

Non Technical Summary

This Non-Technical Summary includes the recommended policy options and guidance on potential wording

Project Background and Objectives (Chapter 1)

AECOM has been commissioned by the participating local planning authorities¹ (LPAs) of Hertfordshire (the 'project group'), to undertake a Renewable and Low Carbon Energy Study. The study will support the reduction of CO₂ emissions from residential and non-domestic buildings in the County through the use of planning policy. This in turn will encourage the uptake of Renewable and Low Carbon (RLC) technologies. Please note, this study refers to "Renewable and Low Carbon" rather than "Low and Zero Carbon" in order to be consistent with the terminology in The PPS1 Supplement on Planning and Climate Change.

The study will form part of the evidence base for the emerging Core Strategies for each of the participating LPAs and reflects the requirements of Planning Policy Statement (PPS) 1 'Delivering Sustainable Development', and the PPS1 Supplement on Planning and Climate Change. It is also intended to inform future development of other local development documents.

The objectives of the study are to identify the:

- Distribution and extent of existing and potential RLC energy resources within Hertfordshire, and how they can be exploited, in relation to specific new developments and larger scale heat and power generation.
- Feasibility of setting an on-site CO₂ reduction target from decentralised RLC energy sources in new development.
- Potential for policies for inclusion in the Core Strategy set in the context of future requirements of the Code for Sustainable Homes, and to some extent BREEAM for non-domestic buildings.
- Delivery mechanisms to assist participating LPAs in implementing policies adopted.

The Need for a RLC study – Policy Context (Chapter 1)

The main objective of this study is to meet the policy requirements set by PPS1 and its Supplement, and to identify options for delivering Renewable and Low Carbon opportunities to Hertfordshire. The key requirements for local planning authorities are to have "*an evidence-based understanding of the local feasibility and potential for renewable and low-carbon technologies*".

Particular regard has been made to the policy requirements set out in the PPS1 Supplement in the preparation of this study. In addition, a government consultation on a replacement PPS 'Planning for a Low Carbon Future in a Changing Climate' was published on 9th March 2010, which aims to combine and update the existing

¹ The participating LPAs are: Broxbourne Borough Council; Dacorum Borough Council; East Herts District Council; Hertsmere Borough Council; North Herts District Council; St Albans District Council; Three Rivers Borough Council; Watford Borough Council; Welwyn Hatfield Borough Council; Hertfordshire County Council.

PPS on climate change and PPS22 on renewable energy. While this is not yet policy it does provide an important indication of the government's future direction of travel. In summary, it supports the notion that the role of planning is to identify energy and climatic opportunities and risks spatially and to use this understanding to set out planning policies designed to support action and delivery, while also acting as a wider resource for use by the local authority and local strategic partnerships.

Policy ENG1 of the East of England Plan encourages new development to be located and designed to optimise its carbon performance and states that local authorities should encourage the supply of energy from decentralised renewable and low carbon energy sources. The Plan also sets targets for renewable and low carbon energy generation in the region (Policy ENG2) and encourages Development Plan Documents to set ambitious but viable proportions of the energy supply of new development to be secured from such sources.

The current 2006 Building Regulations Part L governs the energy efficiency of buildings measured by reductions in CO₂ emissions. Following consultation, the Government announced a policy in July 2007² that all new homes will be designed to be zero carbon from 2016. In Budget 2008, the Government announced an ambition that new public sector buildings should be zero carbon from 2018, one year in advance of the commercial new non-domestic buildings sector.

To enable industry to gear up to zero carbon the following interim changes to the Building Regulations for homes are likely to be introduced:

- 2010 = 25% improvement in regulated emissions (relative to 2006 levels). This corresponds with the mandatory energy and CO₂ standards for Level 3 of the Code for Sustainable Homes.
- 2013 = 44% improvement in regulated emissions (relative to 2006 levels), corresponding to Code Level 4 mandatory energy and CO₂ standards.

A further consultation in 2008³, followed by a Government statement in July 2009 confirmed the definition of zero carbon that will be applied to new homes and set out how it will be taken forward. Achieving zero carbon will include three stages:

1. **Energy Efficiency** - taking account of the building fabric energy efficiency
2. **Carbon Compliance** - taking account of systems and controls, such as heating/cooling systems, RLC technologies and mechanical ventilation.
3. **Allowable Solutions** - covering the remaining carbon emitted from the dwelling for 30 years.

Government has not yet confirmed how the allowable solutions will operate; however, it is likely to result in significant investment in off-site renewable and low carbon measures in local areas. Planning will have a key role in identifying these opportunities. Allowable solutions could be a future source of finance for local authorities for renewable and low carbon energy schemes.

² Building A Greener Future: Policy Statement

³ Definition of zero carbon homes and non-domestic buildings (Department for Communities and Local Government, December 2008)

Hertfordshire in Context – Existing Energy Demand (Chapter 2)

The County has a land area of 1,634 square kilometres and comprises one city and a variety of market towns, industrial towns, new towns, commuter villages and rural villages. At the last census (2001), Hertfordshire had a total population of approximately 1,034,000, 87% of whom live in the 45 settlements of over 3,000 people. The County has a large number of 'Special Designations'. There were approximately 420,650 households with residents in Hertfordshire at the time of the last Census in 2001 (although current statistics suggest this figure is now around 457,000) and the majority are owner-occupied.

Although housing provision targets for each local authority have been set at the regional level through the East of England Plan (some of which have been removed following a successful legal challenge), more recent Strategic Housing Market Assessments (SHMA) were carried out in 2008, and updated in September 2009. Three SHMAs were produced. In addition, the project group provided, where available, copies of their Strategic Housing Land Availability Assessments (SHLAAs).

Data from both the SHMAs and SHLAAs, and where required the East of England Plan, has been used to inform the modelling undertaken for this study. GIS maps have been produced to show CO₂ emissions per unit area, and density of average heat and electricity demand from existing buildings (i.e. 'anchor loads') across Hertfordshire, based on the model.

Key considerations emerging in relation to existing energy demand are summarised as follows:

- Domestic per capita CO₂ emissions in the County are higher than both the regional and the national average and Hertfordshire is expected to deliver many tens of thousands more homes by 2021.
- Updates to Part L and the Zero Carbon Hierarchy will see decentralised energy through RLC technologies and district heating playing a significant role in delivering zero carbon homes from 2016.
- Local planning policy is expected to play a major role in facilitating the move towards zero carbon by gearing up the house building industry and supply chain to 2016.
- Areas of high energy demand and related CO₂ emissions from existing buildings are concentrated in the higher density areas of the major settlements. Buildings and developments in these areas offer the biggest potential as anchor loads for district heating opportunities.
- Future new development may offer opportunities to improve the energy performance of existing development through the delivery of district heating systems.

Opportunities for Energy Efficiency (Chapter 3)

We have considered the opportunities for reducing CO₂ emissions through increased energy efficiency in the existing stock and in new developments. Improvements to the Building Regulations over the last few decades have led to current standards relating to energy consumption and CO₂ emissions being significantly higher than for existing buildings. This means that new buildings will be responsible for less CO₂ emissions than the equivalent existing buildings. Therefore, to make significant reductions in energy use and CO₂ emissions, it is

vital that local authorities address the existing stock efficiency levels alongside promoting high standards in new development. For this reason, this study also considers related opportunities to improve energy efficiency in existing buildings.

Key considerations in relation to opportunities for energy efficiency are summarised below. In many cases the implications go well beyond the remit of planning:

- Energy use and CO₂ emissions from the existing building sector are likely to be significantly higher than for post 2010 construction for many decades to come.
- There may be significant potential in some authorities to reduce energy demand through solid wall insulation, and efforts should be made to identify potential dwellings and assess the viability of installing insulation.
- Improved thermal performance of homes can lead to a rebound effect, where CO₂ savings are partially offset by improvements in comfort. Assessing potential energy and CO₂ savings should take account of this effect when monitoring.
- Appropriate specification of new buildings or renovations can reduce energy demand and improve thermal comfort, including overheating.

Opportunities for District Heating and CHP (Chapter 4)

We have considered the opportunities for reducing CO₂ emissions through the supply of low carbon heat. District heating (DH) is an alternative method of supplying heat to buildings, using a network of super insulated pipes to deliver heat to multiple buildings from a central heat source, such as a Combined Heat and Power (CHP) plant. A CHP plant is essentially a local, smaller version of a traditional power station but by being combined with heat extract, the overall efficiency is much higher (typically 80% – 85%). Whilst the electrical efficiency of smaller CHP systems is lower than large scale power generation, the overall efficiencies with heat use are much higher resulting in significant CO₂ reductions.

The current and draft replacement PPS places significant emphasis on DH and on the role of local authorities in its facilitation. In this chapter we discuss the opportunities in Hertfordshire for establishing DH networks and CHP.

It is theoretically possible to develop a DH network with CHP anywhere that there are multiple heat consumers; however the basic economics of schemes, the size of the CHP engine and the annual hours of operation (or base load) mean that viability is limited to higher density areas. CHP is therefore most effective when serving a mixture of uses, to guarantee a relatively constant heat load. High energy demand facilities such as hospitals, leisure centres, public buildings and schools can act as anchor loads to form the starting point for a district heating and CHP scheme. Key considerations for DH and CHP are as follows:

- DH and CHP increases the efficiency of heat and power generation compared with conventional generation. This results in significant CO₂ reductions, and can contribute to renewable energy targets if powered by biomass or biogas.
- Heat mapping suggests that there could be a significant potential for CHP and district heating in Hertfordshire. In all cases this needs further analysis on a case by case basis using the heat mapping of potentially viable areas in this study as a starting point.

- Further opportunities will be presented by proposed new development, but their extent will be affected by a range of factors, including future heating demands. CHP and DH are most viable when there is a mix of uses with a high and stable heat demand.
- Opportunities for DH will be greater where new developments can be physically linked to buildings in existing developments.
- It is likely that the roll out of DH in existing areas will require some form of public sector support.

Opportunities for Renewable and Low Carbon Technologies (Chapter 5)

We have considered the various RLC technologies currently available and their implications for feasibility and viability. From information provided by the project group and our own research we were able to outline the opportunities for decentralised renewable and low carbon energy installations in Hertfordshire, based on the existing installations and development coming forward. Key considerations are summarised as follows:

- Hertfordshire has resource potential for large scale wind turbines across 604 km². This potential should be exploited due to the significant CO₂ emission reductions that large scale wind offers.
- Smaller, 'community' scale turbines of around 15m to 45m tip height could be an opportunity in most areas of the County. Smaller turbines have a significantly reduced visual impact and would be particularly suited to farms, industrial sites and municipal buildings such as community centres or schools.

It should be noted that some land designated as a 'soft' constraint will not physically prevent the installation of wind turbines. These areas may have constraints which will need careful examination on a case by case basis to ensure that wind turbine development is appropriate to the area, but should not be considered a blanket constraint'

Government policy on development in the green belt is set out in PPG2. The opportunity areas identified in the study area treat Green Belt as if development of renewable or low carbon energy generation automatically conflicts with that designation and is therefore not acceptable. However, PPS22 is clear that whilst elements of many renewable energy projects will comprise inappropriate development, this does not preclude them from taking place should very special circumstances be demonstrated. Very special circumstances for example could include the wider environmental benefits associated with increased production of energy from renewable sources. The location of opportunity areas and therefore energy generation of the study area is potentially greater if GB designation is viewed within the context of PPS22.

Further information and guidance on green belts is provided within this report.

- The County can generate around 1,330,000 MWh from energy crops and 50,000 MWh from arboriculture arisings per year. This is equivalent to the carbon emitted from around 93,500 typical detached homes. Energy crops are relatively expensive compared to some other biomass fuels but do have the potential to provide very significant volumes of fuel.
- There is also significant potential from parks and highways waste, cattle and pig manure, and chicken litter.
- Assuming most of the County's waste resource is solid waste and utilised as energy from waste, the electricity output would be 49,000 to 114,000 MWh and the emission savings would be 28,000 to 65,000 tonnes.
- No resource for geothermal, marine wave or tidal, and very little resource for hydro, has been identified.
- Hertfordshire has potential to exploit a range of microgeneration technologies, including:
 - Solar thermal and PV.
 - Heat pumps (air and ground sourced) may be suited to areas not served by gas and where under floor heating is possible.
 - Biomass heaters are ideal in lower density areas for individual buildings and where DH is feasible in higher density areas.
 - There is limited data on energy generation from building mounted wind turbines in urban locations but early examples appear to have generated significantly less than was predicted by manufacturers and installations should carefully consider local topography.
 - Fuel cells can be used as CHP systems in buildings but are considered to be an emerging technology and currently the costs are high.

The Energy Opportunities Plan (Chapter 6)

The Energy Opportunities Plan presents the outcome of the resource mapping and has been used to support the development of RLC policies, in line with PPS1 Supplement and the draft replacement PPS. Using information supplied by the project group and our own research we used GIS to map the opportunities for generating and supplying energy from RLC sources on a County-wide basis, as well as scaled down to a local authority level (these maps have been supplied separately to each participating local authority). The Plan demonstrates the local potential in terms of resource availability and energy demand and identifies current and future opportunities.

The Energy Opportunities Plan plays a key role in developing and supporting planning policies, targets and delivery mechanisms within the LDF process, and can bring added benefit and support to the Core Strategy and other Development Plan Documents. The Plan should also be regarded as a corporate as well as planning resource and used to support other council and LSP strategies, as well as cross-County strategies for maximising the potential for decentralised energy.

However, it should be noted that although the Energy Opportunities Plan provides an overview of potential applicable RLC technologies and systems within an area,

it doesn't replace the need for a site specific RLC feasibility study for proposed development sites, and this should be undertaken or requested by the LPA.

The Energy Opportunities Plan shows opportunities for biomass fuel production from various sources throughout Hertfordshire. Exploiting this resource would help ensure a constant and sufficient resource is available if biomass plants were to be promoted, without the need for considerable transportation.

Hertfordshire has good wind energy opportunities as shown in the wind speed map of the County in Section 5 (Figure 5.1). However, land availability after engineering and physical constraints have been considered will limit resource potential and other softer constraints need to also be considered on a case by case basis. Although not mapped, smaller scale wind development is less constrained and therefore offers good potential for reducing CO₂ from small sites and from buildings, and should be considered positively by LPAs across the County in appropriate areas.

The Plan presents clearly opportunities for exploiting DH. Viability of potential schemes will be improved by linking of new and existing development, sharing energy centres and making use of anchor loads. The proximity to neighbouring local authorities is important in that it provides opportunities for cooperative working, but it should also be noted that this can present risks. It would be appropriate to use the Energy Opportunities Plan to identify where these opportunities may lie and work with neighbouring authorities, developers and other stakeholders on cross-County strategies. By identifying now the investment opportunities for DH infrastructure that would be utilised by development coming forward in the future, the Plan can go some way to supporting the ramp-up to zero carbon homes in 2016 and the drive towards decentralised energy.

The Use of 'Character Areas' in Policy Testing (Chapter 6)

As demonstrated by the Energy Opportunities Plan, developments in some parts of the County will have RLC energy supply opportunities which are not afforded to developments elsewhere in the County. To reflect this County variation when testing the policy options, three character areas have been defined with the following assumptions:

- Energy Constrained:** This assumes that no community or large scale renewable or low carbon energy resources are available in the vicinity of the development site. Options for complying with the policy options are limited to what can be achieved in individual buildings, namely microgeneration technologies such as solar thermal and solar PV, or gas CHP systems providing individual buildings, or payment to a Carbon Buyout or Allowable Solutions Fund (if implemented by Hertfordshire LPAs). This option assumes that biomass is not feasible due to delivery and/or air quality constraints.
- District Heating:** This assumes that the site is in an area where district heating beyond the site boundary may be a viable option. This could be because there is sufficient local heat demand from existing buildings to justify establishing a district heating network, or there is a local source of available heat, such as the biomass proposal in Potter's Crouch in St Albans or energy from waste site in Westmill.

- Wind:** This assumes that the site is in a location where wind speeds and constraints mapping indicates that on or near-site wind turbines could be an option.

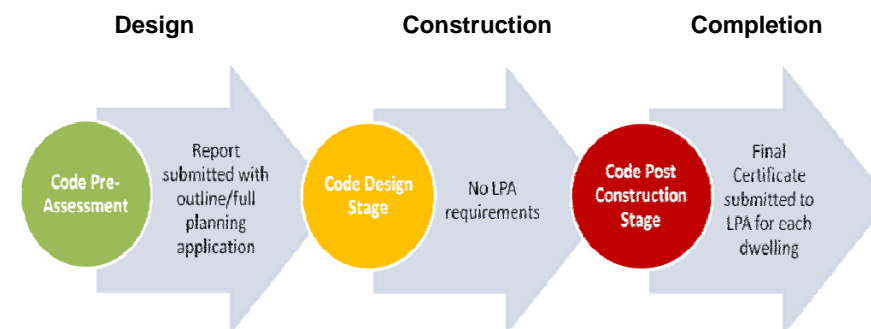
The Code for Sustainable Homes (Chapter 7)

We have assessed the technical feasibility and the construction cost implications of achieving different levels of the Code for Sustainable Homes (Code). The Code is the national standard used to assess the environmental performance of dwellings and can be used by LPAs to define planning policy standards. The PPS1 Supplement supports the use of Code and states: "when proposing any local requirement for sustainable buildings planning authorities should specify the requirement in terms of achievement of nationally described sustainable buildings standards, for example in the case of housing proposals to be delivered at a specific level of the Code for Sustainable Homes".

The Code assessment method encourages a development to go beyond the regulatory minimum by adopting better sustainability practice. It addresses a range of sustainability issues such as energy, water, waste, materials and surface water runoff. Some issues are mandatory to achieve at each Code level (1 to 6, with Level 6 of the energy section equating to a zero carbon home – the Building Regulations definition of zero carbon currently differs from that included in the Code); however points are awarded for achieving the voluntary/tradable credits.

The mandatory elements of the energy section, which is broadly aligned with Part L of the Building Regulations, tends to be the most challenging to achieve, but can provide significant carbon savings. The water section can also bring benefits through reducing a dwelling's water consumption. This issue is particularly pertinent to Hertfordshire. The County is one of the driest in the UK and water resources are predicted to decrease in the future due to climatic change and pressure through significant housing development. The East of England Regional Assembly supports a maximum water use rate of 105 l/p/d, which equates to Levels 3 and 4 of the Code and can be met relatively inexpensively through water efficient sanitaryware. The water elements of Levels 5 and 6 can also be particularly challenging and costly to implement.

The Code offers LPA officers a useful tool for validating compliance with sustainable construction policies through the use of 3rd party verification and certification of Code dwellings. An example of how the Code could be applied to the planning application process is provided below:



A number of key considerations have emerged in relation to the Code. Setting requirements through policy for the use of Code in new development would:

- Meet the objectives of PPS Planning and Climate Change in terms of local requirements for sustainable buildings
- Improve the overall environmental performance of new development providing both environmental and social benefits on a local and national scale
- Go some way towards addressing the potential future impacts of climate change through the reduction of CO₂ emissions and adaptation measures
- Support developers and the supply chain in gearing up to zero carbon
- Assist development control officers in assessing and validating compliance with policies and targets through the use of 3rd party certification

In addition:

- The Code Cost Review indicates that a significant proportion of the costs of delivering current Code levels arise in meeting the standards for energy and CO₂ emissions.
- The Code is under review and the energy section is likely to change significantly. The costs associated with the updated energy section are still to be determined. However there is unlikely to be any major changes to other sections of the Code.
- The Code level 3 mandatory 25% Dwelling Emission Rate (DER) improvement is due to become a legal requirement through Building Regulations from the end of 2010 and therefore should not be considered as an additional build cost.
- There is a jump in cost when moving from Code Level 4 to Code Level 5 due to the associated improvement to the DER, but also the need for water re-use and recycling systems to achieve the 80 l/p/d maximum water use rate.
- Although it could be reasonably justified for an LPA to require a Code rating of Level 3 or 4, and potentially a BREEAM rating of 'Very Good' for non-domestic development, a development's ability to deliver this rating may need to be assessed on a case by case basis, taking into account the physical site constraints which may affect achievement of some credits.
- Come 2016, planning will still have a role to play in requiring developments to consider and achieve sustainable buildings in a holistic way and not just through zero carbon.

Target Recommendations (Chapters 8 and 9)

The analysis and discussion in this section allows recommendations to be made on the type and extent of policy which can be applied to new development across Hertfordshire. An in-house AECOM spreadsheet model was used to carry out a technical feasibility analysis for various Policy Options for a range of Case Study development sites. It is important to recognise that the proposed changes to Building Regulations leading to zero carbon are very challenging in themselves and are based on extensive technical and financial viability analyses. Alongside this, the rapid changes in proposed regulations means that any locally

implemented policies will only impact on the shorter term (the next 6 years for homes) and then be overtaken by national regulation. Therefore, the recommended policy options should provide greater CO₂ reductions where possible but in a way which does not significantly impact on development viability.

When interpreting the model findings it is important to note that the cost uplifts above business as usual reflect construction costs only and do not themselves constitute a viability assessment. To make a judgement on the viability or otherwise of particular targets these numbers should be included in a full viability assessment, perhaps undertaken alongside an assessment of affordable housing viability. The recommendations set out here will need to be considered again following such an assessment.

The two policy options based around percentage improvements on Building Regulations provide small CO₂ savings. Policy 1 (BR+10%) often shows the same capital cost uplift savings as Policy 2 (BR + 15%) but can often be met with the same or similar measures required for Building Regulations. Therefore, Policy 2 is considered preferable to Policy 1.

The Advanced Code +2 Policy (Policy option 4) has been shown to be significantly more expensive than the Advanced Code +1 Policy (Policy option 3) and it is considered that the technology and allowable solutions costs required to meet the 100% reduction in regulated emissions in 2011 could be too financially demanding for developers. Therefore Policy option 3 is considered further in preference over Policy option 4.

The Advanced Code +1 Policy (Policy option 3) shows a capital cost of between zero and £6,000 per dwelling before 2017 and zero and £140 per sqm for non-domestic buildings before 2020. This may be challenging but is considered achievable for most sites, and is currently required for all publicly funded social housing by the Homes and Communities Agency. The higher CO₂ reduction requirements of Policy option 3 (Advanced Code+1) could promote earlier adoption of district heating networks as a means to achieving compliance before 2017. This has the advantage of building capacity and helping developing a supply chain for the construction of zero carbon homes prior to 2017. Furthermore, the use of allowable solutions before 2017 can provide a potential route for reducing CO₂ emissions in the existing building sector.

Policy option 5, which promotes renewable energy in meeting Building Regulations targets, does not result in higher CO₂ savings, but can increase construction costs. The nature of this policy is also against the aims of PPS1 by stipulating the technologies should be renewable and not simply low or zero carbon, and it is therefore not justifiable. The requirement to deliver the target CO₂ reduction via specific technologies also makes demonstrating compliance more complicated since it involved calculating the proportion that has come from the renewable technologies.

In summary, a policy requiring CO₂ standards one step ahead of the Building Regulations based on the Code for Sustainable Homes mandatory CO₂ standards (Policy option 3) is considered to be the most suitable type of policy for large developments in district heating and wind opportunity areas. This provides relatively large CO₂ reductions beyond national standards in the period up to 2016 (and 2019 for non domestic), and helps to promote measures which support future improvements in CO₂ reduction, but with relatively small additional costs. For development in energy constrained areas, the less demanding Policy option 2 is considered suitable. These targets are reflected in the proposed policy wording.

Proposed Policy Wording (Chapter 9)

A suite of planning policies is recommended to assist in delivering the Energy Opportunities Plan. The policies have been developed based on the outcomes of the policy testing and in terms of feasibility and impact on development cost.

In identifying and appraising policy options we have started from the basis that meeting the challenges of climate change and increasing renewable and low carbon energy capacity cannot and should not be delivered through planning alone. Understanding the role of planning as part of a wider set of national, regional and local delivery mechanisms is crucial. That said, planning is unique in being the only activity that is able to build up a comprehensive spatial understanding of the opportunities and constraints for decentralised renewable and low carbon energy.

Using the Energy Opportunities Plan as the starting point, potential policy and delivery mechanisms have been assessed for their impact on both existing and new development (Chapter 6). The evidence demonstrates that the energy technologies available and the CO₂ reductions that may be achieved differ according to the type of development and its location in the district. Three different character areas have been identified to reflect this local variation.

This approach allows us to take advantage of the distinct merits of the planning system in promoting decentralised renewable and low carbon energy without unnecessarily stretching its remit where other regulatory or support regimes may be better placed to take a lead. Importantly, the focus on delivery mechanisms also allows us to address the difficult issue of developer viability by potentially shifting much of the additional cost burden away from developers and onto third parties.

Policy recommendations and predicted CO₂ savings are based on the assumption that the trajectory to zero carbon continues as proposed and that as-built development matches design. Changes to national policy, including future proposals for the Building Regulations, would alter the relative impact of the policies described here. In this event, the policy recommendations described here should be reviewed.

The following policy recommendations are made either for incorporation into Core Strategies or other local development documents or guidance.

The Energy Opportunities Plan

The district or borough specific Energy Opportunities Plan should be incorporated into Core Strategies and should be reviewed regularly to ensure they remain up-to-date.

Core Strategy Recommendation 1: The Energy Opportunities Plan

Planning applications for new development will need to demonstrate how they contribute to delivery of the opportunities identified in the current Energy Opportunities Plan. Different energy technologies and CO₂ reduction strategies will suit different parts of the district/borough and different types of development. To reflect this we have identified three character areas: as shown in the Energy Policy Map (LPA to insert reference to the EOP):

- Energy constrained – Areas where district heating or energy from wind is either not feasible or viable. Due to the constrained nature of the site, developers will be required to achieve CO₂ emissions reductions in line with Building

Regulation Part L (non domestic buildings) and the Code for Sustainable Homes (Domestic Buildings). However, developments would still be expected to explore the feasibility of other opportunities for renewable or low carbon energy generation, from microgeneration or biomass for example. Larger development sites that come forward within energy constrained areas may be suitable to support renewable and low carbon technologies that would allow higher carbon reduction targets to be met. This will be assessed on a site-by-site basis.

- District heating – the Council's ambition is to develop networks across each district heating priority area. New development in these areas should, where possible, contribute to this objective by considering district heating as their first option for the heat supply to the site.
- Wind – wind priority areas have been identified to encourage consideration of wind turbines as stand-alone projects or turbines linked to new and existing development.

A district/borough-wide Supplementary Planning Document will be prepared for each character area to help developers understand what is expected of them for the different development types set out in these Character Areas.

Policy Justification

The Energy Opportunities Plan acts as the key spatial map for energy projects in Hertfordshire. It underpins the policies described here and sets out where money raised through mechanisms such as the Community Infrastructure Levy (CIL) could be spent. It should be used to inform the Sustainable Community Strategy and other corporate strategies, and investment decisions taken by the local authority and local strategic partnership (see Appendix D for further detail on delivery mechanisms).

The energy opportunities include commercial and community scale wind; district heating using waste heat from local sources or from community scale CHP, particularly if development is led by the Council; biomass boilers and other microgeneration technologies. However, the policy does not seek to rule out any other technology if it is in-line with council objectives to deliver reductions in CO₂ or increase the supply of decentralised renewable and low carbon energy.

The character area approach is designed to help applicants determine which technologies are likely to be most suited to a given area. It also seeks to encourage energy installations that will contribute to delivering all opportunities identified in the current Energy Opportunities Plan in the most effective way. The policy recognises, however, that the pace of change is rapid in this field and new technologies are likely to become viable and feasible within the lifetime of this plan and that the applicability of existing technologies to different development types is also likely to change. This could mean the technologies not currently considered suitable to particular areas may become so. It is not the intention to restrict this kind of innovation and LPAs should be prepared to discuss proposals that deviate from the Energy Opportunities Plan and character areas with applicants at the pre-application stage. The SPD will provide information to inform pre-application discussions, including which technologies work well together and which do not.

The policy recognises that different character areas and development types will have different opportunities for achieving CO₂ reductions. For example, developments in energy constrained areas will have fewer opportunities for

delivering CO₂ reductions cost effectively than those in the other two character areas. However, it may be possible for some larger scale development proposed within Energy Constrained areas to achieve higher levels of carbon reduction. This is most likely to be (but not limited to) developments which are sufficiently large, or with a sufficiently high heat load, to support heat network schemes. In this instance it is likely that stand alone developments will be able to support decentralised heat networks to serve the site itself and not rely on a proximity to an identified district heating opportunity area outside the development boundary. Similarly, small developments are also likely to have fewer opportunities than major development (i.e. applications for development over 10 residential units, 1,000 sqm of commercial).

Core Strategy Policy Recommendation 2: Energy and CO₂ Reductions for New Developments in Energy Constrained Areas

All new residential developments in **Energy Constrained Areas** will be required to achieve the following levels of the Code for Sustainable Homes (Code) as a minimum. This requirement will not come into effect until successive updates to Part L of the Building Regulations become mandatory:

- 2010 – Code level 3 as a minimum will be required for all new homes once updates to Part L come into effect (currently scheduled for October 2010).
- 2013 - Code level 4 as a minimum will be required for all new homes once updates to Part L come into effect.
- 2016 - Code level 6 will be required for all new homes once updates to Part L and the national Zero Carbon Homes policy come into effect.

All new non domestic buildings in Energy Constrained Areas will be expected as a minimum to achieve CO₂ emissions reductions in-line with the Building Regulations Part L. This requirement will not come into effect until successive updates to Part L of the Building Regulations become mandatory:

- 2010 – 25% reduction in the Building Emission Rate compared to the Target Emission Rate defined by the Building Regulations (currently scheduled for October 2010).
- 2013 – 44% reduction in the Building Emission Rate compared to the Target Emission Rate defined by the Building Regulations (reductions above 70% can be delivered using allowable solutions).
- 2019 Zero Carbon – no additional requirement.

Where the proposed new development is located within an Energy Constrained Area, the local authority expects the Energy Opportunities Plan to be used to explore other opportunities for renewable and low carbon energy generation (other than wind or district heating) in order to help meet Building Regulation minimum levels and / or Code for Sustainable Homes. Other opportunities could include microgeneration or heat from biomass for example.

It is expected that over time the status of some land currently designated as energy constrained will change and no longer present such constraints. In this event the Council will expect all new residential developments of 10 dwellings and above and new non-domestic developments of 1000 sqm and above to meet the targets set out in *CSP Recommendation 3* or *CSP Recommendation 4*, whichever policy is proven by the applicant to be the most viable in order to achieve the required target.

Larger development sites that may come forward in energy constrained areas may be suitable to support renewable and low carbon technologies that would allow higher carbon reduction targets to be met. All new development within energy constrained areas with a sufficient heat load should consider installing a district heating network to serve the site. Unless the applicant can demonstrate that compliance with these requirements on a particular site is neither feasible nor viable, these developments will be required as a minimum to achieve the levels of Code for Sustainable Homes set out in Core Strategy Policy Recommendation 3.

(Note for LPAs: If a Carbon Buyout Fund is to be created then the following text is recommended)

If an applicant can demonstrate that compliance with the target or the specific requirements from both of these policies are not feasible on site, a payment into the Carbon Buyout or 'Allowable Solutions' Fund will be required.

Core Strategy Policy Recommendation 3: Energy and CO₂ Reductions for New Developments in District Heating Opportunity Areas

All new residential developments of 10 dwellings or more in **District Heating Opportunity Areas** as a minimum will be required to achieve the following levels of the Code for Sustainable Homes (Code). This requirement will not come into effect until successive updates to Part L of the Building Regulations become mandatory:

- 2010 – Code level 4 as a minimum will be required for all new homes once updates to Part L come into effect (currently scheduled for October 2010).
- 2013 - Code level 5 as a minimum will be required for all new homes once updates to Part L come into effect.
- 2016 - Code level 6 will be required for all new homes once updates to Part L and the national Zero Carbon Homes policy come into effect.

All new non domestic buildings of 1000 sqm or more in **District Heating Opportunity Areas** as a minimum will be expected to achieve the following CO₂ emissions reductions in advance of the Building Regulations Part L. This requirement will not come into effect until successive updates to Part L of the Building Regulations become mandatory:

- 2010 – 44% reduction in the Building Emission Rate compared to the Target Emission Rate defined by the Building Regulations.
- 2013 – 100% reduction in the Building Emission Rate compared to the Target Emission Rate defined by the Building Regulations (reductions above 70% should be delivered using allowable solutions).
- 2019 - Zero Carbon – no additional requirement.

New development in District Heating Opportunity Areas should, where possible, contribute to this objective by considering district heating as their first option for meeting the target. It is important to recognise that different development types will have different opportunities, therefore:

- All developments should seek to make use of available heat from district heating networks, including those supplied by heat from waste management sites or power stations.

- Larger developments should consider installing a district heating network to serve the site. The ambition should be to develop strategic area wide networks and so the design and layout of site-wide networks should consider the future potential for expansion into surrounding communities. Where appropriate, applicants may be required to provide land, buildings and/or equipment for an energy centre to serve existing or new development.
- New development should be designed to maximise the opportunities to accommodate a district heating solution, considering: density, mix of use, layout, phasing and specification of heating, cooling and hot water systems.

An SPD will be prepared and will set out the approaches that developers might adopt to deliver the target.

These requirements will apply to a development in or adjacent to a District Heating Opportunity Area or located close to potential sources of waste heat unless the applicant can demonstrate that compliance with these requirements on a particular site is either not feasible or not viable.

(Note for LPAs: If a Carbon Buyout Fund is to be created then the following text is recommended)

If an applicant can demonstrate that compliance with the target or the specific requirements is not feasible on site, a payment into the Carbon Buyout or 'Allowable Solutions' Fund will be required.

Small Developments

Small developments (under 10 residential units or 1,000 sqm of commercial) should consider connection to available district heating networks. Where a district heating network does not yet exist, applicants should consider installing heating and cooling equipment that is capable of connection at a later date.

Core Strategy Policy Recommendation 4: Energy and CO₂ Reductions for New Developments in Wind Opportunity Areas

All new residential developments of 10 dwellings or more in **Wind Opportunity Areas** as a minimum will be required to achieve the following levels of the Code for Sustainable Homes (Code). This requirement will not come into effect until successive updates to Part L of the Building Regulations become mandatory:

- 2010 – Code level 4 as a minimum will be required for all new homes once updates to Part L come into effect (currently scheduled for October 2010).
- 2013 - Code level 5 as a minimum will be required for all new homes once updates to Part L come into effect.
- 2016 - Code level 6 will be required for all new homes once updates to Part L and the national Zero Carbon Homes policy come into effect.

All new non domestic buildings of 1000 sqm or more in **Wind Opportunity Areas** as a minimum will be expected to achieve the following CO₂ emissions reductions in advance of the Building Regulations Part L. This requirement will not come into effect until successive updates to Part L of the Building Regulations become mandatory:

- 2010 – 44% reduction in the Building Emission Rate compared to the Target Emission Rate defined by the Building Regulations.

- 2013 – 100% reduction in the Building Emission Rate compared to the Target Emission Rate defined by the Building Regulations (reductions above 70% should be delivered using allowable solutions).
- 2019 - Zero Carbon – no additional requirement.

New development in wind opportunity areas should consider wind as their first option for meeting the requirements of Policy 4. Wind Opportunity Areas have been designated to encourage applications for all scales of wind turbines, particularly but not exclusively:

- From community groups, co-operatives and individuals
- Related to new domestic and non-domestic developments. Large and mixed-use developments in appropriate locations should consider installing a wind turbine or turbines to serve the site's energy needs.

These requirements will apply to a development in a Wind Opportunity Area unless the applicant can demonstrate that compliance with these requirements on a particular site is either not feasible or not viable.

(Note for LPAs: If a Carbon Buyout Fund is to be created then the following text is recommended)

If an applicant can demonstrate that compliance with the target or the specific requirements is not feasible on site, a payment into the Carbon Buyout or 'Allowable Solutions' Fund will be required.

Wind power will play an important role in reducing CO₂ emissions and increasing installed renewable and low carbon energy capacity. Criteria policies should be prepared to guide applicants and development management decisions.

Policy justification – targets

Changes to the Building Regulations in 2010, 2013, 2016 and 2019 are expected to bring in tighter standards for CO₂ emissions. After 2016 it will be necessary for all new residential buildings to be delivered as zero carbon homes, with the equivalent standard for non-residential buildings due to be introduced in 2019. The role of planning in requiring new development to incorporate such technologies should therefore be limited to a supporting one.

The intention is to encourage applicants to reduce CO₂ emissions from proposed development beyond the Building Regulations requirements, where feasible and viable, and to obtain financial contributions towards community scale renewable and low carbon energy infrastructure. Three target options are recommended for a combination of targets and/or payments into a Carbon Fund, represented by the policy options above.

The targets proposed seek to accelerate the move towards zero carbon ahead of Building Regulations. All new buildings over a set threshold - both residential and non-residential - would be expected to achieve CO₂ emissions reductions one step ahead of the Building Regulations Code Level equivalent with the exception of developments in Energy Constrained Areas. This should be met through a combination of passive energy efficiency measures, incorporation of active energy efficiency, on-site renewable and low carbon energy technologies and direct connection to heat or power (not necessarily on-site).

The proposed policy provides flexibility in proposing renewable and low carbon solutions. The policy recognises that different opportunity areas and development types will have different opportunities for achieving CO₂ reductions. For example, new residential development in energy constrained areas will have fewer opportunities for delivering CO₂ reductions cost effectively than those in the other two opportunity areas.

The proposed policy should be simple to operate for both development managers and developers. Development managers can assess compliance with the targets by asking for design stage and as-built Building Control Compliance documentation.

The evidence base produced in support of this policy demonstrates that the targets should be achievable with minimal impact on overall development costs compared to the Building Regulations base case. It is up to the applicant to demonstrate this to the contrary on a case-by-case basis. However, it is recognised that there may be circumstances when it is not possible or desirable. An example might be in an energy constrained conservation area, where microgeneration technologies may be considered unacceptably intrusive. For such cases there is the option of introducing a Carbon Buyout or 'Allowable Solutions' Fund, with contributions based on the residual carbon emissions after any energy efficiency or on-site generation measures. The Carbon Buyout Fund would act as a 'stop-gap' before 'Allowable Solutions' are brought in through the Building Regulations (note – the Allowable Solutions mechanism is still out to consultation). Further detail on Carbon Buyout Funds and Allowable Solutions is given in Chapter 9.

Policy justification – district heating

The PPS1 Supplement and the draft PPS actively encourage seeking opportunities to set higher standards on specific sites where it can be justified on viability and feasibility grounds. The purpose of this policy is to prioritise district heating in areas where opportunities are the greatest.

The long-term ambition should be to deliver a strategic district heating network across the district heating opportunity areas. Developments will need to show in a design and access statement or energy statement their assessment of the potential to deliver a reduction in the development's CO₂ emissions to the target level using a district heating network. It is recognised that the opportunities for installing such a network across existing communities are, for the most part, beyond the scope of planning. Therefore, the policy requires development to be able to connect once such a network is in place and to be designed to be compatible with future networks, in terms of layout, density and so on. The policy requires larger more strategic new developments to install their own network, which can later be connected up to a larger network or incorporate existing nearby buildings. This has the benefit of reducing CO₂ emissions in new development and contributing to the longer term objective.

Where appropriate, applicants may be required to provide land, buildings and/or equipment for an energy centre to serve proposed or multiple developments. Such a requirement will be important for ensuring availability of the necessary space in the right location for an energy centre designed to serve more than one development. It is expected that requirements will be discussed in pre-application discussions and will be included as part of a planning condition. In order to provide additional certainty to the installation of district heating networks it is recommended

that a Local Development Order be considered for the district heating opportunity areas.

This policy supports the approach of building up large scale networks over time. This barriers and challenges associated with developing large scale networks can hinder their development. Therefore by using policy to support smaller scale schemes in different developments and areas, opportunities are provided for combining these into larger scale networks at a later date.

Criteria that have been used to define the district heating opportunity areas are set out opposite.

- New development:
 - Large scale mixed use development – enables good anchor load and diversity of heat demand
 - Proximity to high heat density areas of existing buildings – enables extension into existing development
 - Proximity to existing heat sources
- Existing development:
 - Heat demand density of at least 3,000kW/km². These areas generally have higher density residential or commercial buildings. The presence of large public sector buildings can assist with acting as a catalyst for schemes.
 - Proximity to sources of heat (e.g. industrial processes) – enables zero carbon energy source

The final wording of this policy and its justification will need to be based on decisions taken about the wider role of the local authority and its partners. Options and their implications for planning policy are discussed in more detail in Chapter 10.

Policy justification – wind

The planning policy approach represents the application of national policy to the Hertfordshire context. The PPS1 Supplement on Planning and Climate Change and PPS22 (Renewable Energy) are both supportive of wind power and this policy has been worded accordingly. The primary driver for such a strongly worded supportive policy for wind are the twin challenges of achieving the national legally binding 34% reduction in CO₂ emissions over 1990 levels by 2020 and the equally binding requirement for the UK to generate 15% of its total energy from renewable sources, also by 2020. The Government's Renewable Energy Strategy expects a significant proportion of this to be delivered from onshore wind. It is evident therefore that every available opportunity for wind power needs to be taken advantage of.

The Energy Opportunities Plan is likely to be more directed at opportunities for community scale wind turbines since commercial developers looking to install large scale wind turbines are likely to develop their own constraints maps. Therefore policies should be prepared to guide applicants and development management decisions for community scale turbines.

The wind opportunity areas seek to promote community scale turbines. As such, the designation is based on the following criteria:

- Good local wind resource, consider hilltops, avoid forested areas.
- Close to electricity infrastructure (e.g. 10-30kV power lines, substations) to connect to grid.
- Close to roads, railways for easier transport of components to site.
- Close to the community involved (but not close enough to cause noise issues).
- Consideration of environmentally and archaeologically sensitive areas.
- Consideration of areas of high landscape quality (e.g. AONBs).
- Consideration of local airports and defence structures (e.g. radars and flight paths).
- Consideration of local residential areas.

Clearly some of these criteria are the same as those used by commercial wind developers. An important distinction is the proximity to the community involved. Here we have assumed that communities investing in their own wind turbine would be keen to be able to see it, but equally these locations are less likely to be of interest to commercial developers.

Developers within wind opportunity areas will need to show in a design and access statement that they have fully considered the potential to deliver the required targets using a wind turbine or turbines on site. Where no opportunities exist on-site applicants should demonstrate that they have considered off-site opportunities.

The final wording of this policy and its justification will need to be based on decisions taken about the wider role of the local authority and its partners. Options and their implications for planning policy are discussed in more detail in Chapter 10.

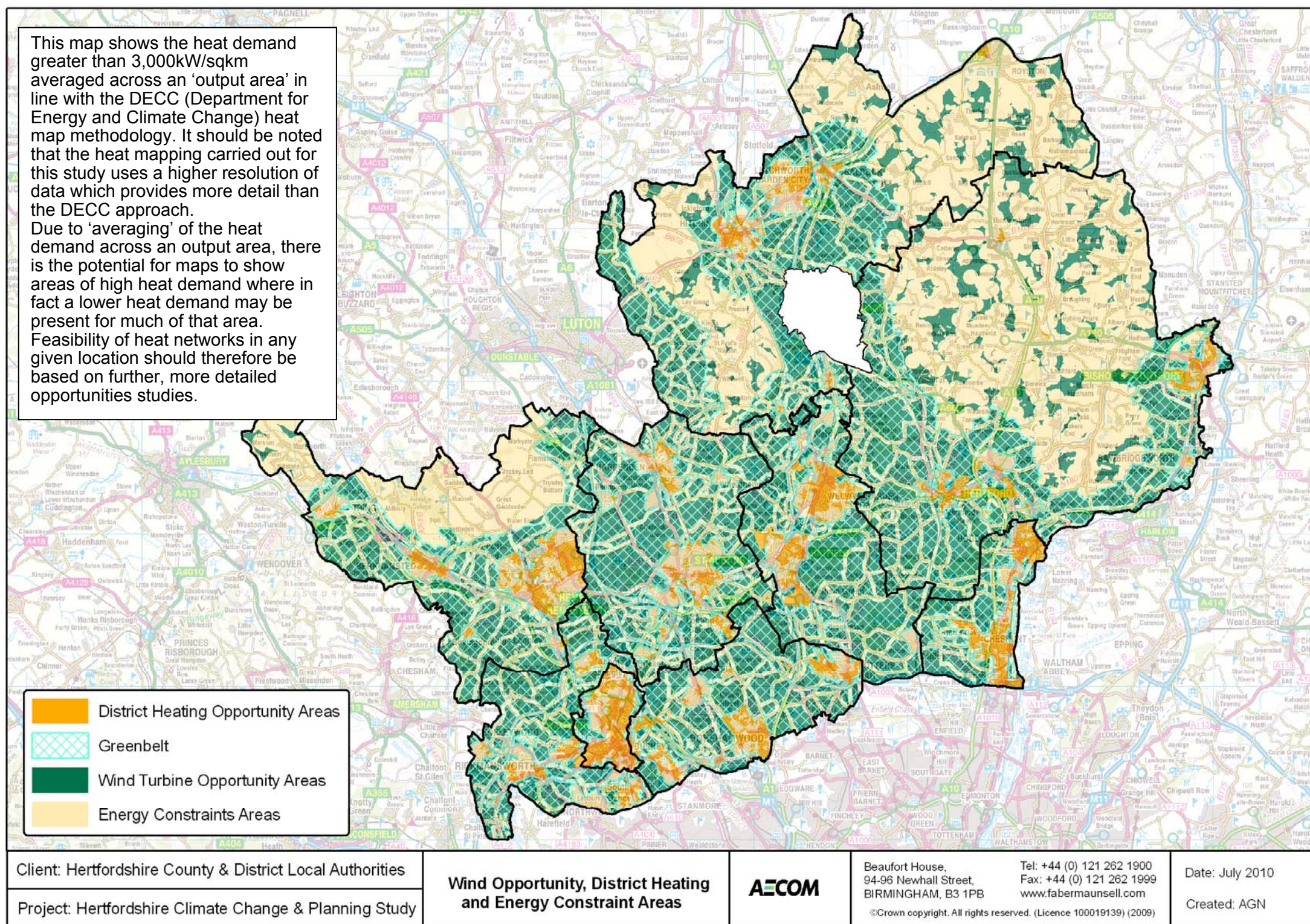


Figure TS1 – Map showing large scale wind opportunity, district heating opportunity and “energy constrained” areas

Delivery of Renewable and Low Carbon Energy in Hertfordshire (Chapter 10)

There are a wide range of delivery mechanisms that can be employed to support planning for energy. Not all will be suitable for Hertfordshire and mix will be needed to encompass all of the energy opportunities. This report provides the context for making those decisions. Further work, discussions and advice will be needed to make them happen. As a first step we recommend that the following next steps be discussed across the County:

Provide the necessary leadership and skills

- The County and its districts must take strategic leadership role together with Local Strategic Partnerships to ensure the necessary political and stakeholder buy-in. This will involve using this study inform preparation of relevant strategies, including climate change and energy strategies.
- Skills must be developed across the councils and its partners and awareness raised amongst communities and stakeholders.

Priority actions and projects

- The County and its districts need to set out a clear framework which gives relative certainty. Action should be prioritised at strategic locations.
- Initiatives to support the proposed residential energy efficiency retrofit policy should be designed to reduce the financial burden on households.
- The County and its districts should work with eligible partners to develop a micro-generation retrofit strategy.
- A set of priority district heating schemes should be drawn up by the County, its districts and partners and further feasibility work carried out. This should be based on factors such as financing options, planning, liaison with stakeholders including the RDA, phasing and type of development.
- Should the County and its districts agree to lead installation of district heating networks then it is recommended that they explore the option of establishing a Local Development Order in order to add certainty to the development process and potentially speed up delivery.
- Beyond the large scale wind opportunity areas identified in the energy opportunities plan opportunities should be explored for isolated turbines in commercial areas. The County, its districts and partners should identify delivery opportunities, considering available financial mechanisms, publically owned land and community involvement and ownership.
- Opportunities for biomass, biofuels and biogas should be explored with partners in the wider region.
- The County, its districts and partners should undertake further work to explore the role for the local authority to link housing development to energy supply delivery.

Delivery vehicles and funding

- The County, its districts and partners need to establish an appropriate form of delivery vehicle or vehicles to pursue the key energy efficiency and supply opportunities. Further work will be needed to understand what

is suitable for individual districts and project but will need to consider ESCo, partnerships and joint ventures.

- Funding mechanisms should be identified and applied first to priority schemes, co-ordinated through the appropriate delivery vehicle. These could include:
 - Delivery of whole house and street-by-street energy efficiency improvements and retrofit of micro-generation technologies.
 - Setting up a Carbon Buyout Fund, possibly using the CIL or allowable solutions. This should be used to pay for projects identified in the Energy Opportunities Plan, including large or small wind turbines off-site in the wind opportunity areas. Further work will need to be undertaken to establish the extent of the opportunities.
 - Developing a plan to deliver allowable solutions to ensure funding from new development is directed towards the best solutions in a coordinated way.

Communities are likely to play a crucial role in the delivery of energy infrastructure. However, to be successful further work will be needed to explore how communities function within Hertfordshire.