease from this peak as the costs of key technologies fall.

More recent evidence identified by the Government has re-examined the costs relating to the Code for Sustainable Homes standards, which cover a wider scope of measures than those directly related to reducing carbon emissions from energy use. Typical costs, again relating to a 2006 Building Regulations baseline, have been found to range up to 40%. A crucial point to consider however is the cost impact of the emerging definition of zero carbon/Code Level 6, which includes off-site ‘allowable solutions’, and which may, with certain assumptions, reduce cost uplift by a third.

Costs for non-residential zero carbon developments are much less documented but are currently being assessed by the Government following a consultation earlier this year. There is currently little conclusive evidence regarding the additional costs of BREEAM standards that can be used to generalise across non-residential development categories. This is mainly due to the complexity and range of building types and uses in this sector, which clearly impacts both potential carbon reduction solutions and costs. The Government is currently researching costs in the lead up to a new Zero Carbon definition for new non-domestic buildings alongside a review of BREEAM and a potential Code for Sustainable Buildings.

6) Policy implementation

With the forthcoming changes in Building Regulations, local authorities will need to fully understand the implications and prepare in advance for any additional resource capacity needed to manage and implement the requirements. Development Management in particular will need to fully understand the requirements and range of solutions so that they can confidently enter into planning negotiations with developers and adopt systems for checking compliance, including allowable solutions. This will be particularly important should local policies be adopted that exceed national standards. In addition, ensuring that local renewable and low carbon energy projects are appropriately monitored at both the planning application stage and once they are implemented will help to track the effectiveness of policies and the progress towards local, regional and national sustainable energy targets.

There are a number of opportunities potentially available to the Council to help facilitate the financing and delivery of renewable or low carbon developments including Planning Obligations, the Community Infrastructure Levy and the formation of Energy Service Companies (ESCOs).

7) Conclusions and recommendations

The evidence gathered by this study is intended to set the context and provide guidance on policy development for the areas of sustainable construction and decentralised renewable or low carbon energy generation. The main policy-related conclusions and recommendations are therefore outlined below under the specific policy areas being assessed. Additional recommendations are then outlined separately. Further explanatory text is included in the main report.

Policy Recommendation 1: District-wide sustainable construction policy for new development

The Council should assess further whether local conditions and its in-house capacity could be developed sufficiently in the short term to justify the adoption of standards in advance of Building Regulations. In particular, the capacity and resources needed to draw up and offer developers a form of 'allowable solution' for local deployment in advance of 2016 should be evaluated.

Should this capacity be available, the Council could consider implementing standards in advance of Building Regulations (such as Scenario 2) as a carbon emission standard for all larger scale new residential development, but with allowable solutions also an option for pre-2016 standards where developments can prove that the standards are not technically or economically viable.

Once the national definition of Zero Carbon non-domestic buildings is better defined, along with the corresponding future trajectory of Building Regulation carbon reduction standards, a similar policy

for non-domestic development could also be implemented, but would again need allowable solutions as an option for pre-Zero Carbon standards.

Should there be significant doubt over the local conditions and the Council's in-house capacity required to implement the above district-wide standards, similar policies could instead be focused on strategic development sites, which may have more proven potential to meet higher standards by virtue of their location and other specific circumstances (see Policy Recommendation 3 below).

The Council should also require an explicit site energy strategy to accompany all larger scale development proposals. This strategy should demonstrate consistency with the following energy hierarchy:

1. Apply energy efficiency measures to reduce demand as far as possible
2. Supply energy efficiently i.e. using decentralised low carbon energy sources where feasible
3. Meet residual demand with as much on-site renewable energy as is practical

Development proposals should also show evidence of having considered wider sustainability issues with reference to the South West Sustainable Construction Checklist.

Policy Recommendation 2: District-wide target for percentage reduction in new development site emissions

It is recommended that a district-wide on-site generation policy should be adopted for all new development. This should be applied in the context of an energy hierarchy where energy demand reduction and efficient supply of energy should be considered first, with the on-site generation policy then used to reduce residual emissions. For example:

“New development will be required to include sufficient on-site renewable energy generation to reduce total CO₂ emissions by at least 20% after accounting for energy efficiency and low carbon energy sources, wherever feasible”

Policy Recommendation 3: Energy/carbon targets for strategic development sites

Once finalised, the Strategic Housing Land Availability Assessment data should be mapped for the district and included on the Energy Opportunities Plans of strategic growth areas, along with other relevant data layers mentioned in this report. The data layers should then be assessed using the GIS package supplied with this report to identify any demonstrable opportunities at new development sites for an increased reduction in emissions when compared to district-wide or national standards, through use of decentralised and renewable or low carbon energy sources. Site-specific targets should then be drawn up as appropriate.

Policy Recommendation 4: Identification and promotion of sites for stand-alone renewable energy generation

The maps, GIS data and resource estimates resulting from this study should be used to help identify sites that hold the best opportunities for renewable energy generation. The Council should then consider ways to allocate or identify them in local development documents, so that applications to develop generation plant within these sites can perhaps be viewed more favourably than elsewhere.

It may be appropriate to develop this policy in conjunction with one on district-wide targets for renewable energy generation (see below).

Policy Recommendation 5: District-wide targets for renewable energy generation

The Council should consider setting district-wide target(s) for renewable energy generation for future milestones. These could potentially be related or aligned to national targets such as the UK target of 15% renewables contribution to total energy use by 2020. It is recommended that the targets state total capacity and energy yield for both renewable electricity and heat but are not prescriptive on technologies, although a 'lead scenario' may serve to illustrate how the targets may be achieved. The targets should be developed through stakeholder consultation and be achievable whilst being suitably challenging.

Policy Recommendation 6: Climate change adaptation

The Council should review the range of policies and guidance proposed or adopted by other local authorities as summarised in this report and consider implementing stand-alone adaptation policies and/or SPD guidance on flooding and summer overheating as a minimum. These should be fully compatible with sustainable construction policies and be periodically reviewed in response to any future changes in climate change prediction data.

General recommendations

Other general recommendations relating to sustainable construction and energy use are as follows:

- To justify and contextualise the development specific policies, the Council should prepare an overarching statement focused on climate change and CO₂ reduction targets. An overall greenhouse gas reduction target of 80% by 2050 and 34% by 2020 is recommended, in line with the latest UK policy set out in the Climate Change Act (2008). Both these targets are set against a 1990 baseline.
- Consideration should be given to material to be included within Supplementary Planning Documents (SPD), such as detailed criteria-based policies, additional details on the required structure and content of proposals for sustainable energy supply (site energy strategies) submitted as part of planning applications, and details on any 'allowable solutions' offered to

developers. These should include increased flexibility to encourage the development of district heating in Heat Priority Areas.

- Build on the heat demand analysis undertaken and incorporate finalised SHLAA data and other relevant data layers into Energy Opportunities Plans and examine in more detail the opportunities available for district heating. Explore the Council's potential role in facilitating partnerships and funding mechanisms for low or zero carbon developments, such as establishing Energy Service Companies (ESCOs) and identifying opportunities to use the Community Infrastructure Levy (CIL)
- In support of any district-wide renewable energy targets, the Council should consider developing a strategy and action plan to include the following:
 - Develop a strategic plan to establish woodfuel supply chains across Teignbridge
 - Coordinate further discussion on wind power development and the level of landscape-type constraints that should be applied in light of setting area-wide renewable energy targets
 - Investigate further the use of local waste arisings for use in smaller scale energy from waste plant including anaerobic digestion.
 - Undertake a survey of Council-owned buildings to explore opportunities for renewable energy installations.