

elementenergy

**Hastings Borough
Renewable and Low
Carbon Energy Study:
Summary**

for

Hastings Borough Council

21/08/09

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1. INTRODUCTION

Element Energy has completed a comprehensive analysis of the low carbon energy strategies appropriate for the new developments planned in Hastings up to 2026 and has produced an optimised low carbon technology strategy for the borough as a whole. This strategy describes the mix of technologies which will be the most appropriate and cost effective in delivering the required CO₂ savings on the new build development sites in the borough.

The results of this analysis form a robust evidence base, which should be used to guide low carbon strategic planning in the town.

The analysis highlights that uptake of a balanced mix of low carbon technologies will be required in Hastings if local and national CO₂ reduction targets are to be achieved. A mixture of fabric performance improvements (e.g. basic heating controls), building integrated microgeneration technologies (e.g. roof-mounted photovoltaics) and standalone renewable energy generation technologies (e.g. large wind turbines) will be required. Therefore, local policy intervention in the following areas is essential:

1.1. Building thermal performance

The application of basic fabric improvement measures to buildings can promote highly cost effective carbon savings and reduce the energy demands and natural resource consumption of new build developments (the exact nature of these measures is outlined in section 2.2).

The application of basic fabric measures also has other key advantages:

1. Avoidance of large scale wind carbon offsetting

The optimised low carbon technology strategy - determined by Element Energy - indicates that a significant installed capacity of MW scale wind will be required in the Hastings Borough to offset the CO₂ impact of the planned new build developments (see section 1.3 below).

However, despite the fact that Hastings has an excellent windspeed resource, the number of appropriate large wind sites in the borough is severely restricted and the potential for installed large wind capacity is heavily constrained.

Application of basic fabric performance improvements to new buildings reduces their CO₂ impact and reduces the required installed capacity of large scale wind in the borough.

2. Future-proofing of domestic building designs

Incorporating basic thermal/fabric improvement measures at the earliest possible stage future proofs building designs against the increasingly stringent CO₂ reduction standards that will be required under the Code for Sustainable Homes (CSH). The highest level of the CSH (level 6) will require mandatory improvements in building thermal performance.

By changing building designs now, developers can avoid constantly updating designs as low carbon legislation becomes increasingly more stringent. This can save developers money in the long term.

Local planning targets should therefore demand a minimum initial 10% reduction in the CO₂ emissions of both domestic and non-domestic developments through basic fabric performance improvements, using Part L of the Building Regulations (2006), and non-domestic best practice benchmarks as a baseline. This reduction is highly feasible technically and results in cost effective CO₂ savings.

1.2. Local renewable planning targets

The Hastings Local Development Framework: Core Strategy Preferred Approaches (2008) currently proposes a local planning requirement to produce 10% of the baseline energy demands of a new development through the installation of renewable energy generation technologies.

The policy should be amended in two areas:

- a) The current energy production target should be updated to a 10% **CO₂ reduction** target with respect to baseline emissions, using renewable energy generation technologies.

This change would make local Hastings policy consistent with the Code for Sustainable Homes (CSH) and Code for Sustainable Buildings (CSB), which use a CO₂ reduction metric.

- b) Exemption from the rule should be granted for clean-energy generation technologies that promote a CO₂ saving of greater than 10%.

Clean energy generation systems (e.g. natural gas-fired CHP engines - potentially connected to district heating networks) can provide highly cost effective CO₂ savings. The uptake of clean energy systems and associated district heating systems should be encouraged, with a view to facilitating higher CO₂ savings in the local area.

1.3. Standalone renewable energy production schemes

Large stand-alone mega-Watt (MW) scale wind turbines can provide some of the most cost effective CO₂ savings of all renewable energy generation technologies (analysis of the relative cost effectiveness of low carbon technologies is presented in the appendices).

Projections indicate that in order for Hastings to achieve the low carbon targets of the CSH and CSB, 4-6MWe of wind capacity will be required in the Hastings borough.

Geographical Information Systems (GIS) resource mapping indicates that the number of suitable MW scale wind sites in the town is severely restricted by local geographical constraints (Areas of Outstanding Natural Beauty and Sites of Special Scientific Interest) and rules governing the necessary separation between existing buildings and wind turbines (~200m as a benchmark). Sites with large potential are situated in:

- 1. Pebsham Countryside Park
- 2. East Ore

Maps of the two opportunity sites are presented in the appendices.

Local planning documents should explore the possibility of siting large wind turbines and other standalone renewable energy generation schemes in these areas and explore the possibilities of allowing standalone renewable schemes to be developed in Areas of Outstanding Natural Beauty (AONBs) and Sites of Special Scientific Interest (SSSIs).

Hastings Borough Council should also begin discussions with the neighbouring Rother District Council regarding the identification of sites for large wind turbines in Pebsham Countryside Park.

1.4. Combined heat and power systems and district heating

With combined heat and power (CHP) systems, the “waste” heat generated during electricity production is provided to an end user, reducing or eliminating their gas heating requirements. CHP connected to district heating (DH) networks can provide CO₂ savings with high cost effectiveness (comparable to that of MW scale wind systems). Significant CO₂ reductions can be achieved with CHP systems fuelled by natural gas, despite the fact that the fuel used is non-renewable.

Installation of CHP/DH networks offers flexibility within the Hastings low carbon energy strategy. Uptake of biomass-fired CHP systems (with district heating) and/or installation of significant capacities of large scale wind will be essential if new build developments in Hastings are to achieve the most stringent CO₂ reduction standards required in the Hastings borough (Code for Sustainable Homes level 6 and the associated standards of the Code for Sustainable Buildings).

Installation of CHP low carbon technologies and district heating should be encouraged so that district heating networks can propagate through Hastings at the earliest opportunity. These systems are likely to be powered by natural gas in the first instance, but upgrade to biomass-fired systems is possible if the district heating networks can be connected to sufficient end-user heating demand.

Local low carbon policy should therefore require developers to assess the technical and economic viability of a comprehensive range of CHP/DH options when submitting a planning application for any new build development. These requirements should include (but not be limited to):

- Connecting to existing CHP distribution networks
- Site-wide CHP powered by renewable energy
- Natural gas-fired CHP
- Communal heating and cooling fuelled by renewable sources of energy
- Natural gas-fired communal heating and cooling

Developers should also be required to assess the viability of extending heating networks – catalysed by new build developments – into the adjacent existing building stock. This extension could facilitate further highly cost effective CO₂ savings, and also improve the technical and economic viability of a CHP/DH system in the first instance.

GIS mapping of the heat demand density of Hastings indicates that there are two key high heat density areas – where new build developments are planned, which could be used to catalyse the introduction and expansion of district heating networks into the existing build stock within Hastings. These sites are located:

- In the vicinity of the Conquest Hospital
- In Central St Leonards/Castle (in the vicinity of Summerfields Sports Centre)

Maps of the two opportunity sites are presented in the appendices.

New build developments should also be designed so that retrofit connection to expanding heating networks is feasible.

1.5. Low carbon buy-out fund

Analysis and previous experience indicate that some specific new build development sites may not be able to achieve the required carbon reduction targets using on site low carbon technologies. Technologies may not be technically viable on a specific site, or may represent an unfeasibly high capital cost.

Hastings Borough Council should therefore assess the operation of a low carbon buy-out fund. The fund would be designed to allow sites to achieve the required low carbon standards through energy trade agreements throughout the town, facilitating the most cost effective CO₂ savings.

The most cost effective carbon savings often require the use of standalone technologies e.g. MW scale wind turbines, which are remote from the development. In order to ensure that these standalone renewable technologies do develop, and at an appropriate scale, a centralised buy-out fund would be required. Capital contributions made to the buy-out fund by separate, individual developments (which cannot meet their CO₂ reduction targets on site), would be consolidated and used to fund large scale standalone renewable energy generation schemes.

Access to the buy-out option should only be granted for those sites where it has been demonstrated that achieving the required CO₂ reduction standards on site is technically or economically unfeasible.

2. CONCLUSIONS

2.1. Low carbon legislation

Attainment of UK CO₂ reduction and renewable energy targets will require definitive action to be taken at the local scale. Boroughs and cities must understand the implications of central government low carbon policy, and must formulate clear and informed low carbon policy now, to facilitate attainment of mandatory CO₂ reduction targets in the coming decade.

The new build developments planned in Hastings will have a significant CO₂ impact. Baseline calculations suggest that if no low carbon legislation is enacted and new developments continue to be built to today's standards, CO₂ emissions from the new developments will exceed 20,000 tonnes/yr in 2030.

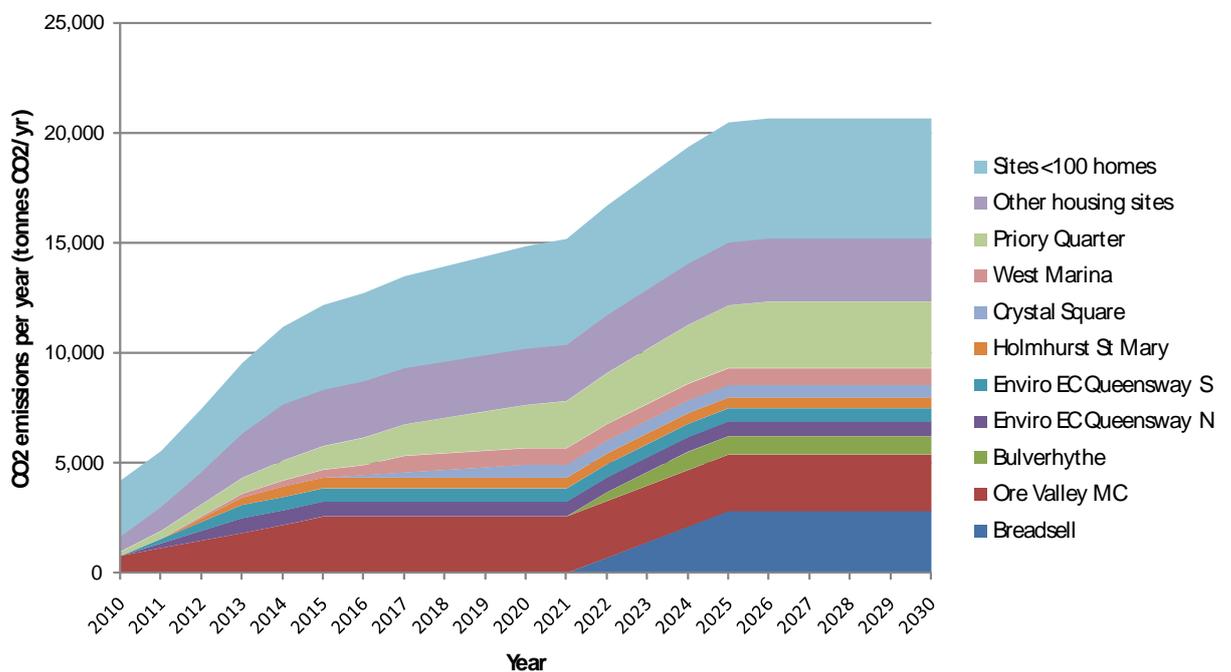


Figure 1 - annual CO₂ emissions which will result from the Hastings new build developments if all buildings continue to be built to part L 2006 (domestic) or best practice benchmarks (non-domestic).

Cumulative CO₂ emissions between 2010 and 2030 are likely to total approximately 300,000 tonnes.

Compliance with central government low carbon legislation (Code for Sustainable Homes and Code for Sustainable Buildings) and the local 10% onsite CO₂ reduction rule will facilitate significant CO₂ savings. Annual CO₂ emissions from the new build developments planned in Hastings could be reduced to 8,000 tonnes/yr – a 60% reduction – by 2030.

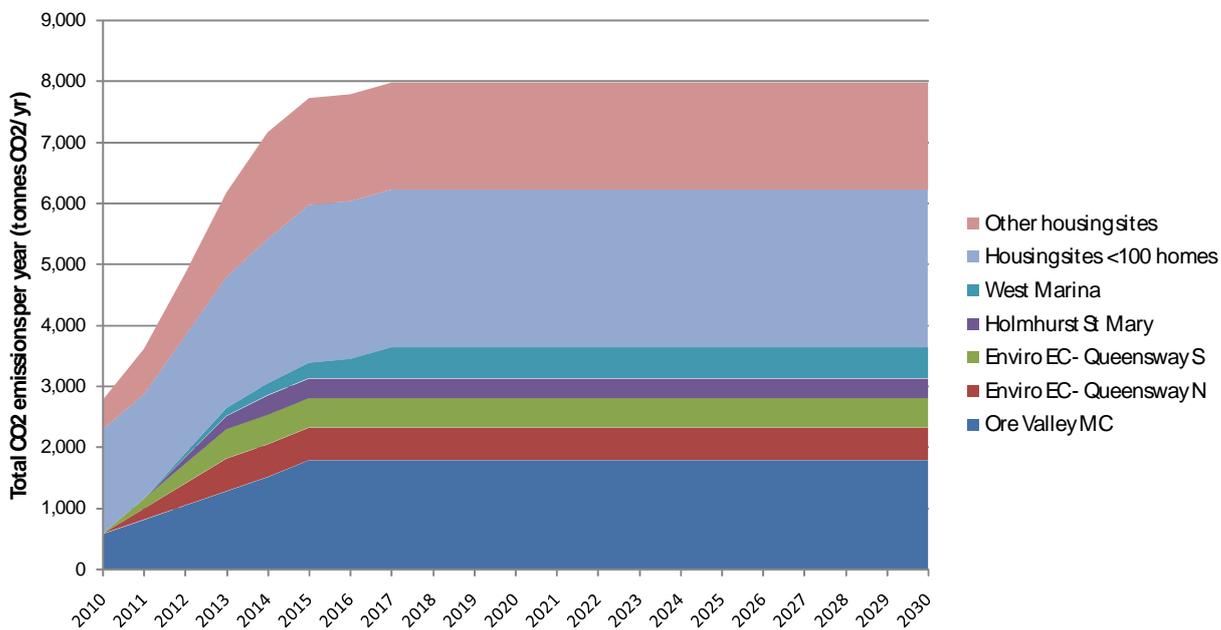


Figure 2 - annual CO₂ emissions from the Hastings new build developments if the targets of the CSH and CSB are met. Note that emissions plateau after 2016 as new developments must be zero carbon.

Cumulative CO₂ emissions from 2010 to 2030 could be reduced to 150,000 tonnes – a 50% reduction.

2.2. Attaining CO₂ reduction targets in Hastings

Analysis indicates that the most capital cost effective and appropriate low carbon energy strategies in Hastings will incorporate:

1. Basic thermal/fabric performance improvement measures in new build developments

A comprehensive range of fabric performance improvement measures were studied¹. The most appropriate and cost effective fabric improvement strategies differ between flats, houses and non-domestic buildings. The strategies are outlined below:

House

The following basic fabric measures can produce highly cost effective CO₂ savings in a typical new build house:

a. 4:1 S:N glazing

4/5 of all windows are designed to be south facing. Heating bills are reduced as solar heating gains are higher.

b. Basic heating controls

I. Thermostat in hot water cylinder

Controls the temperature of domestic hot water and avoids overheating. Heating demands are reduced.

II. Zoned and timed heating controls

Allow occupants to heat specific areas of the homes at specific times. These controls allow occupants to live comfortably without heating unoccupied areas of the home unnecessarily.

III. Delayed start thermostat

Delayed start thermostats delay the start-up of the home heating system until the latest possible moment, thus avoiding unnecessary heating.

c. High efficiency boiler upgrades

Standard gas boilers can be upgraded to high efficiency condensing boilers, reducing heating fuel demands.

d. Air permeability reduced to 5m³/m²/hr

Decreasing the air permeability of homes slows the leakage of heat to the atmosphere and reduces heating demands.

e. Upgraded windows

Thermal leakages through windows can be reduced by installing double or triple glazing.

¹ The fabric improvement measures studied were derived from the recent Cyril Sweett report Cost Analysis of The Code for Sustainable Homes
<http://www.communities.gov.uk/publications/planningandbuilding/codecostanalysis>

Flat

The following basic fabric measures can produce highly cost effective CO₂ savings in a typical new build flat:

- a. 4:1 S:N glazing
- b. Delayed start thermostat
- c. Zoned and timed heating controls
- d. Air permeability reduced to 5m³/m²/hr
- e. Upgraded walls

Thermal leakages through walls can be reduced by increasing wall thickness or using materials which conduct heat less well.

Non-domestic

Installation of basic fabric/thermal improvement measures in non-domestic properties can achieve significant and highly cost effective CO₂ savings.

2. MW scale wind turbines or natural gas-fired CHP engines connected to district heating networks²

The most cost effective low carbon energy strategies utilize large capacities of MW scale wind to offset the CO₂ emissions of new developments (see appendix 5.2).

However, although MW scale wind strategies would be highly cost effective in the Hastings borough, the MW scale wind resource is heavily constrained by environmental designations, including Sites of Special Scientific Interest (SSSIs) and the High Weald Area of Outstanding Natural Beauty (AONB), and guidelines ruling the minimum separation distance of large wind turbines from existing buildings.

Therefore, the most appropriate low carbon energy strategies (at each CSH/CSB code level) for new build development sites in Hastings are those which avoid MW scale wind offsetting as far as possible, whilst incurring minimal additional capital cost with respect to wind dominated carbon offsetting strategies.

- At the lowest levels of the CSH (level 3) or CSB, application of basic fabric measures and a small capacity of a renewable energy generation technology (e.g. solar photovoltaics or solar water heating, or a biomass boiler in non-domestic properties) will meet the required CO₂ reduction targets at minimal capital cost. The installation of a small capacity of a renewable energy generation technology facilitates compliance with the 10% onsite renewable energy generation rule at the lowest capital cost.
- At intermediate code levels (CSH level 4) site-wide natural gas-fired CHP systems with district heating networks (where feasible) represent the most cost-effective way of reducing CO₂ emissions whilst avoiding MW scale wind offsetting.

² N.B: There are no viable opportunities for biomass CHP systems on the new build development sites in Hastings

- At the highest code levels (CSH levels 5-6) some MW scale wind carbon offsetting will be required to achieve the mandatory CO₂ reduction standards. The most appropriate and cost effective low carbon energy strategies at the highest code levels deploy the technologies outlined above for intermediate code levels and then supplement these strategies with MW scale wind offsetting.

Following these strategies allows the appropriate low carbon technology mix for the Hastings borough as a whole to be determined. These strategies could allow the new build developments in Hastings to achieve mandatory CO₂ reduction targets in a highly cost effective manner.

2.3. Implications of the preferred low carbon technology strategies

The implementation of the preferred low carbon energy strategies on the new build development sites throughout Hastings could facilitate compliance with central government CO₂ reduction targets in the most appropriate and cost effective manner. However, significant capital cost would still be incurred ~£27M.

A large proportion of this cost is due to the micro-generation technologies required to facilitate compliance with the 10% onsite CO₂ rule at low CSH/CSB code levels (up to 30% of the total capital outlay).

It is envisaged that significant provision of natural gas-fired CHP/DH and MW scale wind capacity will be required in the borough by 2026. A minimum capacity of approximately 4-5MWe of MW scale wind will be required within the borough to offset the CO₂ emissions of new build developments at the highest CSH/CSB code levels. This is the equivalent of approximately 2-3 large turbines.

2.4. Vulnerability of low carbon energy strategies in Hastings

Variation analysis indicates that serious deviations from this preferred low carbon technology strategies would be hard to accommodate in Hastings:

1. If no CHP/DH systems are installed in the town, new build development sites will increasingly rely on MW scale wind offsetting. The required capacity of MW scale wind increases significantly (~20%) to 5-6MWe by 2026. This capacity may be difficult to accommodate within the town.

The capacity would be impossible to deliver unless Hastings borough council reassesses the restrictions on siting large wind turbines in SSSIs and AONBs and safeguards specific sites with great potential for siting of MW scale wind (see section 1.3) in the first instance.

2. If no suitable MW scale wind sites can be identified then new build developments required to be net zero carbon will need to rely on oversized, heat dumping biomass CHP systems and DH networks. These systems waste the local biomass resource and may overtax it.

These variations indicate that reliance on a single low carbon technology is not advisable in Hastings. Uptake of a balanced mix of low carbon energy generation technologies will be required in the town if local and central government carbon reduction targets are to be met in a cost effective and appropriate manner.

3. LOW CARBON POLICY RECOMMENDATIONS

Hastings Borough Council currently has a set of Preferred Approaches, which seek to promote environmentally conscious new build development. However, taking into account the conclusions detailed in the previous section, we suggest that a number of alterations should be made to the phrasing of these preferred approaches.

The following three policy statements are based on the original preferred approaches. However, Element Energy has amended them in light of the analysis undertaken in the main report.

In each case the following is presented:

1. Recommended low carbon policy statement
2. A rigorous evidence base explaining the policy approach and highlighting the changes made to the current policy wording.

3.1. Preferred Approach 44: Sustainability and Design

3.1.1. Recommended policy statement

Incorporate a strategic policy that:

- Promotes development that will minimise energy consumption and CO₂ production through appropriate building layout and orientation, building form and design and accounting for the micro-climate.
- Requires that all dwellings demonstrate a CO₂ reduction of at least 10% (relative to the baseline estimate) **through fabric and thermal performance improvement measures**. The baseline will be the Part L regulations in force at the time, and will be calculated using a methodology approved for Part L calculations.
- Promotes development that incorporates renewable and low carbon energy production facilities into new developments to minimise carbon dioxide production.
- Manages and reduces the threat of flooding through consideration of planning applications using the Strategic Flood Risk Assessment and the incorporation of appropriate Sustainable Drainage Systems in new development.
- Minimises consumption of natural and non-renewable resources.
- Protects against light, air, land, noise and water pollution.
- Promotes development that incorporates recycling facilities, and uses waste as a resource.
- Meets high water efficiency standards.
- Promotes safe, 'Secure by Design' and community safety features.

3.1.2. Evidence base

This policy statement outlines the higher level aims of the preferred approaches. They aim to reduce the CO₂ emissions and energy demands of new build developments; minimise the consumption of natural resources in the town and promote recycling.

The second criteria specifically consider CO₂ emission reduction targets derived from increased building thermal/fabric performance.

- Analysis shows that the most appropriate carbon reduction strategies, for all CSH/CSB code levels, include the use of some basic fabric and thermal performance improvements (see section 2.2).
- Analysis further indicates that a CO₂ reduction target of ~10% - with respect to baseline estimates - through initial application of basic fabric/thermal performance improvement measures is highly feasible technically, and a cost effective method of reducing CO₂ emissions. This level of thermal/fabric improvement is highly recommended.

- Demanding this level of fabric/thermal performance improvement has the following advantages:

- 1. Cost effectiveness**

Application of basic thermal/fabric improvement measures to buildings is a very cost effective method of saving carbon.

- 2. Conservation of the local MW scale wind resource**

Analysis indicates that a significant capacity of MW scale wind will be required in Hastings to offset the CO₂ impact of new build developments, particularly at high CSH/CSB code levels. Application of basic fabric measures to buildings can reduce the need for MW scale carbon offsetting and preserve the highly constrained local resource.

- 3. Future-proofing of domestic building designs**

Incorporating basic thermal/fabric improvement measures at this early stage, future proofs domestic building designs for high CSH code levels. These code levels will require mandatory improvement in building thermal performance.

By changing building designs now, developers can avoid constantly updating domestic building designs as low carbon legislation becomes increasingly more stringent. Developers need only change current designs once.

This can save developers money in the long term and reduce the long term cost of compliance with low carbon legislation in Hastings.

- 4. Decreased consumption of natural resources**

Improved building thermal performance decreases the consumption of e.g. natural gas and lowers fuel bills. This is a particularly important advantage in an area such as Hastings, where fuel poverty is high.

3.2. Preferred Approach 45: Renewable Energy – Standalone Schemes

3.2.1. Recommended policy statement

Proposals for renewable energy developments, including any ancillary infrastructure or building will be favourably considered if:

1. Their scale, form, design, materials and cumulative impacts can be satisfactorily assimilated into the landscape or built environment and would not harm the appearance of these areas; and
2. They would not impact adversely on the local community, economy, biodiversity or historical interests.

The Council will investigate the area’s potential for accommodating renewable and low carbon energy sources and supporting infrastructure. Suitable sites will be identified through the forthcoming Site Allocations Development Plan Document.

3.2.2. Evidence base

- No changes to this existing statement are recommended.
- Analysis indicates that a significant capacity of MW scale wind capacity will be required in Hastings to offset the CO₂ impact of new build developments. The Council should therefore favourably consider plans to develop stand-alone renewable schemes in the borough.

3.3. Preferred Approach 46: Renewable Energy – On Site Provision

3.3.1. Recommended policy statement

Developers should consider a comprehensive range of renewable and low carbon energy technologies on their sites, some of which may be more appropriate in different locations.

All developments will be expected to reduce their CO₂ emissions (relative to a baseline estimate) by 10% through onsite renewable energy generation, unless it can be demonstrated that the development will be unviable in terms of development type, location, design or economics. The baseline estimate should be produced using an approved methodology, e.g. SAP.

A site that can reduce its CO₂ by more than 10%, through the use of low carbon energy generation systems, such as CHP, will be allowed to use this technology in place of renewables to meet the requirement.

3.3.2. Evidence base

The original local planning target – to produce 10% of new development energy demands through onsite renewable energy production – has been amended to a 10% CO₂ reduction (from baseline) through onsite renewable/clean energy production. The reasons for these changes are detailed in section 3.3 of the main report.

The onsite 10% CO₂ rule will be vital if the low carbon targets of Hastings are to be realised. Implementation of the rule has the following advantages:

1. Reduces the demand for MW scale wind carbon offsetting

MW scale wind carbon offsetting is the most cost effective method of achieving large CO₂ reductions. However, the MW scale wind resource in Hastings is highly constrained. Local planning targets, which reduce the CO₂ emissions of new build sites through onsite renewable/clean energy generation, help to reduce the installed capacity of MW scale wind required in the borough.

2. Promotes the uptake of CHP/DH and micro-generation

Analysis indicates that a balanced mix of low carbon energy generation technologies will be required if Hastings is to achieve mandatory national CO₂ reduction targets. Hastings cannot rely upon low carbon energy strategies dominated by a single technology e.g. MW scale wind, as the local resource is heavily constrained.

The 10% onsite CO₂ rule requires developers to consider micro-generation and CHP systems at an early stage. This will help developers to adjust to the planned timetable for CSH/CSB, which will require a sudden and very large increase in renewable/clean energy generation technology capacities at higher code levels.

Local Planning targets that support the development of carbon reducing technologies are required now to ensure that the market develops sufficiently to be able to deliver the capacities required for the high code levels.

Allowing clean energy generation technologies e.g. natural gas-fired CHP to contribute to the 10% onsite CO₂ rule has the following advantages:

1. Cost effectiveness

Non-renewable low carbon energy generation technologies can be a more feasible and more cost effective means of reducing carbon than renewables.

2. Deployment of DH networks at an early stage promotes flexibility in town-wide low carbon energy strategies

The most cost effective low carbon energy strategies for attaining high CSH/CSB levels incorporate MW scale wind turbines and/or biomass-fired steam CHP engines and DH networks.

Promoting the installation of natural gas-fired CHP engines and DH networks now means that gas engines could be replaced with biomass-fired CHP engines in the future as heat networks expand, effective heat demands placed upon the networks increase and higher CSH/CSB CO₂ reduction targets become mandatory in Hastings.

Early installation of CHP systems and DH networks in Hastings creates a high level of flexibility in future low/zero carbon energy strategy.

3. Deployment of DH networks offers retrofit opportunities

Significant CO₂ savings can be made by extending CHP/DH networks – catalysed by new developments – into existing properties with higher heating loads. This extension could also make the development of a CHP/DH system on a new build development more economically/technically viable in the first instance. There are a number of excellent heating network retrofit opportunities in Hastings. These include (but are not limited to) the following locations of higher heat demand:

- Conquest Hospital
- Summerfields Sports Centre

The 10% onsite CO₂ rule is an extremely powerful local planning target, with many far reaching implications. Adoption of the recommended policy statement will help Hastings Borough Council to develop an effective and flexible low carbon energy strategy.

4. ADDITIONAL POLICY RECOMMENDATIONS

Hastings Borough Council currently has no low carbon policies relating to:

1. Combined heat and power and district heating systems
2. The attainment of low carbon targets on sites where current low carbon technologies are not feasible or represent an unacceptable capital cost

The following additional policy statements are highly recommended by Element Energy in light of the analysis undertaken.

As before, the recommended policy statement is presented along with a comprehensive evidence base.

4.1. Preferred Approach 47: Supporting CHP/CCHP and Heat Networks

4.1.1. Recommended policy statement

Incorporate a strategic policy which:

- Ensures that local, existing heat and cooling networks are identified and safeguarded.
- Maximises the opportunities for providing new networks that are supplied by decentralised energy (including renewable generation).
- Ensures that developers evaluate the technical and economic feasibility of combined cooling, heat and power (CCHP) and combined heat and power (CHP) systems on all new developments, and where a new CCHP/CHP system is installed as part of a new development, examine opportunities to extend the scheme beyond the site boundary to adjacent areas.
- Ensures that developers study the technical and economic feasibility of the following heat and cooling network strategies before submitting a planning application:
 - Connection of a new development to existing CCHP/CHP distribution networks in the vicinity
 - Site-wide CCHP/CHP powered by renewable energy
 - Natural gas-fired CCHP/CHP
 - Communal heating and cooling fuelled by renewable sources of energy
 - Natural gas-fired communal heating and cooling
- Ensures that it is feasible for new developments to connect to existing heating and cooling networks.
- Requires all developments to demonstrate that their heating, cooling and power systems have been selected to minimise carbon dioxide emissions.

Also:

- Sites where it can be demonstrated that non-renewable CCHP/CHP and heating and cooling networks could produce CO₂ savings equal to or greater than those possible using onsite renewable energy generation technologies will be exempt from onsite renewable energy generation targets.

4.1.2. Evidence base

Analysis indicated that a balanced mix of low carbon energy generation technologies will be required to allow Hastings to achieve mandatory CO₂ reduction targets. CHP/DH systems can provide highly cost effective CO₂ savings and are likely to be an important component to the low carbon energy strategy in the town.

Designers should therefore be required to assess the technical and economic feasibility of CHP/CCHP and DH systems on their sites when writing a planning application, even if such systems are not required to achieve the CO₂ reduction targets of a site.

Where there is an obvious opportunity to extend heat and cooling networks beyond the boundary of a site (and hence affect further highly cost effective CO₂ savings), developers should make this point clear.

There may be a possibility of combining heat networks and increasing the cost effective CO₂ savings that can be attained (and reducing capital installation costs).

Dwellings should be built so that they can easily be retrofitted and connected to heat networks that may expand throughout Hastings. This may allow significant, cost effective retrofit CO₂ savings to be made in the future.

Non-renewable clean energy systems e.g. natural gas-fired CHP can provide significant CO₂ savings. However, under current planning policy in Hastings, such non-renewable systems must be supplemented with expensive building mounted renewables and are hence an unfavourable economic proposition. Exemption from the 10% on site CO₂ rule would make them far more appealing economically.

4.2. Preferred Approach 48: Low Carbon Buy-Out Fund

4.2.1. Recommended policy statement

Hastings Borough Council will explore the option of a CO₂ buy-out fund.

The fund will be designed to allow sites to achieve the required low carbon through energy trade agreements throughout the town, facilitating the most cost effective CO₂ savings in the town.

Access to the buyout option will only be granted for those sites where it has been demonstrated that achieving the required CO₂ reduction standards onsite is technically or economically unfeasible.

The tariff level of any CO₂ buy-out will be determined following further evidence base work, but will be set at a level that encourages developers to explore all relevant onsite clean/renewable energy generation technologies in the first instance.

Capital contributions to the CO₂ buy-out fund will be used to fund major low carbon developments in the town.

4.2.2. Evidence base

Some sites may not be able to achieve the required carbon targets using on site technologies. Low carbon technologies may be unviable on a specific site, or represent an unfeasible capital cost.

The most effective carbon savings often require the use of standalone technologies e.g. MW scale wind turbines, which are remove from the development. In order to ensure that these standalone renewable technologies do develop, and at an appropriate scale, a centralised, buy-out fund would be required.

The “buy-out price” or tariff of any fund should be set at a level, which supports the proliferation of the preferred renewable/clean energy technologies e.g. it should not be set lower than the cost of a typical CHP system and DH network if these technologies are to be seriously considered by developers, as they will simply buy-out of their on site low carbon obligations.

However, the buy-out price cannot be set so high as to make development economically unfeasible.

Energy strategy analysis in Hastings suggests that the most cost effective energy strategies for achieving high CO₂ reductions will incorporate:

- Site wide CHP systems with district heating (biomass CHP being the most cost effective)
- Offsite MW scale wind supplementation

Proceeds from the buy-out fund could be used to install MW scale wind capacity in some of the suitable and very windy sites in the town.

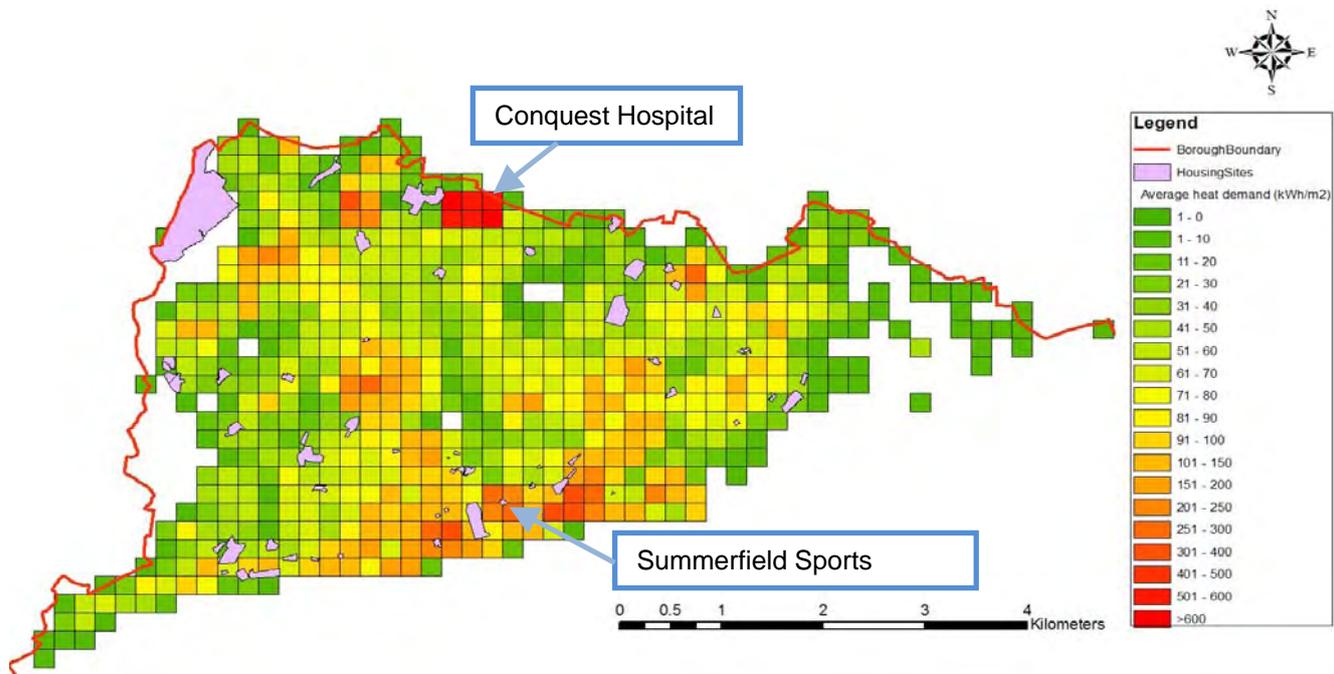
5. APPENDICES

5.1. Opportunities for low carbon technology installation in the Hastings Borough

5.1.1. Opportunities for combined heat and power and district heating systems

GIS mapping of the heat demand density of Hastings indicates that there are two key high heat density areas – where new build developments are planned, which could be used to catalyse the introduction and expansion of district heating networks into the existing build stock within Hastings. These sites are located:

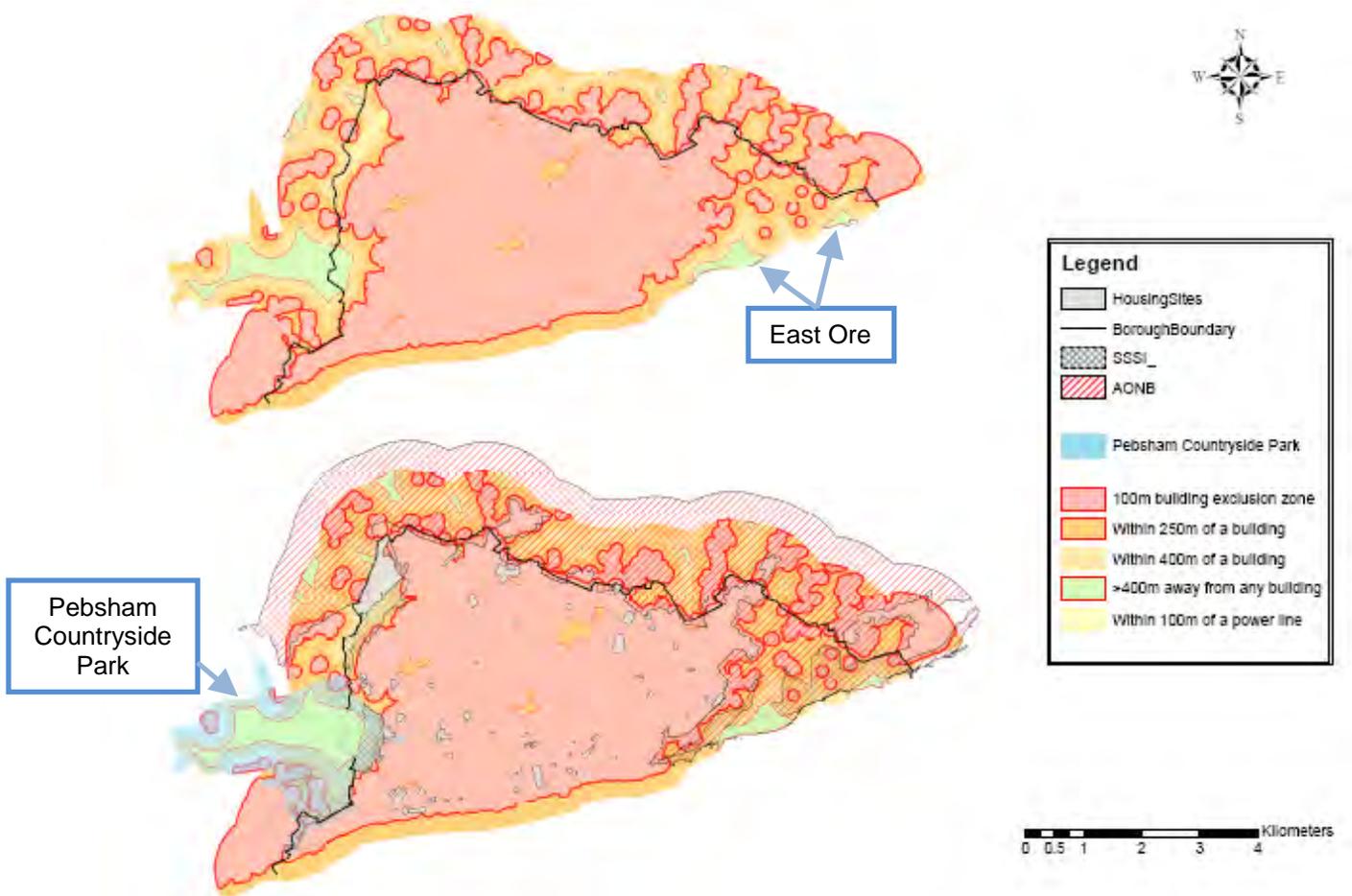
- In the vicinity of the Conquest Hospital
- In Central St Leonards/Castle (in the vicinity of Summerfields Sports Centre)



5.1.2. Opportunities for large scale wind turbines in the Hastings Borough

Geographical Information Systems (GIS) resource mapping indicates that the number of suitable MW scale wind sites in the town is severely restricted by local geographical concerns. Sites with large potential are situated in:

1. Pebsham Countryside Park
2. East Ore



5.2. Relative capital cost effectiveness of low carbon technologies

The graph below shows the approximate capital cost effectiveness (kg of CO₂ saved per capital £ spent) for a comprehensive range of low carbon technologies:

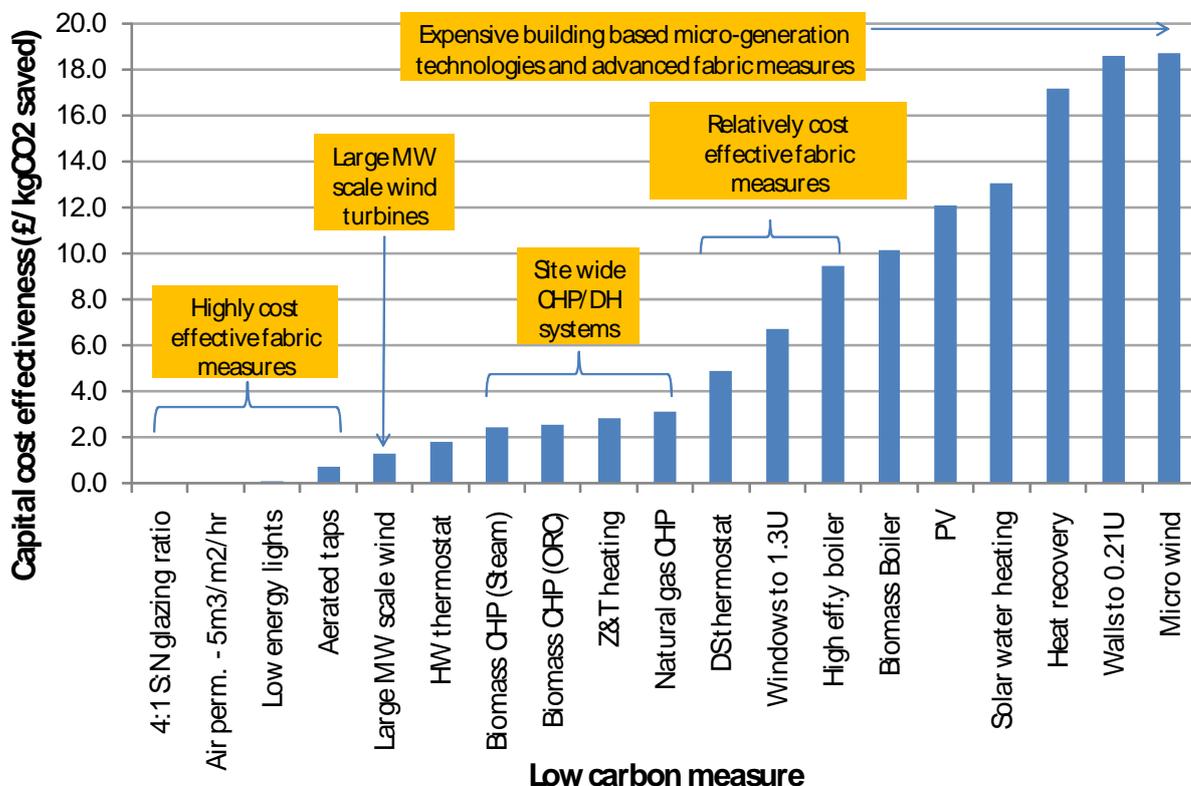


Figure 3 - CO₂ capital cost effectiveness of low carbon technologies for a typical semi detached house.

Technologies towards the left hand side of the graph save more carbon for each capital £ spent. Basic fabric efficiency measures, large wind turbines and site-wide CHP/DH systems (where feasible) can be highly cost effective.