Brighton and Hove City Plan Part 2 Energy Study

Brighton & Hove City Council

Quality information

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Executive Summary

Brighton and Hove City Council (BHCC) has commissioned AECOM to provide technical support to develop energy and sustainability policy within the forthcoming City Plan Part 2 (CPP2).

This report describes the current state of affairs with regards to energy use in Brighton and Hove, discusses some of the anticipated changes that may arise in the coming years as a result of the development proposed in CPP2, national policy and wider changes, and presents a variety of options for responding to these through planning policy. It builds on work presented within the 2013 Energy Study conducted by AECOM and should be read in conjunction with that report.

Background and Regulatory Context

The Climate Change Act (2008) sets a legally binding target to reduce UK carbon emissions by 80% by 2050, against a 1990 baseline. This target is reflected in national and local UK policies which address the energy efficiency and design of buildings, as well as the method of energy delivery.

The National Planning Policy Framework (NPPF) includes a presumption in favour of sustainable development. It states that, *'Local planning authorities should adopt proactive strategies to mitigate and adapt to climate change,'* by ensuring that the design of buildings minimises energy demand, and encouraging energy generation from low and zero carbon (LZC) sources.

The same approach is promoted within the UK Heat Strategy (2013), Industrial Strategy (2017) and Clean Growth Strategy (2017). These strategies particularly highlight the need to decarbonise the heating supply in conjunction with decreasing heating energy demand through improved energy efficiency.

Part L of the UK Building Regulations (2013) is the key mechanism for regulating the conservation of fuel and power in buildings; it includes standards for fabric energy efficiency and CO_2 emissions. Whereas, prior to the publication of the Housing Standards Review in 2015, local planning authorities (LPAs) could set higher energy efficiency targets than those in Part L, it is now expected that local policies will accord with national standards. That said, at the time of writing, it is possible to require new dwellings to achieve up to a 19% reduction in CO_2 emissions (the equivalent of the Code for Sustainable Homes Level 4).

With regards to existing buildings, the government has introduced Minimum Energy Efficiency Standards (MEES) that will apply to privately rented buildings starting in April 2018. This policy is intended to progressively increase the energy performance of the existing stock by requiring landlords to implement cost-effective energy saving measures where feasible.

The City Plan is the strategic spatial development policy for BHCC. City Plan Part 1 (CPP1) was adopted on 24th March 2016 and Part 2 (CPP2) is currently being developed. The strategic objectives of CPP1 recognize the need to improve the sustainability of the built environment, energy infrastructure and transportation network. This is demonstrated by policies such as Policy CP8: *Sustainable Buildings*, which requires new build residential developments to achieve a 19% carbon emissions improvement against Part L 2013. CP8 also requires non-residential developments of a certain size (151 sqm and above for retail; 236 sqm and above for other uses) to achieve a BREEAM 'Very Good' or 'Excellent' rating.

The sustainability objectives in CPP1 are supported by a variety of additional planning documents including PAN09: *Householder guidance on energy efficiency for historic houses in conservation areas*, and the Sustainability Checklist which must be submitted alongside all planning applications.

In our view, the policies contained in CPP1 provide a solid basis for encouraging sustainable development within Brighton and Hove. Nonetheless, it is considered that there may be opportunities for CPP2 to reinforce this goal. The remainder of this report will describe some of the options available to do so, and sets out the quantitative and spatial evidence for the suggested approach.

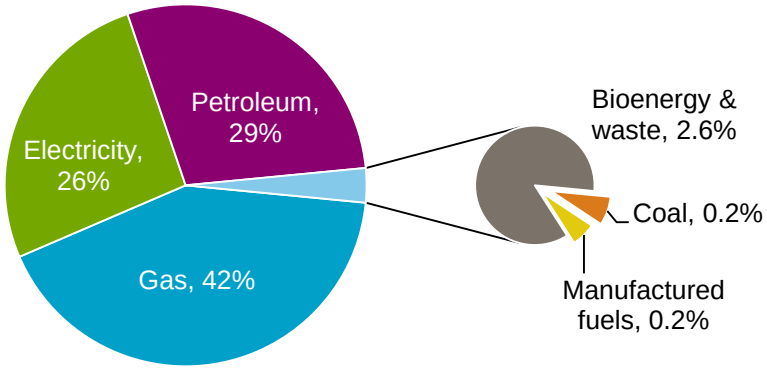
Understanding the existing baseline

Analysis has been carried out to establish the current (baseline) fuel consumption and CO_2 emissions, assess the current energy efficiency of the building stock and identify installed or planned LZC energy generation capacity within Brighton and Hove.

Fuel consumption and CO_2 emissions

According to the Department of Business, Energy and Industrial Strategy (BEIS) publication: '*Sub-national total final energy consumption statistics: 2005-2015'* (published in 2017), fuel consumption in Brighton and Hove was approximately 4,004 GWh in 2015 (the most recent year for which data is available). The largest proportion of fuel consumed was gas (42%), with petroleum and electricity accounting for 28.7% and 26.3%, respectively. Other fuels, including bioenergy & waste, coal, and manufactured fuels make up the remaining 3%.

Energy consumption by fuel type in 2015 (%)



CO_2 emission estimates for the area were taken from *'UK local authority and regional carbon dioxide emissions national statistics: 2005-2015'* (published in 2017). The data breakdown is shown in the table below.

	Industry & Commercial	Domestic	Transport	Total (unadjusted)	Total (adjusted)[12]
Gas	72.4	244.1	-		
Electricity	206.8	155.6	-		
Large installations	0.2	0	-		*LULUCF adjustment: +0.7 ktCO₂*
Other fuels	13.0	6.8	-		
Agriculture	1.5	0	-		
Transport	-	-	306.4		
TOTAL	**294.0**	**406.5**	**306.4**	**1,006.9**	**1,007.6**
Percent of total	*29.2%*	*40.4%*	*30.4%*		

Energy performance of the building stock

Energy Performance Certificate (EPC) data has been used to assess the energy efficiency of existing buildings within Brighton and Hove. This analysis found that:

- The majority of existing domestic buildings achieve a current rating of D or above and could potentially achieve a rating of C or above with some relatively straightforward energy efficiency improvements;

- The majority of new domestic buildings have achieved a rating of B or above;
- The majority of existing non-domestic buildings achieve a current rating of D or above; and
- The majority of new build non-domestic buildings have achieved a rating of B or above.

Low and zero carbon energy generation

The 2013 Energy Study conducted by AECOM included a review of existing LZC installations in Brighton and Hove. The study identified that:

> *'[…] There are relatively few large scale low and zero carbon energy installations in Brighton and Hove. The largest existing identified installation is the gas CHP plant at the University of Sussex. Other than several medium-scale biomass and gas CHP plants, including some with district heating, installations are limited to the small scale, although a very large offshore wind farm is currently proposed by EON at Rampion c.13km off the coast.'*

A desk review was carried out to identify the additional LZC energy capacity installed since the 2013 report was issued. Our findings indicate that:

- Two new communal biomass systems have been installed;
- There are two new planned CHP systems, one at Circus Street and another at Preston Barracks, and these developments are also expected to include PV arrays;
- There has been a 311% increase in the number of small-scale PV installations, from a total capacity of 1.5MW in 2013 to a total capacity of 6.168MW in 2017; and
- Three new large (>50kWp) PV arrays have been installed within LSOA code E01016974. It is thought that these are located on industrial sites near the seafront.

In addition, construction is nearly complete at the 400MW Rampion offshore wind farm, though this is not within the local authority boundary.

Assessing the impacts of future changes

The emerging draft CPP2 and the Strategic Housing Land Availability Assessment (SHLAA, 2017) indicate the levels of new development that may be delivered within Brighton and Hove in the coming years. These have been used to provide a rough estimate of the potential future gas and electricity demands and CO_2 emissions within the city.

Our analysis suggests that, because the majority of new development is likely to be domestic, most of the increase in fuel consumption would be associated with the domestic sector. Under a business-as-usual scenario in which energy demand does not change from current levels, and assuming that all of the new dwellings listed in the SHLAA are in fact delivered by 2031, the CO_2 emissions from domestic gas and electricity consumption could rise by roughly 5% due to new development (4% if the new builds achieve the 19% CO_2 reduction target laid out in CPP1).

However, these estimates should be interpreted with caution as there are a significant number of unknown changes that could occur, both in the way that we use energy and the way that it is generated. Future levels of energy consumption and CO_2 emissions will be significantly affected by the following trends (note that this list is not exhaustive):

- Decarbonisation of the national electricity grid;
- Changes in UK-wide energy efficiency standards, e.g. Building Regulations and MEES;
- Increasing uptake of LZC energy technologies, both at a macro- and micro-generation scale (along with changes in any financial incentive schemes);
- A shift to low-carbon heating through the use of heat networks, heat pumps and decarbonisation of the gas grid;
- Increasing use of electric vehicles, including the potential for vehicle-to-grid energy systems;
- Uptake of smart meters, smart grids and other energy controls; and

- Improvements in battery storage technologies.

Among these trends, it is particularly worth noting that the UK government has recently announced initiatives aimed at increasing electric vehicle uptake, and the resulting impacts on grid electricity demand, though unknown, could potentially be very large. It is also important to note that the carbon intensity of the electricity grid is expected to fall dramatically in the coming years. Based on our modelling, it is possible that future CO_2 emissions levels will be much more sensitive to the carbon intensity of the electricity grid than the amount of new development within Brighton and Hove.

Opportunities to deliver greater benefits

This report has identified a variety of potential opportunities for delivering additional energy and sustainability measures, which are described below.

Renewable energy generation

GIS mapping has been undertaken in order to identify locations within Brighton and Hove that might be more suitable for low and zero carbon energy installations in relation to planning considerations. The results indicate that:

- Provided that consideration is given to visual impacts (particularly in conservation areas), **solar technologies** and **air source heat pumps** are expected to be suitable in most of the Development Areas (as defined in CPP1).
- Opportunities for installing **ground source heat pumps** may be more limited due to the presence of a variety of environmental designations (e.g. archaeological notification areas, SSSIs) and, notably, the need to avoid contaminating highly vulnerable aquifers in the area.
- Opportunities for **onshore wind** turbines are limited as the majority of suitable sites are within the South Downs National Park. Supporting text to CPP1 Policy SA1: *The Seafront* notes that smaller-scale turbines may be suitable for some seafront locations; this would be subject to community consultation in accordance with the Written Ministerial Statement HCWS42. It is noted that the authority area contains several industrial estates where there may be less concern related to visual impact.
- Due to air quality concerns, **biomass boilers** are unlikely to be a preferred option within built-up areas, although PAN 09 provides some information as to their appropriate installation within historic buildings in conservation areas.

Note that this high-level analysis has considered potential *planning* constraints on the installation of LZC technologies; it does not constitute a technical feasibility assessment. Technical feasibility is discussed within the 2013 Energy Study produced by AECOM.

Support for the delivery of district heat networks

The *Brighton and Hove Energy Study* (AECOM, 2013) highlighted potential locations for the possible deployment of heat networks (DHNs), but noted that further work would be needed to define precisely which buildings would connect to them. This report does not include a re-assessment of those opportunity areas. However, per the Clean Growth Strategy (2017), it is considered likely that DHNs will play a role in the transition to lower carbon heating.

Higher sustainability targets in certain locations

Some sites may be particularly suitable for LZC energy installations. Other sites may be subject to environmental, planning or infrastructure-related constraints. In such locations, there may be a greater opportunity, or a greater need, for new development to adhere to meet higher standards of environmental performance, or to deliver increased levels of LZC energy generation, in order to make the best use of resources and/or mitigate any unwanted impacts.

Examples of such sites include:

- Locations with utility constraints;

- Locations with environmental designations;
- Greenfield sites;
- Locations in the Urban Fringe Special Area; and
- Designated industrial sites.

Support for community energy initiatives

Based on conversations with BHCC it is understood that there is a strong local appetite for community energy initiatives. A review of recently-approved local plans across the UK indicates that several of them contain qualitative wording within sustainability or renewable energy-related policies that indicates support for such schemes.

Delivering higher levels of energy efficiency

Although the Housing Standards Review prevents LPAs from setting higher energy efficiency targets than those included in the UK Building Regulations, BHCC may wish to consider implementing minimum EPC ratings for smaller non-domestic developments or domestic conversions. This would be in keeping with the MEES approach. The EPC data analysis described above could be used to set targets that new developments can reasonably be expected to meet.

BREEAM requirements

In order to address the existing loopholes within CPP1 Policy CP8, and further strengthen the sustainability assessment process for development within Brighton and Hove, BHCC may wish to consider encouraging developers to undertake specific BREEAM assessments:

- **BREEAM Communities** – This is suitable for medium- to large-scale developments, including new communities and regeneration projects. At present, BREEAM Communities is rarely applied in the UK, with only 10 final certificates issued since 2008. However, it might be appropriate for specific sites where there is a particularly large amount of new development planned, and/or greenfield sites where there are greater opportunities to deliver high levels of performance. To give an example, DA7 Toads Hole Valley would meet this definition.
- **BREEAM Domestic Refurbishment** – This scheme is applicable to existing domestic buildings undergoing refurbishment, as well as change of use developments, and therefore a recommendation relating to BREEAM Domestic Refurbishment would directly address some of the loopholes in CP8. There have been several hundred BREEAM Domestic Refurbishment projects certified in the UK since 2008.

Based on AECOM's experience, it is often feasible for developments to achieve an 'Excellent' rating provided that sustainability is integrated into the design process from the outset.

Any policy wording relating to the use of specific BREEAM assessment schemes should address the possibility that the scheme could change or be superseded in future. For this reason, it may be preferable for any references to BREEAM to be included in a technical guidance document as an example of a sustainability measure to be encouraged, as this would be easier to update than adopted policy wording.

Conclusions

CPP1 and Policy CP8 provide a solid baseline for the delivery of good performance with regards to energy and sustainability in new development in the city. However some gaps in the policy have been identified and some opportunities for delivering higher performance have been identified. Although there are limitations to what can be required by policy due to the rulings in the Housing Standards Review, national policy and regulation encourages the delivery of greater levels of energy efficiency and LZC energy generation where possible.

Based on the findings of this study, our view is that CPP2 could strengthen and enhance BHCC's sustainability objectives by:

- Addressing gaps in policy CP8, e.g. by establishing sustainability targets for smaller non-residential developments and domestic conversions;
- Setting higher targets in locations where there are more opportunities, or where there is a greater need, to reduce energy use, increase renewable generation or meet higher environmental standards;
- Providing more support to developers on how to achieve and demonstrate compliance with the energy and sustainability targets, which may take the form of a technical guidance note;
- Ensuring that energy and sustainability measures proposed by developers are delivered to ensure the benefits for future residents and the wider community are realised;
- Provide greater support for the delivery of district heat networks;
- Encourage community involvement in energy projects; and
- Consider options to create a carbon offset fund and
- Supporting the energy efficiency improvement of the existing building stock.

Recommendations for City Plan Part 2

On the basis of the results and conclusions drawn from this study, we have made the following recommendations for CPP2:

1. **Extend the minimum CO_2 reduction target to apply to all developments and consider a trajectory for greater reductions in the future**
2. **Set a minimum target for fabric and energy efficiency performance**
3. **Require all developments to provide details of the low and zero carbon energy technologies installed and the estimated reduction in CO_2 emissions these will deliver**
4. **Encourage higher performance in developments taking place in areas with greater potential for the application of LZCs or where impacts to the local environment are greater and consider establishing low carbon zones**
5. **Include a requirement for all developments to complete an energy statement to demonstrate compliance with the relevant policies**
6. **Include a requirement for all developments to achieve a minimum EPC rating prior to starting onsite and on completion**
7. **Include a requirement for all suitable developments in heat network opportunity areas to incorporate the necessary infrastructure to enable future connection**
8. **Consider establishing a carbon offset scheme to enable developments that cannot meet the carbon reduction policy on-site to achieve compliance**
9. **Encourage developers to work with community groups to deliver energy projects as part of new developments**
10. **Consider expanding the BREEAM target to cover other development types**
11. **Consider strengthening the sustainable design and construction requirements**
12. **Produce a technical guidance to support developers in complying with the policy requirements**

Together, these recommendations aim to strengthen and support the existing Policy CP8, by addressing gaps in the policy and helping to secure better compliance, and provide the framework to seek higher standards where appropriate.

1. Introduction

Brighton and Hove City Council (BHCC) has commissioned AECOM to provide technical support to develop energy and sustainability policy within the forthcoming City Plan Part 2 (CPP2).

This report aims to describe the current state of affairs with regards to energy use in Brighton and Hove, discusses some of the anticipated changes that may arise in the coming years as a result of the development proposed in CPP2, national policy and wider changes, and presents a variety of options for responding to these through planning policy.

The aim is to support BHCC in ensuing that CPP2 will contribute to the broader goals of reducing CO_2 emissions from the built environment, through a reduction in energy consumption and an increase in low and zero carbon (LZC) energy generation, and delivering sustainable design and construction for development proposed in the city.

The analysis is also intended to provide an evidence base for policy with CCP1 and CPP2 policies as well as contributing to a quantitative and spatial understanding of current and future energy demands and LZC generation capacity within the city.

The report is structured as follows:

- Section 2 – Provides an overview of the relevant policy and regulatory context with regards to carbon emissions and energy efficiency in the built environment
- Section 3 – Describes the current (baseline) fuel consumption and CO_2 emissions in Brighton and Hove, details of the current energy efficiency of the building stock and the current levels of installed or planned LZC energy generation capacity.
- Section 4 – Provides an estimation of the projected changes in gas and electricity consumption that may arise from future developments, as laid out in the emerging draft CPP2 and the Strategic Housing Land Availability Assessment (SHLAA) 2017
- Section 5 – Examines the potential opportunities and constraints for delivering additional energy and sustainability measures, including an assessment of the opportunities and constraints that exist for the installation of additional LZC energy generation.
- Section 6 – Presents the conclusions of the analysis described above.
- Section 7 – Sets out our recommendations for CPP2.
- Appendices – These contain more detailed information regarding the data sources and methodology used to inform the numerical analysis, where relevant.

2. Background and Regulatory Context

The following section sets out the key policies, regulations and incentive schemes relating to energy use and carbon emissions in the UK built environment. These will inform the discussion throughout the report, and in particular, the policy recommendations presented in Section 7.

2.1 National policies and legislation

2.1.1 UK Commitments on Climate Change Mitigation & Renewable Energy

The Climate Change Act (2008) sets a legally binding target to reduce UK carbon emissions by 80% by 2050, against a 1990 baseline. The Committee on Climate Change advises the Government on the setting of binding 5-year carbon budgets on a pathway to achieving the 2050 target. The first five carbon budgets covering the period up to 2032 have been set in law. The current budget requires a minimum 57% reduction in carbon emissions (compared with 1990 levels) by 2030.

Pending and subject to the outcome of negotiations for the UK to leave the European Union, the UK is committed to meeting the requirements of EU legislation designed to tackle climate change. The main piece of legislation affecting new buildings is the Energy Performance of Buildings Directive (EPBD). The majority of EPBD requirements – e.g. the setting of minimum energy performance standards and energy performance certification for new buildings – are implemented through Part L of the Building Regulations.

The UK is also committed to supplying 15% of all energy from renewable sources by 2020 as part of an EU target to supply 20% of energy from renewables by 2020. The UK Renewable Energy Strategy (2009) anticipates that renewables will need to contribute around 30% of electricity supply, 12% of heating energy and 10% of transport energy to meet this target.

2.1.2 Planning and Energy Act (2008)

The Planning and Energy Act 2008[1] enables local planning authorities to set requirements for energy use and energy efficiency in local plans. Some of the key paragraphs are set out below:

> *(1) A local planning authority in England may in their development plan documents […] include policies imposing reasonable requirements for –*
> *a) a proportion of energy used in development of their area to be energy from renewable sources in the locality of the development;*
> *b) a proportion of energy used in development in their area to be low carbon energy from sources in the locality of the development;*
> *c) development in their area to comply with energy efficiency standards that exceed the energy requirements of building regulations.*

2.1.3 National Planning Policy Framework (2012)

The National Planning Policy Framework was published in March 2012, replacing all previous Planning Policy Statements and guidance. Some of the key paragraphs relating to energy are set out below:

> *93. Planning plays a key role in helping shape places to secure radical reductions in greenhouse gas emissions, minimising vulnerability and providing resilience to the impacts of climate change, and supporting the delivery of renewable and low carbon energy and associated infrastructure. This is central to the economic, social and environmental dimensions of sustainable development*
> *94. Local planning authorities should adopt proactive strategies to mitigate and adapt to climate change, taking full account of flood risk, coastal change and water supply and demand considerations.*

[1] https://www.legislation.gov.uk/ukpga/2008/21/pdfs/ukpga_20080021_en.pdf

95. To support the move to a low carbon future, local planning authorities should:
- *plan for new development in locations and ways which reduce greenhouse gas emissions;*
- *when setting any local requirement for a building's sustainability, do so in a way consistent with the Government's zero carbon buildings policy and adopt nationally described standards.*

96. In determining planning applications, local planning authorities should expect new development to:
- *comply with adopted Local Plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and*
- *take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.*

97. To help increase the use and supply of renewable and low carbon energy, local planning authorities should recognise the responsibility on all communities to contribute to energy generation from renewable or low carbon sources. They should:
- *identify opportunities where development can draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.*

In paragraph 95, reference to 'the Government's zero carbon buildings policy' now needs to be read in the context of the effective cancellation of 2016 Zero Carbon Homes policy (see below). The nature of 'nationally described standards' was addressed in the Housing Standards Review, summarised below.

The NPPF retains an emphasis on decentralised energy sources, and is careful to link this with viability.

2.1.4 Housing Standards Review and the Code for Sustainable Homes (2015)

In August 2013 the Department for Communities and Local Government published a Housing Standards Review Consultation. The aim of the review was to rationalise technical building standards by bringing local policies more closely in line with the UK Building Regulations, thereby avoiding duplication or conflicting standards; for instance, in regards to minimum space standards, water use, and CO_2 emissions reductions.

Following the Housing Standards Review (2015), a Written Ministerial Statement[2] was issued which indicated that local authorities are 'not expected' to require energy performance above the levels needed to meet Code for Sustainable Homes (CSH) Level 4 (equivalent to a 19% improvement over 2013 Building Regulations).

On the specific issue of energy performance, the Policy Statement includes the following:

> *Local planning authorities will continue to be able to set and apply policies in their Local Plans which require compliance with energy performance standards that exceed the energy requirements of Building Regulations until commencement of amendments to the Planning and Energy Act 2008 in the Deregulation Bill 2015.*
>
> *This is expected to happen alongside the introduction of zero carbon homes policy in late 2016. The government has stated that, from then, the energy performance requirements in Building Regulations will be set at a level equivalent to the (outgoing) Code for Sustainable Homes Level 4. Until the amendment is commenced, we would expect local planning authorities to take this statement of the government's intention into account in applying existing policies and not set conditions with requirements above a Code level 4 equivalent.*

[2] https://www.gov.uk/government/speeches/planning-update-march-2015

The Government has now withdrawn the CSH, aside from the management of legacy cases. Therefore, whilst it is currently permissible for policies to include energy performance standards in excess of Building Regulations, this ability may be removed in future through amendment to the Planning and Energy Act 2008. This is of particular relevance to BHCC because CPP1 includes a 19% carbon reduction target for domestic developments (beyond Building Regulations 2013 Part L1A), which is equivalent to CSH Level 4 energy target. This was approved by the Planning Inspector on 5 February 2016 in line with legal powers given to Local Planning Authorities (LPAs) under the Planning and Energy Act 2008.

2.1.5 UK Zero Carbon Homes policy (2006-2015)

In July 2015 it was announced that:

> *"the Government does not intend to proceed with the zero carbon Allowable Solutions carbon offsetting scheme, or the proposed 2016 increase in on-site energy efficiency standards, but will keep energy efficiency standards under review, recognising that existing measures to increase energy efficiency of new buildings should be allowed time to become established".*

This announcement effectively interrupted the previous schedule to update energy efficiency standards for homes every 3 years (with standards having been updated in 2013 and the next update due in 2016) and cancelled the policy for new homes to be zero carbon from 2016.

In the Clean Growth Strategy (October 2017) the government announced its intention to consult on strengthening energy performance standards for new and existing homes.

In terms of implications for local planning policy, it is assumed that the situation established in the Planning Update Policy Statement of March 2015 continues to apply, i.e. planning authorities may continue to apply existing policies and set new planning policies on energy standards since no changes have been made to the Planning and Energy Act. However they should take account of the government's stated policy intentions and not adopt new policies nor set conditions that require energy efficiency standards above CSH Level 4.

2.1.6 Building Regulations (Part L 2013)

Part L of Building Regulations is the key mechanism for implementing the Building Act (1984) with regard to the conservation of fuel and power in buildings and for implementing the EPBD in the UK.

The Building Regulations have been progressively tightened including updates in 2006, 2010 and 2013. With each improvement to Building Regulations Part L Target Emission Rate (TER) the scope to achieve further carbon savings becomes more limited. Part L 2013 came into force in April 2014, with an average 6% reduction in regulated CO_2 emissions for homes and 9% reduction for non-residential buildings compared with Part L 2010.

A key priority in previous updates to Building Regulations has been to maintain flexibility in how developers meet the required carbon reductions: enabling a choice between fabric and fixed services enhancements to reduce demands, or investing in renewable technologies, or to supply energy demands through low carbon fuel sources. A key change in the 2013 update was the introduction of a new Target Fabric Energy Efficiency (TFEE). This aims to increase the attention given by developers to reducing the intrinsic heating demands of new homes and addresses a concern that carbon reductions were increasingly being delivered through low carbon or renewable energy supply options without sufficient focus on reducing the underlying energy demands of homes. Meeting the TFEE is an additional requirement and developers are still required to achieve an overall CO_2 Target Emission Rate.

2.1.7 Energy Act (2011)

The Energy Act provides support for energy efficiency measures to homes and businesses through the introduction of the Energy Company Obligations and the Green Deal (now withdrawn).[3] The Act also lays out a requirement for energy efficiency improvements to be made in the private rented sector, which has been defined further in the *Energy Efficiency (Private Rented Property) (England and Wales) Regulations 2015.*

2.1.8 UK Heat Strategy: 'The Future of Heating: Meeting the Challenge' (2013)

The UK Heat Strategy laid out a strategic framework for the transition to a low carbon heat supply.[4] The strategy highlighted the importance of improving energy efficiency of buildings, and incentivised local authorities to enable the development and expansion of heat networks; for instance, by setting up the Heat Network Development Unit (HNDU).

2.1.9 Home Energy Conservation Act (HECA, new guidance 2012)

In 2012, the government provided new statutory guidance relating to the HECA (1995). HECA aims to encourage Local Authorities to plan for CO_2 emission reductions on a borough-wide basis. It required all English authorities with housing responsibilities to prepare an initial report by March 2013 setting out 'the local energy conservation measures that the authority – or group of authorities – consider practical, cost-effective, and likely to significantly improve the energy efficiency of residential accommodation in its area.'

The guidance required Councils to consider how they will use government initiatives such as the Renewable Heat Incentive (RHI) and Feed-in Tariff (FiT) (see below), and how they can facilitate improvements on a street-by-street or area basis.

2.1.10 Energy Efficiency (Private Rented Property) (England and Wales) Regulations 2015

This policy has introduced a Minimum Energy Efficiency Standard (MEES) which is based on the Energy Performance Certificates (EPCs) of buildings (see Section 3.3.2).

Under the MEES regulations, from 1st April 2018, any properties newly rented out in the private sector will normally be expected to have a minimum EPC rating of E (exceptions apply).[5] A range of energy efficiency measures can be required of the landlord, though consideration is given to financial viability, the anticipated payback time and impacts on property value. Fines will be applied for non-compliance.

These requirements will apply to all private rented properties even where there has been no change in tenancy arrangements – from 1 April 2020 (domestic properties), and from 1 April 2023 (non-domestic). The domestic property regulations will be enforced by Local Authorities and the non-domestic property regulations by Local Weights and Measures Authorities. The government has stated its intention to increase the minimum rating to D by 2025 and that, *'Our aspiration is for as many homes as possible to be EPC Band C by 2035 where practical, cost-effective and affordable.'* (Clean Growth Strategy, p. 13).

2.1.11 House of Commons: Written Statement HCWS42, DCLG (18th June 2015)

The Secretary of State for Communities and Local Government issued a Written Statement[6] (HCWS42) on 18th June 2015 which included the following direction:

> *When determining planning applications for wind energy development involving one or more wind turbines, local planning authorities should only grant planning permission if:*

[3] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/48199/3211-energy-act-2011-aide-memoire.pdf
[4] https://www.lgiu.org.uk/wp-content/uploads/2013/05/The-future-of-heating-heat-strategy-update.pdf
[5] https://www.gov.uk/government/publications/the-private-rented-property-minimum-standard-landlord-guidance-documents
[6] https://www.parliament.uk/documents/commons-vote-office/June%202015/18%20June/1-DCLG-Planning.pdf

- *the development site is in an area identified as suitable for wind energy development in a Local or Neighbourhood Plan; and*
- *following consultation, it can be demonstrated that the planning impacts identified by affected local communities have been fully addressed and therefore the proposal has their backing.*

2.1.12 Clean Growth Strategy (October 2017)

The UK Clean Growth Strategy[7] was published in October 2017 and sets out the Government's vision for decoupling economic growth from carbon emissions. The strategy includes objectives for the improvement in building energy efficiency (including a target to deliver EPC ratings of C in as many homes as possible by 2035), increased generation of energy from renewable sources, increasing the delivery of clean, smart and flexible power and accelerating the shift to low carbon transport., smart grids and energy storage.

The Clean Growth Strategy in particular recognises the need to deliver low carbon heating, as it is acknowledged that there are technical and cost obstacles to achieving this important outcome:

> *'There are a number of low carbon heating technologies with the potential to support the scale of change needed, including heat pumps, using low carbon gases (such as hydrogen) in our existing gas grid and district heat networks.'*

2.1.13 UK Industrial Strategy (2017)

The Industrial Strategy[8], published in November 2017, emphasises the need for clean growth in order to boost economic prosperity within the UK. Some of the stated aims of the Industrial Strategy relevant to energy use in the built environment include:

- Increasing the delivery of new homes;
- Decarbonising the heat supply; and
- Lowering emissions from the transport sector.

There is a particularly strong emphasis on supporting electric vehicle uptake, through £400m investment in in charging infrastructure and by extending the plug-in car grant. The Strategy also states that, 'After the Grenfell Review, we will update Building Regulations to mandate that all new residential developments must contain the enabling cabling for charge-points in the homes' (p. 145).

2.2 Financial incentives

Below is a brief overview of some of the key financial incentive schemes for low and zero carbon energy in the UK. Note that the levels of Government incentives for these technologies have been adjusted repeatedly in recent years and it is reasonable to assume that further changes will occur.

2.2.1 Feed-in Tariff (FiT)

Launched in April 2010, FITs provide a financial incentive for uptake of the following renewable electricity generating technologies:

- Photovoltaics
- Wind
- Micro combined heat and power (CHP)
- Hydroelectric power
- Anaerobic digestion

[7] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/651916/BEIS_The_Clean_Growth_online_12.10.17.pdf

[8] https://www.gov.uk/government/publications/industrial-strategy-building-a-britain-fit-for-the-future

Tariff rates are adjusted annually and deployment caps were put in place in February 2016. New applications are expected to end in March 2019.

2.2.2 Renewable Heat Incentive (RHI)

The RHI provides a financial incentive for the uptake of the following heat generating technologies:

- Biomass boilers
- Air source heat pumps
- Ground source heat pumps
- Solar thermal collectors

Renewable Heat Incentive is available to support renewable heat delivered to new homes via heat networks, and for renewable heat installed to serve non-domestic buildings. Renewable heat installations serving single new homes are ineligible.

Note that the *Clean Growth Strategy* identifies a need to strengthen and reform the RHI in recognition of the difficulty and urgency of decarbonising the UK heat supply.

2.2.3 Energy Company Obligations (ECO)

The 2011 Energy Bill, which made provision for the Green Deal, also provided for an Energy Company Obligation (ECO). The scheme has been updated several times with the latest update in 2017, known as ECO2t. Under the scheme energy companies are obligated to promote and support carbon emissions reductions to customers.

2.3 Local planning policy and guidance

2.3.1 City Plan

The City Plan is Brighton and Hove City Council's strategic spatial development policy. City Plan Part 1 (CPP1) was adopted on 24th March 2016 and Part 2 (CPP2) is currently being developed.

CPP1 includes a variety of policies aimed at improving the sustainability of the built environment, energy infrastructure and transportation network. These are evidenced, for example, in the following Strategic Objectives:

- ***SO1*** *– Ensure that all major new development in the city supports the regeneration of the city, is located in sustainable locations, provides for the demands that it generates and is supported by the appropriate physical, social and environmental infrastructure.*
- ***SO7****– Contribute to a reduction in the ecological footprint of Brighton & Hove and champion the efficient use of natural resources and environmental sustainability.*
- ***SO8*** *– Ensure design and construction excellence in new and existing buildings in Brighton & Hove which responds positively to the challenges posed by local impacts of climate change, resource-efficiency, and delivers biodiversity and environmental objectives and improvements to accessible natural green space.*

These are further evidenced in *'Table 1: Delivering One Planet Principles of Sustainability'* (extracts below).

Principle	Description
Zero Carbon	Making buildings more energy efficient and delivering all energy with renewable technologies
Zero Waste	Reducing waste arisings, reusing where possible, and ultimately sending zero waste to landfill
Sustainable Transport	Encouraging low carbon modes of transport to reduce emissions, reducing the need to travel
Sustainable Materials	Using sustainable products that have a low embodied energy

Principle	Description
Local and Sustainable Food	Choosing low-impact, local, seasonal and organic diets and reducing food waste
Sustainable Water	Using water more efficiently in buildings and in the products we buy; tackling local flooding and water course pollution
Land Use and Wildlife	Protecting and expanding old habitats and creating new space for wildlife
Culture and Community	Reviving local identity and wisdom; support for, and participation in, the arts
Equity and Local Economy	Inclusive, empowering workplaces with equitable pay; support for local communities and fair trade
Health and Happiness	Encouraging active, sociable, meaningful lives to promote good health and wellbeing

Table 1: Delivering One Planet Principles of Sustainability

Taken as a whole, the policies in CPP1 cover a wide range of environmental, economic and social sustainability topics. CPP1 recognizes the role that LZC technologies must play in delivering sustainable development in Brighton and Hove but there are currently no associated quantitative targets.

Policy CP8 defines specific requirements in regards to energy use and sustainability in buildings; the full text is presented below.

Policy CP8: Sustainable Buildings

The council will seek that all new development incorporate sustainable design features to avoid expansion of the city's ecological footprint, help deliver the principles of the One Planet approach, radical reductions in greenhouse gas emissions, particularly CO_2 emissions, and mitigate against and adapt to climate change.

Residential (New Build)		
Energy Performance	19% carbon reduction improvement against Part L 2013[188]	
Water performance	Water efficiency 'optional' standard[189]	
Non - residential	**Development Size**	
	Non-major	**Major and Greenfield**
BREEAM	**Very Good**	**Excellent**

Unless it can be demonstrated that doing so is not technically feasible and/or would make the scheme unviable:

1. *All development will be required to achieve the minimum standards as set out below unless superseded by national policy or legislation;*
2. *All development proposals including conversions, extensions and changes of use will be expected to demonstrate how the development:*

a) *addresses climate change mitigation and adaptation;*

b) *contributes to a reduction in the city's current level of greenhouse gas emissions by delivering significant reductions in fuel use and greenhouse gas emissions via: passive design and orientation; fabric performance; energy efficiency measures; and low carbon solutions;*

c) *facilitates on-site low or zero carbon technologies, in particular renewable energy technologies;*

d) connects, makes contributions to low and zero carbon energy schemes and/or incorporates provision to enable future connection to existing or potential decentralised energy schemes;

e) aspires towards water neutrality by meeting high water efficiency standards and incorporating facilities to recycle, harvest and conserve water resources;

f) improves the sustainability of existing buildings, makes the most effective use of land and re-uses existing buildings;

g) protects occupant health and the wider environment by making the best use of site orientation, building form, layout, landscaping and materials to maximise natural light and heat, whilst avoiding internal overheating by providing passive cooling and ventilation;

h) reduces 'heat island effect' and surface water run-off;

i) uses materials that are sustainable and have low embodied carbon:

j) enhances biodiversity;

k) minimises waste and facilitates recycling, composting and re-use;

l) reduces air, land and water pollution and safeguards water supplies if development is within groundwater Source Protection Zones;

m) maximises operational efficiency through ongoing evaluation, monitoring and improvement of building performance especially in relation to energy and water use;

n) introduces means to encourage users, tenants and householders to reduce their ecological footprint;

o) is adaptable to respond to changing needs; and

p) encourages food growing.

Technical guidance and clarification will be produced to help planning applicants address this policy.

The Sustainability Checklist and the Authority Monitoring Report (AMR) will be used to assess planning applications, and monitor the effectiveness of the policy.

At the time of writing, the technical guidance note mentioned in CP8 has not been produced. However, the Sustainability Checklist provides prompts and advice to developers as to how they can improve the environmental performance of their design proposals.

BHCC Planning officers have identified the following gaps in the applicability of CP8 as it is currently worded:

1 Residential – The policy wording specifies that the 19% CO_2 reduction target applies to new build residential developments, and therefore it is not clear what standard would apply to new dwellings created in existing buildings i.e. domestic conversions.

2 Non-residential – 150 sqm and below (retail) or 235 sqm and below (other uses). As per CPP1 *Table 6 – Definition of Development size*, 'non-major developments' are defined as those between 151-999 sqm (retail) or 236-1000 sqm (other uses) and 'major developments' are those over 1000 sqm.

Policy CP8 relates to sustainable development and is therefore of greatest relevance to this report. The following additional policies are referenced in the main body of this report and wording is provided below for context.

Policy CP10: Biodiversity

The council will develop programmes and strategies which aim to conserve, restore and enhance biodiversity and promote improved access to it through the following:

1. *Working with neighbouring local authorities, contribute to the delivery of biodiversity improvements within the South Downs Way Ahead Nature Improvement Area (NIA), which incorporates parts of the urban area, the urban fringe, the seafront and surrounding downland. Within the NIA, a strategic approach to nature conservation enhancement will be taken, with the objectives of:*
    - *linking and repairing habitats and nature conservation sites to achieve landscape scale improvements to biodiversity;*
    - *conserving, restoring, recreating and managing priority habitats and protecting and recovering priority species populations to contribute to Local Biodiversity Action Plan targets;*
    - *enabling people to have improved access to and understanding of local habitats and species; and*
    - *ensuring development delivers measurable biodiversity improvements.*
2. *Ensure that all development proposals:*
    a) *Provide adequate up-to-date information about the biodiversity which may be affected;*
    b) *Conserve existing biodiversity, protecting it from the negative indirect effects of development, including noise and light pollution;*
    c) *Provide net gains for biodiversity wherever possible, taking account of the wider ecological context of the development and of local Biosphere objectives; and*
    d) *Contribute positively to ecosystem services, by minimising any negative impacts and seeking to improve the delivery of ecosystem services by a development.*
3. *Establish criteria-based policies against which development proposals affecting designated sites of international, national and local importance; protected species; and biodiversity in the wider environment will be judged. Such policies will distinguish between the relative importance of each of these nature conservation features to provide clarity about when development may be permitted and about any mitigation, conservation and enhancement which may be required.*
4. *Monitor progress with the delivery of biodiversity objectives through suitably devised indicators.*

Policy CP15: Heritage

The council will work with partners to promote the city's heritage and to ensure that the historic environment plays an integral part in the wider social, cultural, economic and environmental future of the city through the following aims: 1. The city's historic environment will be conserved and enhanced in accordance with its identified significance, giving the greatest weight to designated heritage assets and their settings and prioritising positive action for those assets at risk through, neglect, decay, vacancy or other threats. The council will further ensure that the city's built heritage guides local distinctiveness for new development in historic areas and heritage settings; and 2. Where proposals are promoted for their contribution to mitigating climate change, the public benefit of this will be weighed against any harm which may be caused to the significance of the heritage asset or its setting;

Policy SA4 Urban Fringe

Development within the urban fringe will not be permitted except where:

a) *a site has been allocated for development in a development plan document; or*

b) *a countryside location can be justified; and where it can be clearly demonstrated that:*

c) *the proposal has had regard to the downland landscape setting of the city;*

d) any adverse impacts of development are minimised and appropriately mitigated and/or compensated for; and

e) where appropriate, the proposal helps to achieve the policy objectives set out above.

Should proposals for development come forward prior to the adoption of Part 2 of the City Plan, the 2014 Urban Fringe Assessment will be a material planning consideration in the determination of applications for residential development within the urban fringe.

2.3.2 Sustainability Checklist

BHCC has produced a Sustainability Checklist[9] which can be accessed and completed online and must be submitted alongside planning applications. Users are required to enter details of the project and provide responses to prompts which address the following topics:

- CO_2 emissions
- Building fabric
- Materials
- Passive design
- Greening
- Water
- Building standards
- Technologies
- Flood risk
- Growing food
- Open space and recreation
- Biodiversity
- Parking
- Waste
- Access

At the bottom of each topic page, there is a link to further background information and guidance.

2.3.3 PAN 09: Householder guidance on energy efficiency for historic houses in Conservation Areas (December 2016)

Supplementary to the City Plan, BHCC has produced several Planning Advice Notes (PANs) which provide technical advice and information on specific policy topics. Of particular relevance here is PAN 09, which relates to historic houses in Conservation areas and discusses how LZC technologies may be incorporated into these:[10]

- Biomass heating: Air quality is a key concern and therefore to prevent local air quality impacts on Air Quality Monitoring Areas, biofuel combustion is discouraged in AQMAs. In smoke control areas, an exempt appliance must be installed. In addition, the location and appearance of flues and wood stores should be carefully considered. Wherever possible existing chimneys should be used for flues for wood stoves; new flues should generally not to be fitted on the principal or side elevation if visible from a highway.
- Solar technologies: Where an Article 4 Direction applies in the Conservation Area, planning permission may be required for roof slopes facing the highway. At present this applies to only a few Conservation Areas but where it does, planning permission for solar equipment is required. Permission is not normally required on a house in a Conservation Area if: equipment on a building is sited to minimise the effect on the external appearance of the building and amenity of the area; panels are not installed above the highest part of the roof (excluding the chimney) and projects no more than 200mm from the roof slope or wall surface.

[9] http://www.brighton-hove.gov.uk/content/planning/planning-applications/sustainability-checklist

[10] https://www.brighton-hove.gov.uk/sites/brighton-hove.gov.uk/files/PAN09%20Householder%20guidance%20on%20energy%20efficiency%20in%20Conservation%20Areas_1.pdf

- Air source heat pumps (ASHPs): Must be sited to minimise any effect on the external appearance of a historic house; further restrictions apply.

PAN 09 should be read in conjunction with CPP1 Policy CP15: Heritage.

3. Understanding the existing baseline

This section describes the current energy consumption and CO_2 emissions in Brighton and Hove by fuel type and sector. Then, the energy efficiency of the existing building stock is discussed with reference to EPC ratings. Finally, an estimate is made of the installed LZC energy generation capacity based on a review of various data sources.

3.1 Energy consumption

Fuel consumption figures were taken from the Department of Business, Energy and Industrial Strategy (BEIS) publication: '*Sub-national total final energy consumption statistics: 2005-2015'* (published in 2017).[11] 2015 is the most recent year for which data is available. The dataset includes a breakdown of emissions by sector as follows: industrial & commercial, domestic and transport. Fuel types included are: gas, electricity, coal, petroleum, manufactured fuels and bioenergy & waste.

For further information, including definitions of the various fuel types, see the *'Sub-national methodology and guidance booklet 2016* (BEIS, December 2016).[12]

Table 2 shows that total fuel consumption in Brighton and Hove was approximately 4,004 GWh in 2015. As illustrated in *Figure 1*, the largest proportion of fuel consumed was gas (42%), with petroleum and electricity accounting for 28.7% and 26.3%, respectively. Other fuels, including bioenergy & waste, coal, and manufactured fuels make up the remaining 3%.

Fuel Consumption (GWh)	Industrial & Commercial	Domestic	Road transport	Rail	Bioenergy & waste	Total
Gas	385	1,297	-	-	-	1,682
Electricity	600	451	-	-	-	1,051
Coal	-	10	-	-	-	10
Petroleum	40	7	1,100	1	-	1,148
Manufactured fuels	-	8	-	-	-	8
Bioenergy & waste	-	-	-	-	105	105
Total by sector	1,025	1,773	1,100	1	105	4,004

Table 2: Energy consumption by sector and fuel type in GWh per year

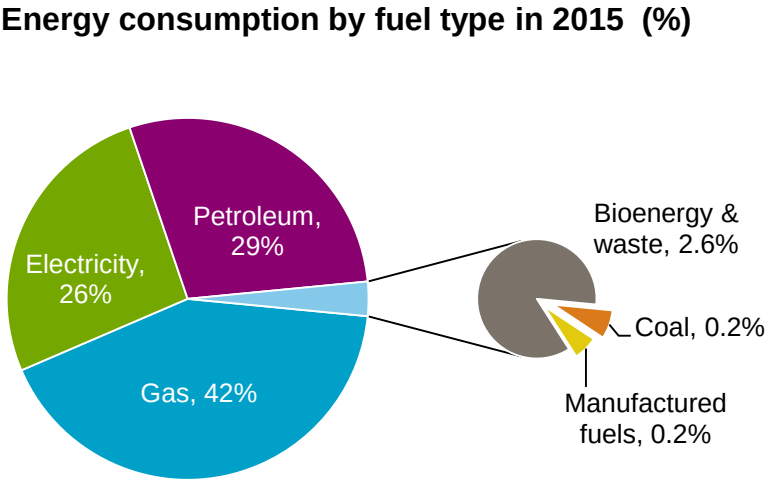


Figure 1: Energy consumption by fuel type in 2015

[11] https://www.gov.uk/government/statistical-data-sets/total-final-energy-consumption-at-regional-and-local-authority-level
[12] *For further information, see* https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/609332/Sub-national_Methology_and_Guidance_Booklet_2016.pdf

Figure 2 depicts the breakdown of fuel consumption by sector, based on the information provided in Table 2. Note that bioenergy & waste is not reported by sector and the technical guidance[12] does not provide specific details as to the fuel types used in Brighton and Hove.

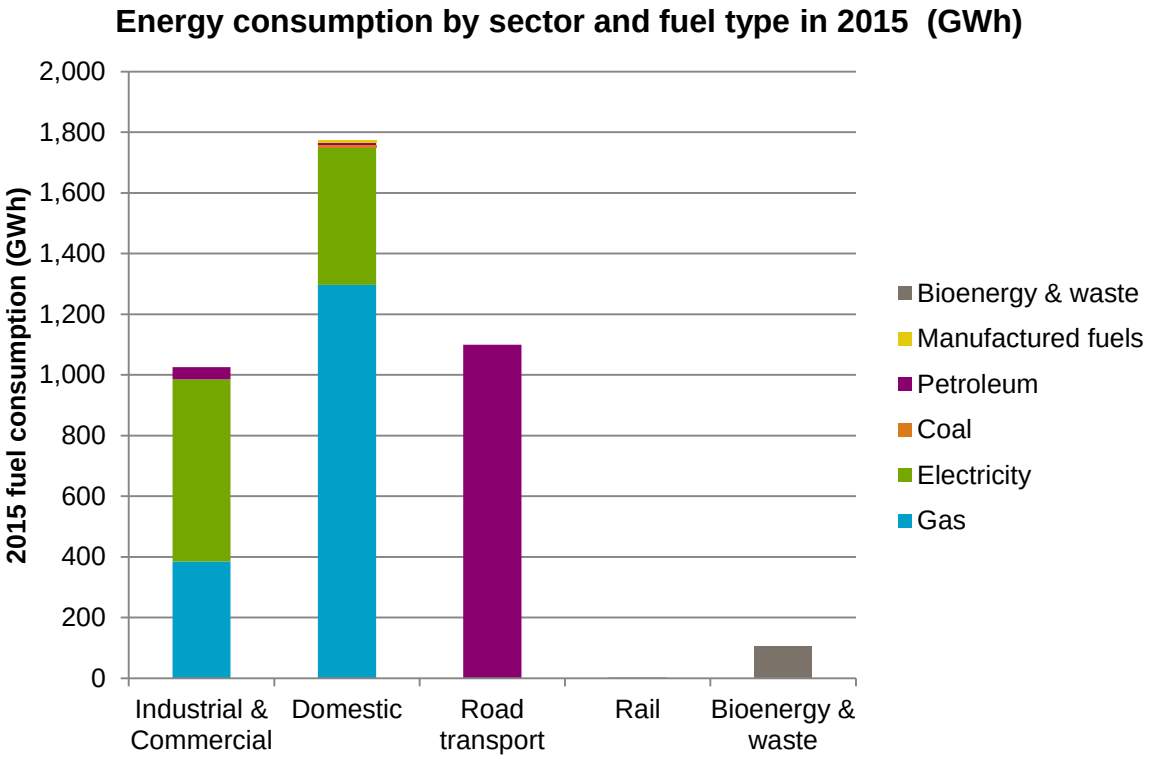


Figure 2: Energy consumption by sector and fuel type in 2015

Figure 2 indicates that the domestic sector accounts for the highest proportion of energy consumption, followed by transport and other non-domestic ('Industrial and Commercial') sectors. For buildings in the domestic sector, approximately 73% of fuel consumed is gas and 25% is electricity. In the non-domestic sector, approximately 38% of fuel consumed is gas and 59% is electricity. Petroleum consumption is predominately associated with road transport. Electricity used for transport, i.e. for electric vehicles, is not represented in the dataset, possibly because it is relatively small, and possibly because it is not always metered separately.

Note that gas and electricity consumption figures are based on sales data. The data source assumes that domestic gas customers are those consuming up to 73,200 kWh annually, the remainder classed as non-domestic. For electricity, data is divided between domestic and non-domestic categories according to the meter's profile type; consumption above 100,000 kWh is automatically assumed to be non-domestic; and consumption levels between 50,000 kWh and 100,000 kWh are processed by address to check for non-domestic labelling (i.e. 'plc'; 'ltd'). As a result, it is possible that some small non-domestic consumers are included in the 'domestic' category.

Another implication of using sales data is that energy that is generated and consumed on the same site (e.g. domestic PV) may be excluded. At present, it is considered likely that this represents a small portion of total energy consumption and therefore would not have a significant impact on the results.

Lower and Middle Level Super Output Area data on gas and electricity consumption is provided by BEIS in *'Regional and local authority electricity consumption statistics: 2005 to 2015'* and *'Regional and local authority gas consumption statistics: 2005 to 2015'* respectively (both published 2017)[13,14]. This has been used to map energy usage across Brighton and Hove, as shown in Figures 3-8.

[13] https://www.gov.uk/government/statistical-data-sets/regional-and-local-authority-electricity-consumption-statistics-2005-to-2011
[14] https://www.gov.uk/government/statistical-data-sets/gas-sales-and-numbers-of-customers-by-region-and-local-authority

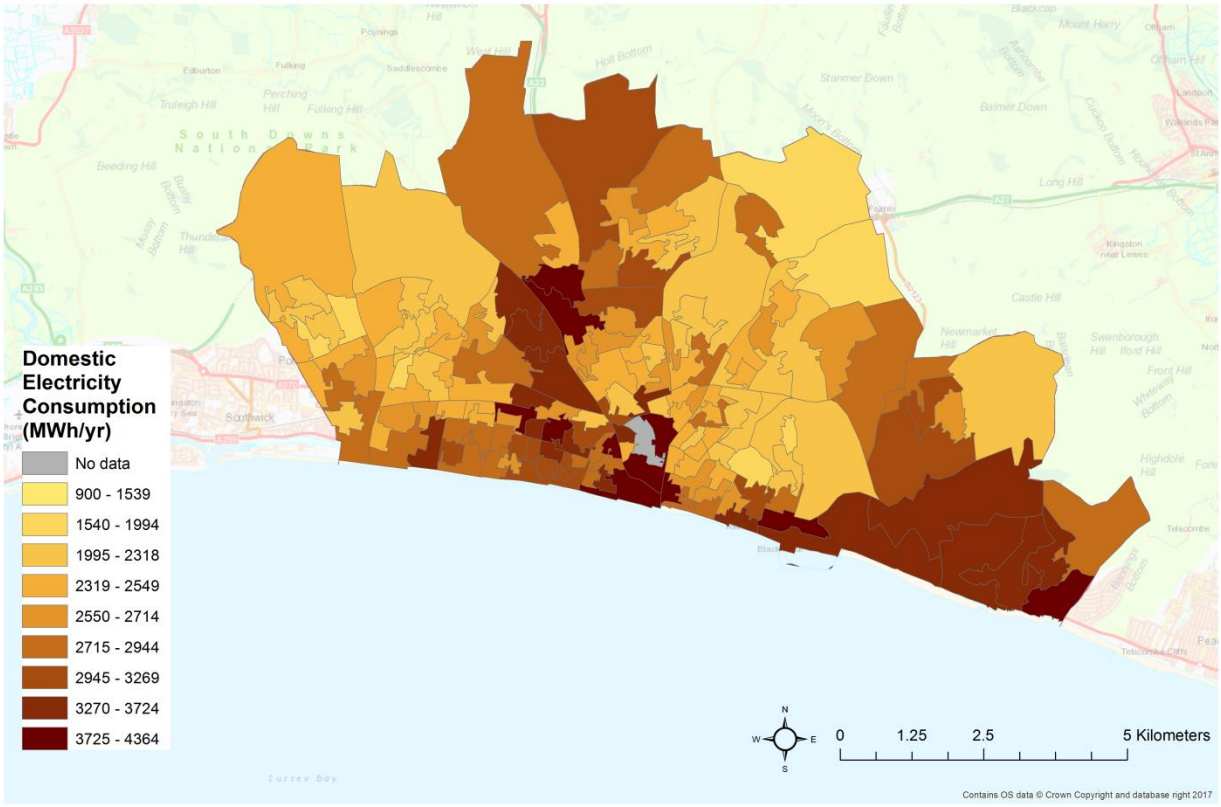


Figure 3: Domestic electricity demand by LLSOA (2015 data)

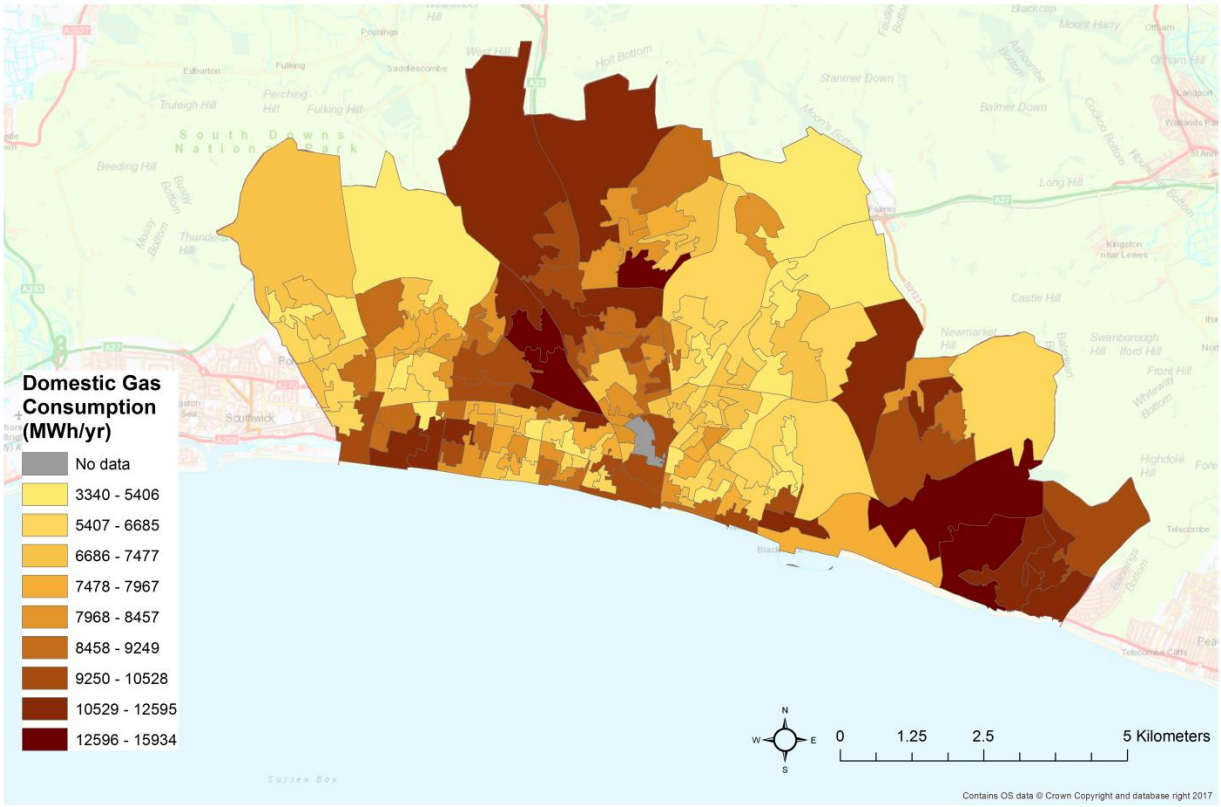


Figure 4: Domestic gas demand by LLSOA (2015 data)

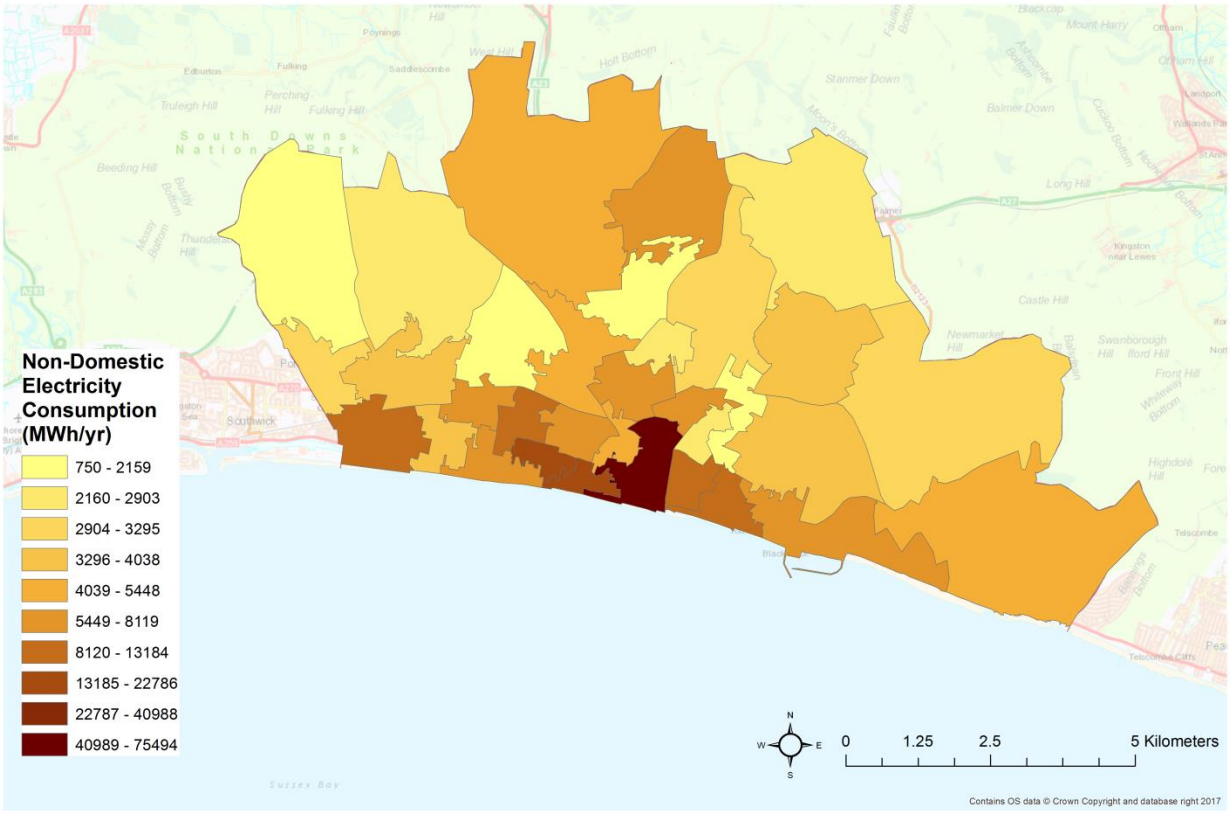


Figure 5: Non-domestic electricity demand by MSOA (2015 data)

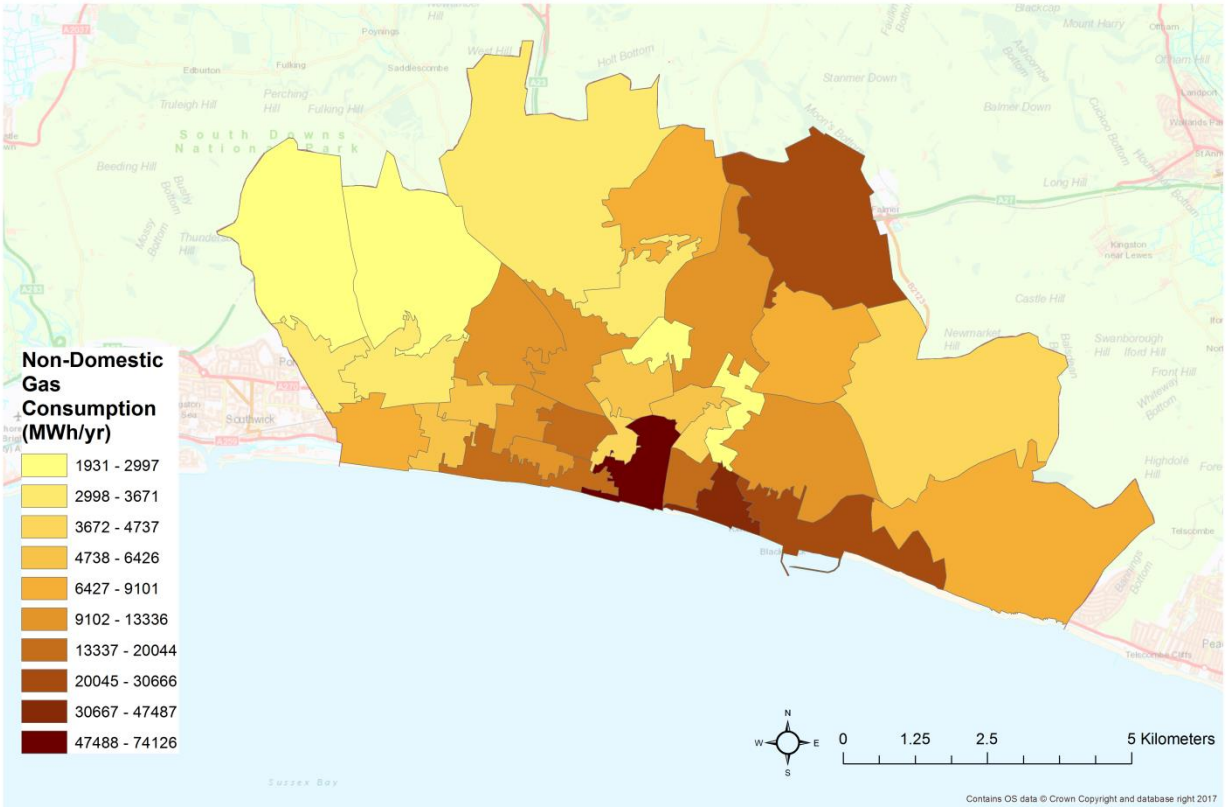


Figure 6: Non-domestic gas demand by MSOA (2015 data)

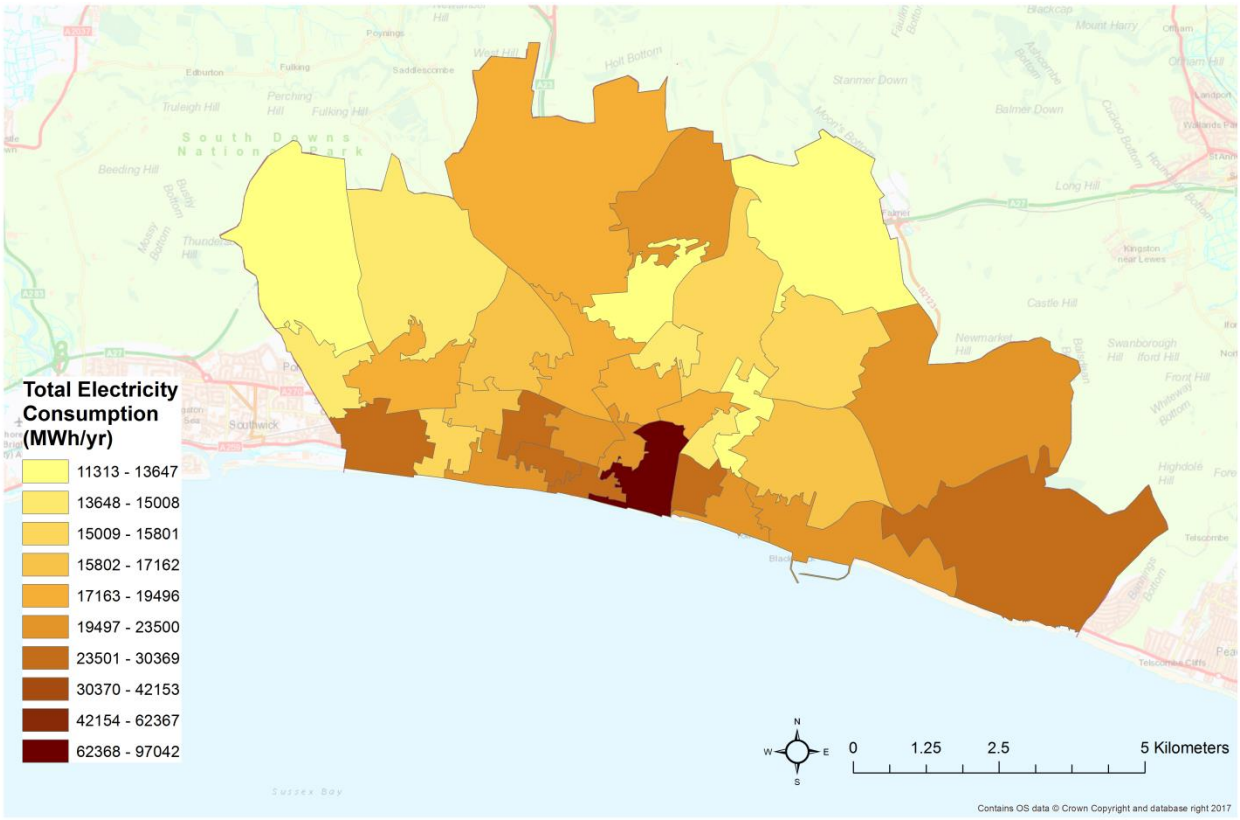


Figure 7: Total electricity demand by MSOA (2015 data)

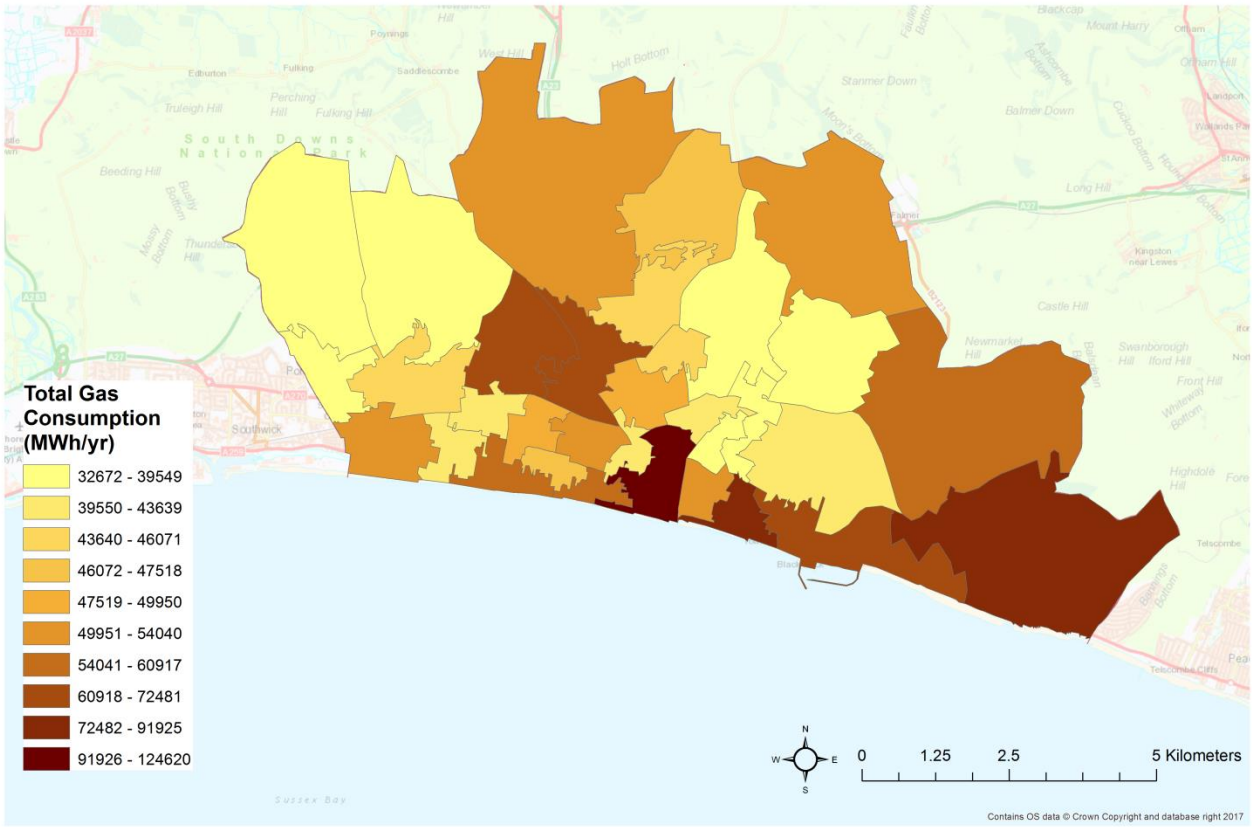


Figure 8: Total gas demand by MSOA (2015 data)

3.2 CO_2 emissions

CO_2 emission estimates for the area were taken from *'UK local authority and regional carbon dioxide emissions national statistics: 2005-2015'* (published in 2017).[15] 2015 is the most recent year for which data is available. The dataset includes a breakdown of emissions by sector as follows: industrial & commercial, domestic and transport. As well as electricity and gas emissions, the data provides emission levels from 'agriculture' (fuel sources not specified) and 'other fuels'. For clarity, and in order to align these results as much as possible with the energy consumption figures, 'agriculture' has been included in the category of 'Industrial & Commercial' emissions.

It is important to note that the CO_2 emissions figures include point source estimates for some consumers, and therefore may not directly relate to the energy consumption figures provided in the previous section.

For further information, including further details regarding the sectors and categories reported, see the *'Technical Report: Local and Regional Carbon Dioxide Emissions Estimates for 2005-2015 for the UK'* (BEIS, June 2017).[16]

The 2015 data breakdown for Brighton and Hove is shown in Table 3 and is further illustrated in Figure 9 and Figure 10.

	Industry & Commercial	Domestic	Transport	Total (unadjusted)	Total (adjusted)[12]
Gas	72.4	244.1	-		
Electricity	206.8	155.6	-		
Large installations	0.2	0	-		*LULUCF adjustment: +0.7 $ktCO_2$*
Other fuels	13.0	6.8	-		
Agriculture	1.5	0	-		
Transport	-	-	306.4		
TOTAL	**294.0**	**406.5**	**306.4**	**1,006.9**	**1,007.6**
Percent of total	*29.2%*	*40.4%*	*30.4%*		

Table 3: Brighton and Hove CO_2 emissions (2015 data)

The BEIS estimate for total CO_2 emissions in the Local Authority area of Brighton and Hove in 2015 is **1,008 $ktCO_2$**. This total consists of the industrial & commercial, domestic and transport values, adjusted for LULUCF[17] emissions.

As shown in Figure 9, the majority of emissions in Brighton and Hove are attributed to the domestic sector (40.4%). The remaining CO_2 emissions are divided fairly equally between transport (30.4%) and non-domestic sectors (29.2%). The majority of the CO_2 emissions from industry and commercial uses are derived from electricity consumption, whereas for domestic uses the majority derived from gas consumption, as shown in Figure 10.

[15] https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-2015

[16] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/623020/2005_to_2015_UK_local_and_regional_CO2_emissions_technical_report.pdf

[17] *Land Use, Land Use Change and Forestry. This adjustment reflects the fact that certain land use activities (e.g. planting or cutting down trees) may act as either a sink or source of CO_2 emissions.*

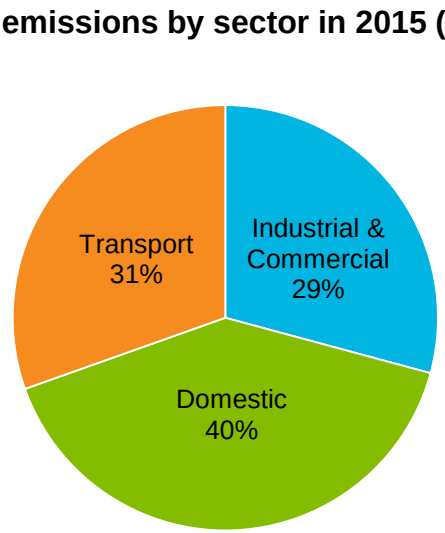


Figure 9: Carbon emissions by sector in 2015

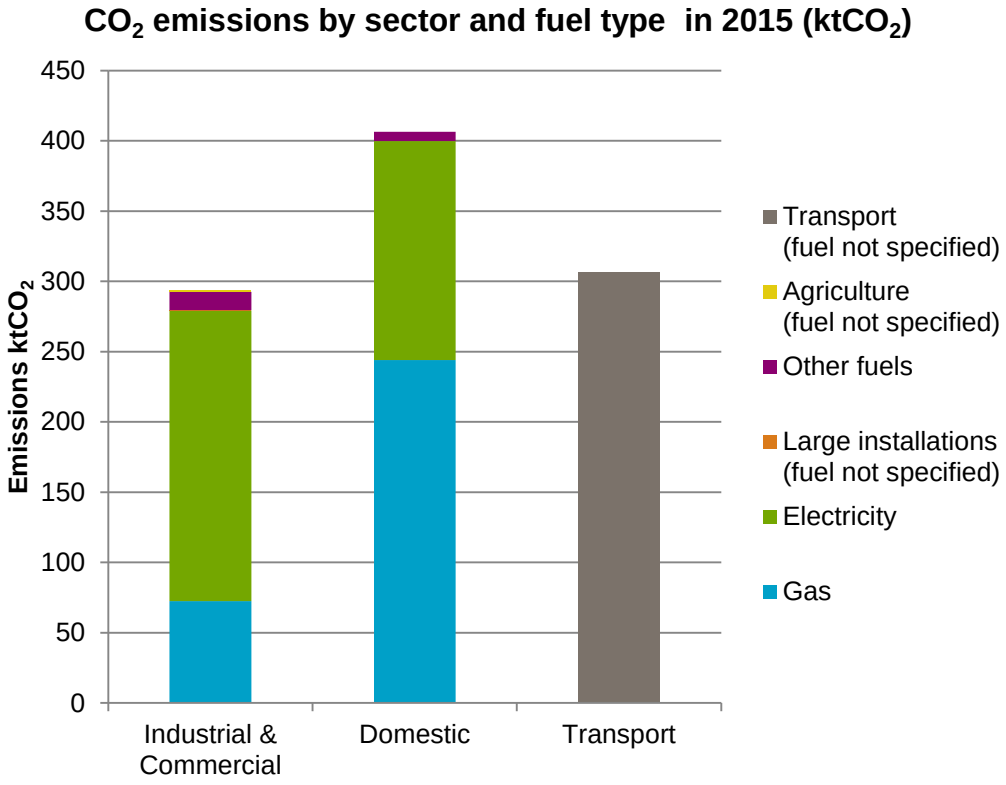


Figure 10: Carbon emissions by sector and fuel type in 2015

Note: Aside from 'Agriculture, which is here classed within 'Industrial & Commercial' sector for the sake of clarity, categories have been reported as described in the source publication. For some sectors, no fuels are specified. 'Large installations' refers to large industrial users. For more information, refer to the BEIS Technical Guidance.[16]

The above results should be interpreted with caution, particularly when assessing progress in relation to CO_2 reduction, energy use or energy efficiency targets. A significant change in CO_2 emissions does not necessarily indicate that there have been significant changes in energy consumption patterns or energy efficiency. For instance, if one or more large commercial/industrial users in a particular area go offline, the data would show that the emissions for that area period have decreased, even if all other users adopted less conservative habits. For further information, see *'Sub-national consumption statistics: methodology and guidance booklet'* (BEIS, 2016).[18]

Changes in the carbon intensity of the national gas and electricity grids also have a significant impact on these results. BEIS published the following emission factors in 2017:[19]

Fuel Emission Factors, 2017

Fuel type	kgCO_2e/kWh
Natural gas	0.184
Electricity	0.352
Coal	0.301
Petrol	0.240
Diesel	0.251

Table 4. Government emission conversion factors, 2017

Using the above emission factors for natural gas and electricity, and BEIS statistics for fuel consumption as provided in Figures 3-8, it is possible to provide a rough estimate the CO_2 emissions arising from use of these two fuels within the built environment. This is shown in Figure 11. Note that CO_2 emissions from transport and other fuels are not included.

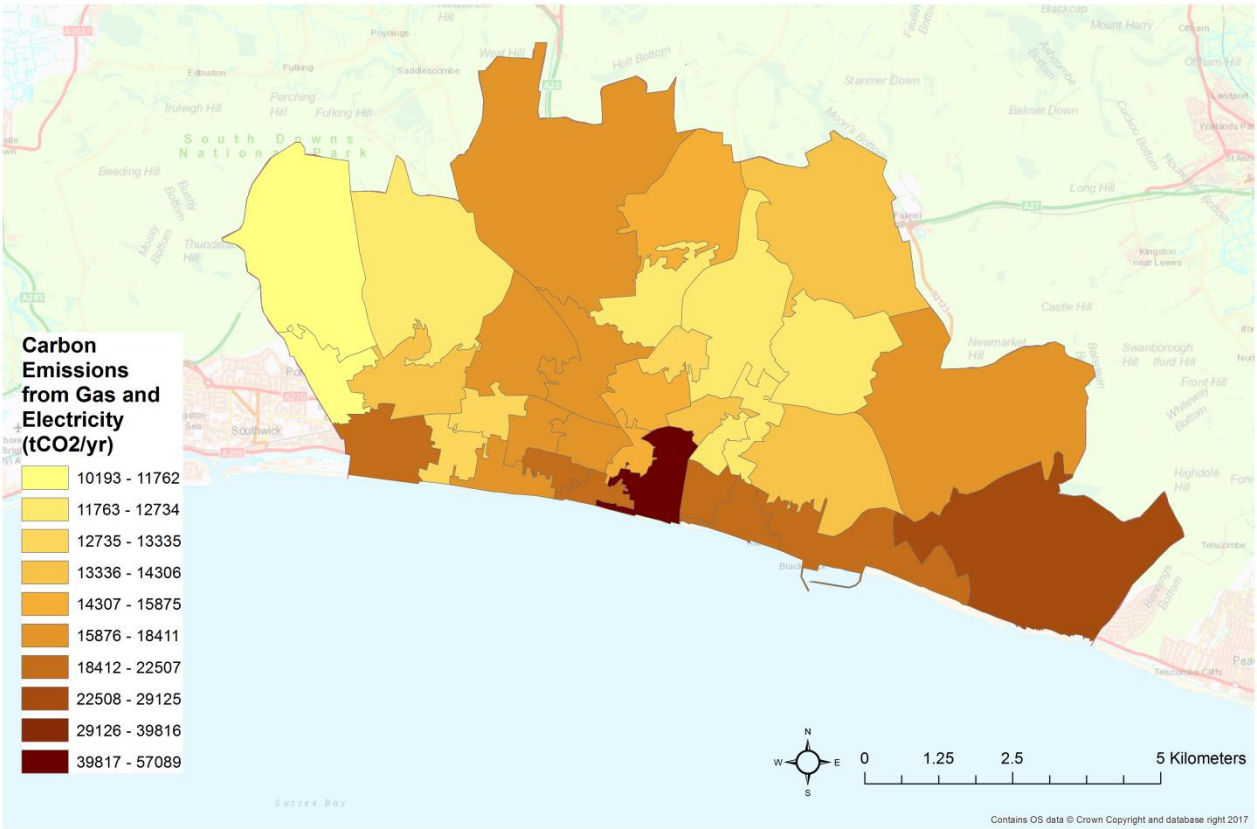


Figure 11: CO_2 emissions from gas and electricity (non-transport) by MSOA.

3.3 Energy efficiency of the current building stock

[18] https://www.gov.uk/government/publications/regional-energy-data-guidance-note

[19] https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting Note that emissions factors are published annually and therefore the above figures are different from those used in the 2013 report.

3.3.1 Overview

Energy Performance Certificate (EPC) ratings provide a normalised means of comparing the energy efficiency of different buildings. EPC records are made freely available on the DCLG website[20] unless the holder chooses to opt out. Therefore, this database provides valuable insight into the energy efficiency of the building stock in Brighton and Hove.

It should be noted that the EPC database does not capture the energy efficiency of the entire building stock. Except in circumstances where a property owner has sought an EPC voluntarily (e.g. for the purpose of a Green Deal assessment), EPCs in the database will primarily include buildings rented, sold, or constructed since 2008. The website states:

> *"This data should, therefore, not be interpreted as a true representation of the whole of the building stock in England and Wales, but viewed as part of a wider package of Government's provision of information on the energy efficiency of buildings."*

The dataset is updated continuously and was downloaded on 17/11/17. The total number of domestic EPC records[21] was 89,214. Assuming that there are roughly 127,000 dwellings in Brighton and Hove based on government energy statistics,[22] the EPC database is estimated to cover roughly 70% of the domestic building stock.

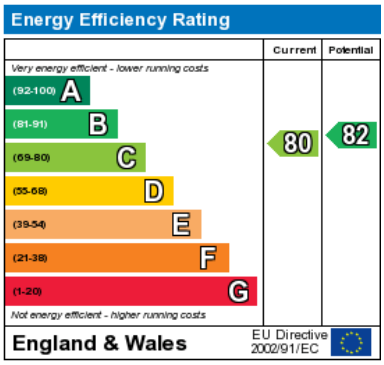
In order to establish whether the EPC was issued for a new build property or an existing one, the data was filtered by 'Transaction Type' with categories defined as follows:

- **Existing homes** – included all domestic listings except those marked as marked as 'new dwelling'
- **New homes** – included all domestic listings marked as 'new dwelling'
- **Existing non-domestic** – all non-domestic listings except those marked as 'Mandatory Issue (property on construction)'
- **New non-domestic –** non-domestic listings marked as 'Mandatory Issue (property on construction)'

3.3.2 EPC rating system

The rating system for domestic buildings is shown below. Buildings are rated on a scale of 1 (worst) to 100 (best), and these scores correspond to 'bands' of A-G. Numerical ratings are also referred to as Standard Assessment Procedure (SAP) ratings, which provide a way of modelling carbon emissions from fuel use of fixed lighting and heating). Ratings are split into two scores, 'current' and 'potential' ratings. The potential rating could be achieved if certain energy efficiency improvements are made.

Band	SAP Rating
A	92-100
B	81-91
C	69-80
D	55-68
E	39-54
F	21-38
G	1-20



Sample domestic EPC

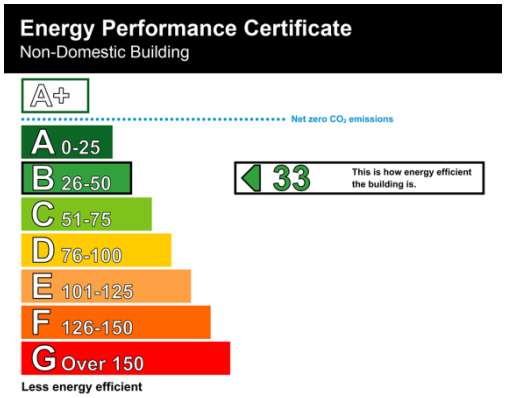
[20] https://epc.opendatacommunities.org/login

[21] Records containing 100% matches in all fields were marked as duplicates; 136 were identified and removed from the dataset. It is possible that there are more, e.g. multiple entries for the same property where some identifying information was recorded differently, but due to the size of the dataset a more in-depth analysis was not carried out.

[22] *The total number of domestic electricity meters reported in 'Sub-national total final energy consumption statistics: 2005-2015' (BEIS, 2017) is 126,542; there were 126,827 households identified by the 2011 Census.*

A different system is used for non-domestic buildings. Rating 'bands' range from A+ to G, but numerical scores are not bounded; higher numerical scores indicate *worse* performance; and scores below zero indicate that the building is net zero carbon or carbon negative.

Band	Rating
A+	Below 0
A	0-25
B	26-50
C	51-75
D	76-100
E	101-125
F	126-150
G	Over 150



Above: Sample non-domestic EPC

3.3.3 EPCs for domestic buildings

Existing domestic buildings

Figure 12 shows the range of current and potential EPC ratings registered for **existing** domestic properties. It can be seen that the highest number of current SAP ratings are in the range of 60-70 out of 100, which equates to a 'D' rating. The highest numbers of potential SAP ratings are in the range of 70-80, which equates to a 'C' rating.

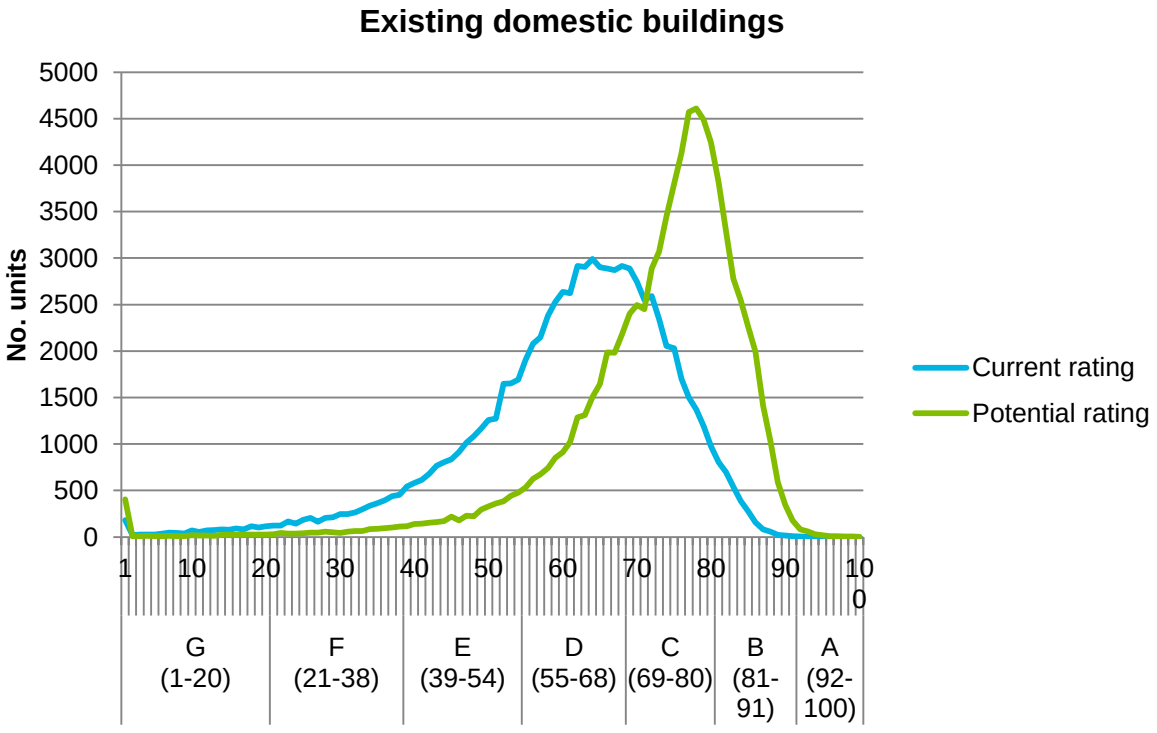


Figure 12: EPCs and SAP ratings of existing domestic buildings in Brighton and Hove

% of properties with this

rating or above		
Rating	**Current**	**Potential**
A	0%	0%
B	4%	24%
C	31%	73%
D	74%	93%
E	93%	98%
F	98%	99%
G	100%	100%

Table 5. Proportion of existing domestic properties in Brighton and Hove at specific EPC ratings or higher

Table 5 shows that the majority (74%) of dwellings in Brighton and Hove achieve an EPC of 'D' or above.

The 'potential' EPC results also indicate that, for a majority (73%) of existing domestic properties, it would be possible to achieve an EPC rating of 'C' or above, provided that they implement a range of energy efficiency improvements.

New domestic buildings

Figure 13 shows the range of current and potential EPC ratings registered for **new** domestic developments. As expected for new builds, the majority of buildings receive a 'B' rating or above, and there are very few ratings below a 'C' or 'D'. This is attributed to increasing energy efficiency standards in the Building Regulations. Unlike ratings for existing dwellings, in most cases there is close agreement between the potential rating and the rating achieved for new dwellings.

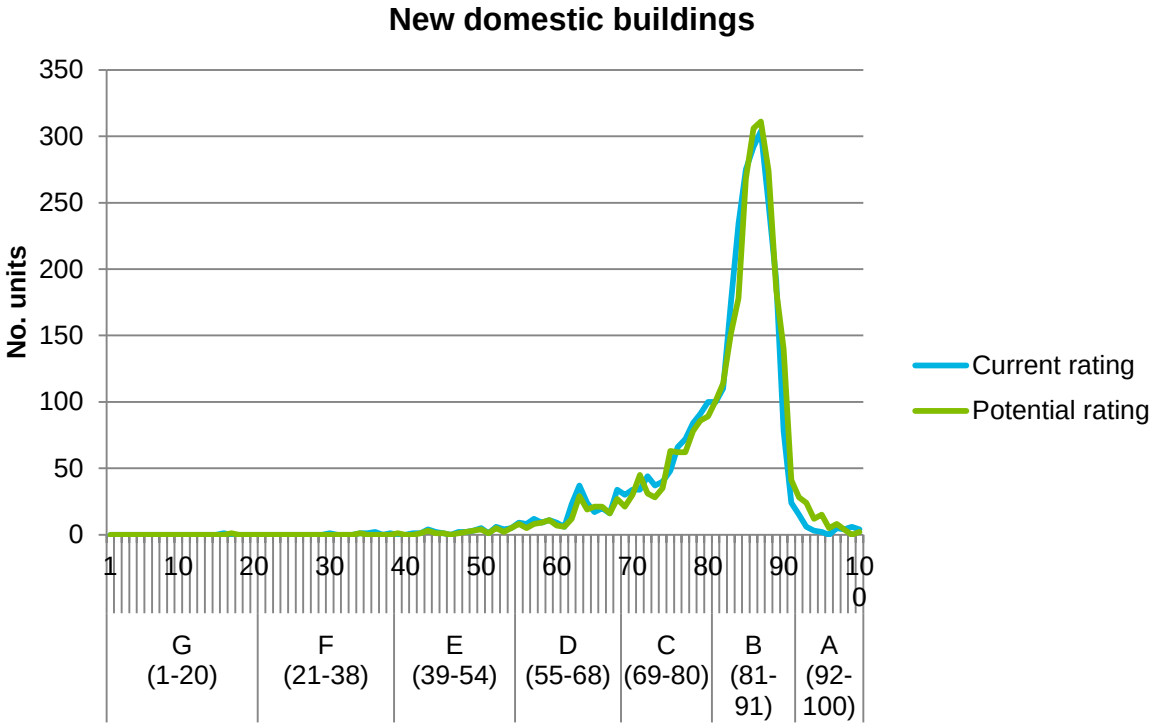


Figure 13: EPCs of new domestic buildings in Brighton and Hove

	% of properties with this rating or above	
Rating	**Current**	**Potential**
A	2%	4%
B	69%	72%
C	91%	92%
D	99%	99%
E	100%	100%
F	100%	100%
G	100%	100%

Table 6. Proportion of new domestic properties in Brighton and Hove at specific EPC ratings or higher

These results indicate that the majority (69%) of new domestic properties in Brighton and Hove achieve an EPC of 'B' or above and almost all (91%) achieve an EPC of 'C' or above.

3.3.4 Non-domestic buildings

Existing non-domestic buildings

Figure 14 shows the distribution of EPC ratings for existing non-domestic buildings. It can be seen that the highest number of current ratings are 'D' or 'C', with roughly 57% of properties achieving a 'D' rating or above. Note that there is a high number of 'G' rated properties due to a long 'tail' in the data; unlike for domestic properties, there is no upper end of the rating scale for non-domestic buildings. No information about potential ratings is provided in the dataset; therefore, it is difficult to ascertain the potential uplift that would be possible following a refurbishment or energy efficiency improvements.

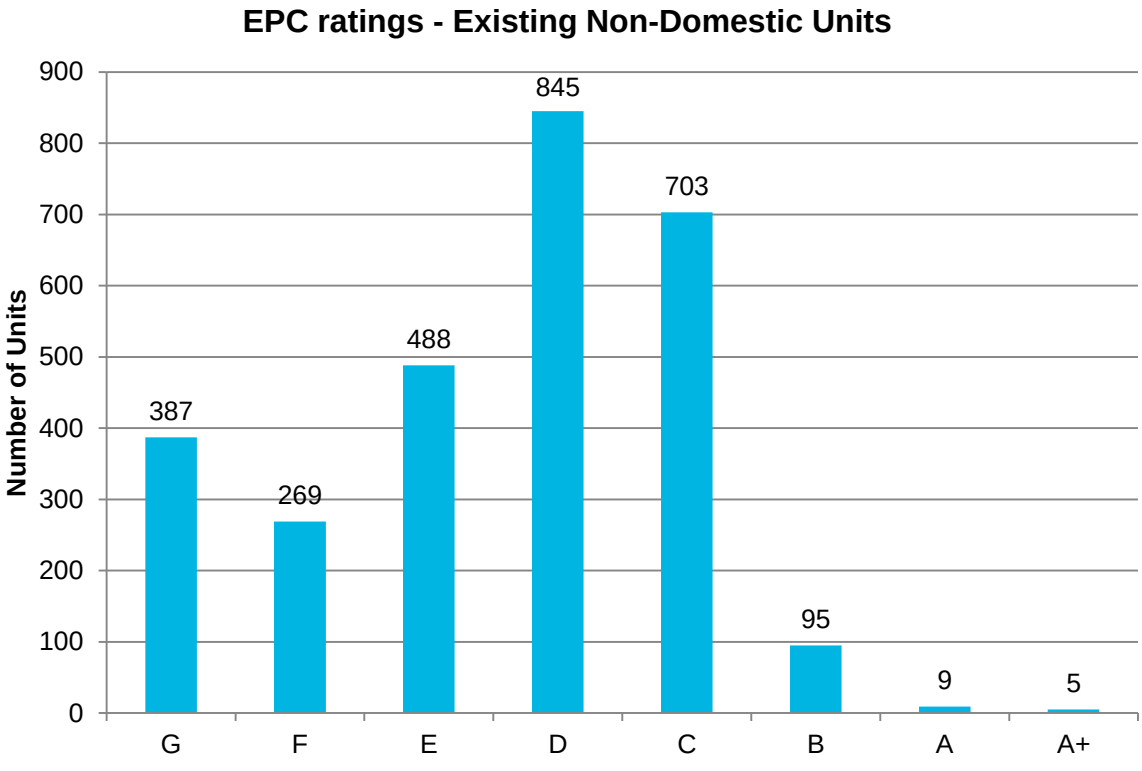


Figure 14: EPCs of existing non-domestic buildings in Brighton and Hove

Rating	% of properties achieving this rating or above
A+	0.2%
A	0.5%
B	3.7%
C	27.8%
D	56.7%
E	73.4%
F	82.6%
G	95.9%

Table 7: Proportion of existing non-domestic properties in Brighton and Hove at specific EPC ratings or higher

Table 7 indicates that the majority (57%) of existing non-domestic properties in Brighton and Hove achieve an EPC of 'D' or above.

New non-domestic buildings

Figure 15 shows the distribution of EPC ratings for new build non-domestic buildings, for which the most common rating is a 'B'; 78% of non-domestic new builds have received ratings of 'B' or above.

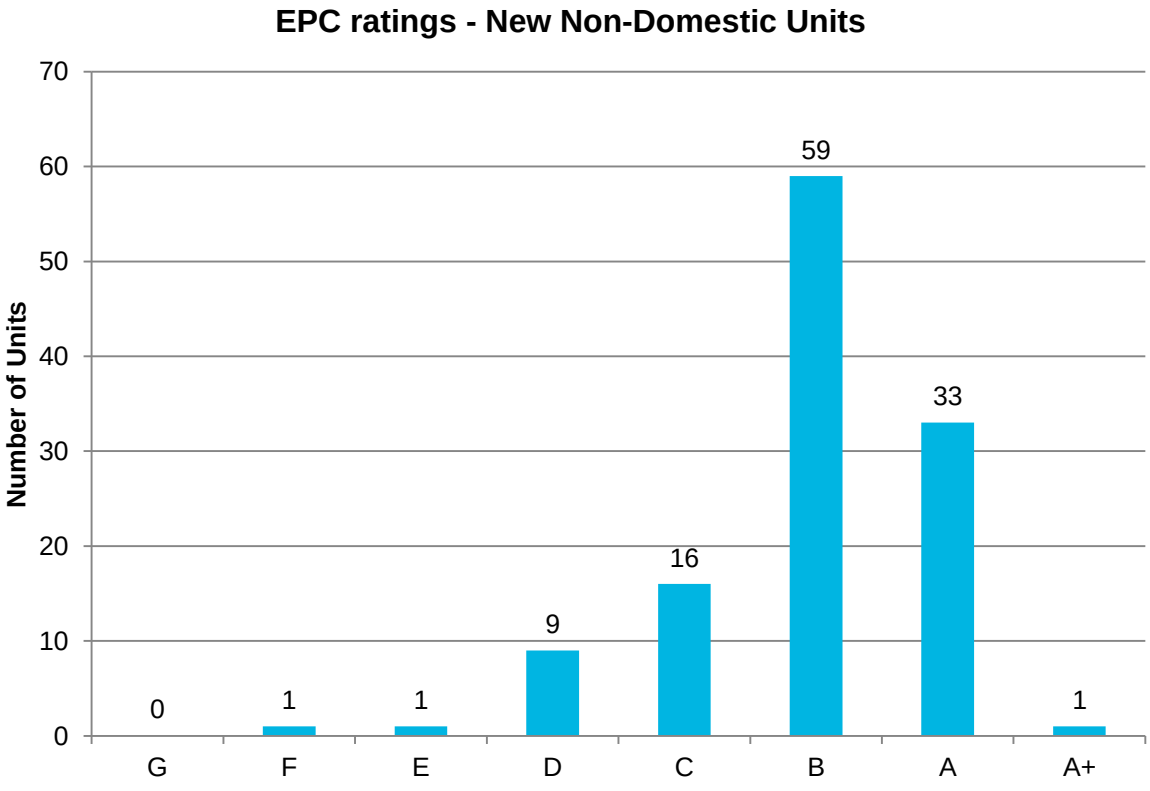


Figure 15: EPCs of new non-domestic buildings in Brighton and Hove

Rating	% of properties achieving this rating or above
A+	1%
A	28%
B	78%
C	91%
D	98%
E	99%
F	100%
G	100%

Table 8: Proportion of existing non-domestic properties in Brighton and Hove at specific EPC ratings or higher

Table 8 indicates that the majority (78%) of new non-domestic properties in Brighton and Hove achieve an EPC of 'B' or above and 28% achieve a rating of 'A' or above.

3.4 LZC energy technologies in Brighton and Hove

3.4.1 Existing and planned installations

The 2013 Energy Study conducted by AECOM included a review of existing LZC installations in Brighton and Hove. The study identified that:

> *'[…] There are relatively few large scale low and zero carbon energy installations in Brighton and Hove. The largest existing identified installation is the gas CHP plant at the University of Sussex. Other than several medium-scale biomass and gas CHP plants, including some with district heating, installations are limited to the small scale, although a very large offshore wind farm is currently proposed by EON at Rampion c.13km off the coast'*

A desk review has been carried out to evaluate the number and capacity of any additional PV, wind, waste, hydro, or wave/tidal energy installations commissioned since the 2013 report was issued. The review examined the following sources of information:

- **OFGEM Feed-in Tariff (FiT) data:** The UK Quarterly statistics are published by OFGEM and give an account of all total number of installations and the total capacity of generators registered with the incentive scheme. The publication provides anonymised information relating to all installed renewable schemes claiming the FiT. It is available in regional format. Data was taken from *'Feed-in Tariff Installation Report 30 June 2017 Part 1'* (accessed 05/10/17)[23] and was processed down to a Local Authority level for the purposes of this report.
- **OFGEM Renewable Heat Incentive (RHI) data:** As with the FiT, this dataset has been published by OFGEM and is updated on a monthly basis. This study reviewed the *'RHI Monthly Official Statistics Tables 03 June 2017'* (accessed 05/10/17)[24], which indicated that 62 domestic RHI installations and <5 non-domestic RHI installations are present within the Local Authority; however, a breakdown by technology type is not available. Due to the small sample size, it is difficult to draw inferences about the number and type of installed technologies and therefore these have been excluded from the analysis.
- **BEIS installed CHP capacity:** Information about installed CHP capacity was taken from 'BEIS CHP Focus' (accessed 10/10/17)[25]. This is a public domain database of CHP schemes maintained by BEIS.
- **The UK Renewables Map:** The UK Renewables Map is an online resource that compiles data from a large range of publications and statistical datasets (accessed 10/10/17). It aims to provide the fullest possible account of all renewable electricity installations in the UK, including wind, solar, waste and hydro power installations. Note that the Renewables Map only lists larger installations, typically above 0.6 MW in size.
- **BHCC planning website:** For details of planned installations in new major developments.

Note: the review of the BHCC Planning website was undertaken using the search function on the website and may not have identified all planned or completed installations. It has also not reassessed installations identified as being active in the 2013 report.

Table 9 lists all large or medium scale installations identified by this review. Since the 2013 report was issued:

- Two new communal biomass systems have been installed;
- There are two new planned CHP systems, one at Circus Street and another at Preston Barracks, and these developments are also expected to include PV arrays;
- The FiT database indicates that there has been a 311% increase in the number of small-scale PV installations, from a total capacity of 1.5MW in 2013 to a total capacity of 6.168MW in 2017, which is likely due to decreasing costs of this technology; and notably

[23] https://www.ofgem.gov.uk/publications-and-updates/feed-tariff-installation-report-31-march-2017
[24] https://www.gov.uk/government/collections/renewable-heat-incentive-statistics
[25] http://chptools.decc.gov.uk/app/reporting/index/viewtable/token/2

- Three new large (>50kWp) PV arrays have been installed within LSOA code E01016974. The sites are not individually identified within the FiT database, but a review of Google Satellite images suggests that these are likely to be located on industrial sites.

Although not included within Brighton and Hove boundaries, also note that construction is nearly complete at the 400MW Rampion offshore wind farm.

3.4.2 Limitations of this approach

- Consolidating renewable energy data sources

  The data from the Renewables Map does not include projects with an installed capacity of less than approximately 0.6 MW. Information about the smaller installations was taken from the FiT and RHI published data. However, neither dataset has specific size cut-off points. Therefore, it is possible that some installations may be unaccounted for, if there is a gap between the two datasets (i.e. between 0.5MW and 0.6 MW). This particular capacity range occupies a grey area between micro and macro generation projects and it is not expected that there is a large number of installations which would be overlooked as a result. Discussions regarding the actions of the various delivery partners indicate that this capacity range is not in common use by a particular technology type or delivery partner.

- Validating data from the UK Renewables Map

  The UK Renewables Map is a secondary source; that is, it compiles data taken from a broad number of other sources. It is predominantly composed of statistics published by BEIS/DECC and OFGEM, and supplemented with other project-specific data or information from e.g. the Planning Portal website. Because this database was not compiled by AECOM, the company cannot take responsibility for the accuracy of the data it contains. However, a spot-checking validation exercise has been carried out to assess the general reliability of the source, which was found to be satisfactory. This included e.g. cross-checking data against the FiT database, and Google satellite images to confirm the locations of larger solar installations.

- Renewable installations not captured in the data

  The use of FiT and RHI datasets means that only registered or accredited schemes have been captured by this study. These incentive schemes are widely regarded as the key driver for micro generation installations due to the more favourable financial conditions they create. Therefore, it is anticipated the FiT and RHI data will account for the majority of all renewable generation installation in Brighton and Hove and will give a reasonably accurate estimation of the current capacity installed within the county. However, for some mature technologies, in particular SHW, a number of installations may have been present before the introduction of the RHI and additional installations may not have been registered.

Type	Name	Total Installed Generating Capacity (MWe)	Source	Comments
Larger Installations, CHP and Biomass				
Existing/On Site				
Biomass	One Brighton	0.5	BHCC Sustainability Achievements May 2012	N/a
Biomass	Brighton Aldridge Community Academy	0.55	BHCC Sustainability Achievements May 2012	N/a
District Heating (DH)	Brighton General, Elm Grove	Unknown	BHCC	N/a
Gas boiler DH	Brighton University, Cockcroft Building	Unknown	BHCC	N/a
Gas CHP	Sainsbury's Brighton *[Note: it is not clear which Sainsbury's this refers to; based on news reports[26] it is assumed to be the one on New England Road.]*	0.321	DECC CHP database	N/a
Gas CHP	Amex House	0.3	BHCC Sustainability Achievements May 2012	N/a
Gas CHP	Portslade Aldridge Community Academy, Chalky Road Portslade	Unknown	Planning Register BH2011/02824	N/a
Gas CHP	Brighton University, Falmer site	Unknown	BHCC	N/a
Gas CHP	Patching Lodge Park Street	Unknown	BH2006/03952 and BH2008/02769	N/a
Gas CHP	William Moon Lodge The Linkway Brighton	Unknown	BH2007/02692	N/a
Gas CHP and DH	University of Sussex	1.16	DECC CHP database	N/a
Gas CHP and DH	Varley Halls of Residence, University of Brighton	0.2	Planning Register BH2010/00235	N/a
Gas DH	Royal Alexandra Quarter (Former Royal Alexandra Hospital site, 57 Dyke Road)	Unknown	BH2010/03379	N/a
Gas micro-CHP, communal heating	331 Kingsway, Hove	Unknown	Planning Register BH2011/00227	N/a

[26] http://www.theargus.co.uk/news/6723371.Heated_row_over_power_plant_scheme/?ref=arc

Type	Name	Total Installed Generating Capacity (MWe)	Source	Comments
Biomass	The Keep, Woollards Field	0.3	BHCC Sustainability Achievements May 2012	Listed as 'planned' in 2013 report
Biomass and Communal Heating	Maycroft & Parkside, London Road, Patcham	0.12	Planning register BH2011/03358	Listed as 'planned' in 2013 report
PV	LSOA: E01016974	0.2	FiT database	Note: Although these installations are listed in the FiT database, OFGEM classifies micro-generation as those below 50kWp[27] and therefore these have been separated from the FiT data
PV	LSOA: E01016974	0.12	FiT database	
PV	LSOA: E01016974	0.091	FiT database	
Planned				
CHP	Circus Street	0.138	Planning register BH2013/03461	New since 2013 report
PV		0.043		New since 2013 report
CHP	Preston Barracks	0.77	Planning register BH2017/00492	New since 2013 report
PV		0.118		New since 2013 report
Gas CCHP and DH	Royal Sussex County Hospital 3T's	3	Planning register BH2011/02886	Unknown if installation complete
Microgeneration				
Existing/On Site				
Micro CHP	2 x records; locations unknown	0.002	FiT database	No change since 2013
Micro Wind	1 x record; location unknown	0.01	FiT database	No change since 2013
Biomass	Stanmer Earthship	0.015	BHCC Sustainability Achievements May 2012	N/a
PV	Various (density shown in Figure 16)	6.168	FiT database	Represents a +311% increase from 2013

Table 9: Existing installations of low and zero carbon energy technologies in Brighton and Hove

[27] https://www.ofgem.gov.uk/environmental-programmes/fit

Figure 16 shows the total installed capacity of small-scale PV installations (FiT) by LLSOA, as described in Table 9. The FiT database lists three large-scale (>50kW) PV arrays, two micro-CHP units and one micro wind installation which are not shown.

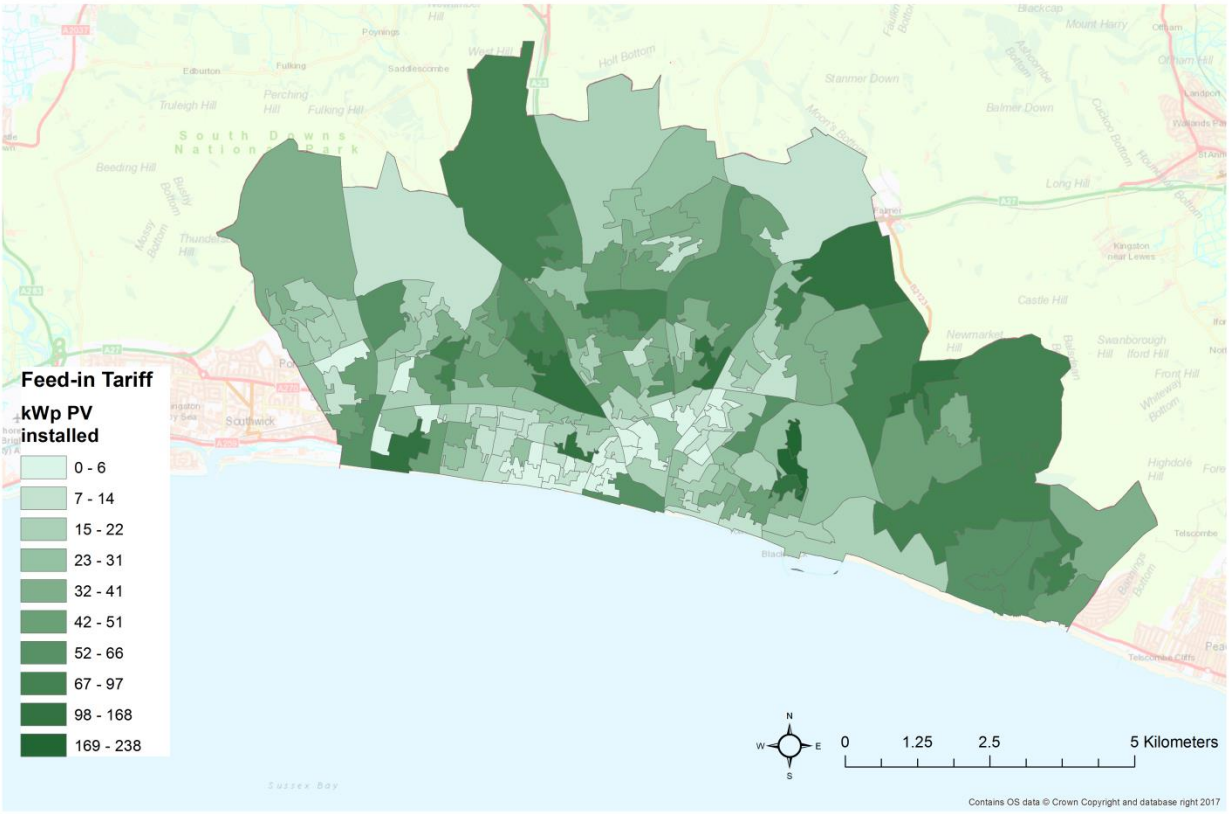


Figure 16: Existing installations of PV in Brighton and Hove registered to the FIT scheme

4. Assessing the impacts of future changes

This section describes the anticipated changes that are expected to occur in Brighton and Hove in regards to new development and energy systems. The potential quantities and types of new development are described, and used to provide a rough estimate of future electricity and gas consumption based on a 'business as usual' scenario. Consideration is also given to the potential effects of trends such as grid decarbonisation, changes in heat delivery and transport electrification.

4.1 Future development

4.1.1 New domestic buildings

The BHCC *Strategic Housing Land Availability Assessment* (SHLAA, 2017) identifies that there is housing delivery potential of circa 15,000+ new dwellings within Brighton and Hove. Assuming that there are currently around 127,000 homes in the area[28], if these potential housing sites all came forward this would represent roughly a 12% increase in the number of dwellings.[29]

The SHLAA will inform housing site allocations in the draft CPP2. CPP2 will allocate further housing sites to meet the housing targets of a minimum of 13,200 new homes by 2030, and a trajectory for achieving this is presented in the 'Housing Trajectory Revised Position 2016' chart (SHLAA, page 25). Figure 17 shows the number of new dwellings that would be delivered in Brighton and Hove from based on those annual completion rates.

Note that, because fuel consumption data is available through the year 2015, for the purpose of modelling future changes in energy use, 2015 is taken as a baseline and increases in housing numbers or energy demands are measured from the year 2016 onwards.

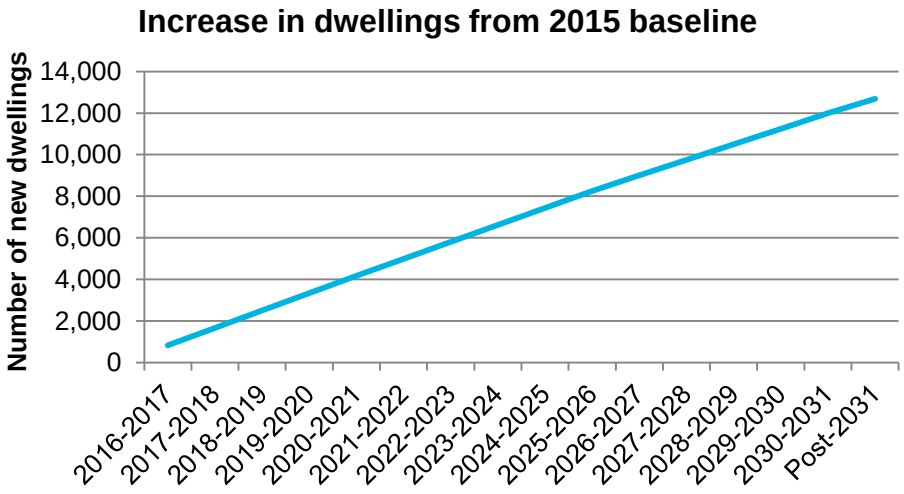


Figure 17: Anticipated potential increase in the number of dwellings in Brighton and Hove from the 2015 baseline

This report does not include a spatiotemporal analysis of potential changes in fuel consumption, but further details as to the location and timing of developments in Development Areas are in Appendix B.

For the purpose of modelling future energy consumption, it has been assumed that the split of unit types will reflect the current building stock as described in the 2011 Census.[30] Median gas and electricity consumption figures for different dwelling types are derived from the National Energy

[28] The total number of domestic electricity meters reported in '*Sub-national total final energy consumption statistics: 2005-2015*' (BEIS, 2017) is 126,542; there were 126,827 households identified by the 2011 Census.
[29] The SHLAA 2016 update shows housing potential not housing site allocations. The City Plan Part 1 has a minimum housing delivery target figure 13,200 over the plan period and this will be met through CPP1 strategic allocations; CPP2 housing allocations (site to be identified and allocated from the SHLAA) and windfall site allowance.
[30] https://www.bhconnected.org.uk/sites/bhconnected/files/City%20Snapshot%20Report%20of%20Statistics%202014%202.pdf

Efficiency Database (NEED) *'Domestic energy consumption – Gas and electricity consumption by property attributes'* (2017), filtered by age (post-1999) and region (Southeast).[31] NEED provides regular statistical updates on domestic fuel consumption and accounts for a variety of property attributes. Note that these two sources categorise building types in slightly different ways; for further information about how these have been brought into alignment, see Appendix C.

Unit type	%	Gas kWh/yr	Elec kWh/yr
Detached (inc. bungalows)	10.2%	14,835	4,034
Semi-detached	19.1%	10,100	3,200
Mid-terrace	14.1%	9,800	3,000
End terrace	6.4%	10,300	3,100
Flat, maisonette or apartment	50.2%	5,850	2,850

Table 10: Assumed housing split and domestic energy consumption benchmarks for housing

Projected gas and electricity consumption for new domestic developments are estimated by multiplying the projected number of new dwellings by the energy benchmarks listed above.

4.1.2 New non-domestic buildings

Non-domestic development levels have been taken from the spreadsheet *'13191_02 Brighton Employment Sites Delivery Trajectory (V3 final) 14.06.13.xls'* and supplemented with information from the *'List of draft Proposed City Plan Part 2 Strategic Mixed Use Sites.docx'* (see email from Helen Gregory, BHCC, to Matthew Turner, AECOM, dated 9th November 2017)[32]. This includes details of specific sites within each DA, in addition to extant planning permissions, mixed use and other (miscellaneous) sites. Where details were unavailable, assumptions have been made based on AECOM's experience of aiding the delivery of large-scale mixed use projects.

Non-domestic energy consumption benchmarks are taken from CIBSE Guide F (2012), with the exception of 'Health/Clinic' which is taken from CIBSE TM46 (2008) as this was considered a closer match for the use described. [32]

Use category	Area (m^2)	Electricity consumption (kWh/m^2)	Heating energy consumption (kWh/m^2)	Energy benchmark used
Office	88,528	128	97	'Offices, air-conditioned, standard' Table 20.1, CIBSE Guide F (2012)
Industrial	9,510	31	90	'Type 6 [Light manufacturing]' Table 20.18(b), CIBSE Guide F (2012)
Retail	850	224*	82*	'Shops/stores, non-food' Table 20.6, CIBSE Guide F (2012) **Based on Sales Area. A 67% reduction is applied to convert the total floor area to sales area, in accordance with the guidance in CIBSE Guide F, Table 20.3.*
Health	1,200	70	200	'Clinic' CIBSE TM46 (2008)
School	6,783	25	108	'Secondary education' Table 20.1, CIBSE Guide F (2012)
Leisure	800	152	573	'Swimming pool centre' Table 20.1, CIBSE Guide F (2012)

Table 11: Assumed new non-domestic floorspace and energy consumption benchmarks

[31] https://www.gov.uk/government/statistical-data-sets/need-table-creator
[32] *From '13191_02 Brighton Employment Sites Delivery Trajectory (V3 final) 14.06.13.xls', email from Helen Gregory (BHCC) to Matthew Turner (AECOM)*

Projected gas and electricity consumption for new non-domestic developments are estimated by multiplying the projected new floor area per use category by the relevant benchmarks.

4.1.3 Existing buildings

Energy consumption for the existing building stock is assumed to remain at 2015 levels throughout the analysis period (2016-2031) with no demolition taking place. The 2015 fuel consumption figures were taken from '*Sub-national electricity consumption statistics: 2005-2015'* and '*Sub-national electricity consumption statistics: 2005-2015'* (BEIS, 2017).

4.2 Projected future energy consumption

Based on the assumptions listed above, an estimate has been made of the future gas and electricity consumption in Brighton and Hove. This is presented in Table 12 below.

Non-Domestic	Benchmarks		New development	Consumption	
Category	*Electricity (kWh/m^2)*	*Gas (kWh/m^2)*	*Area (m^2)*	*Electricity (kWh/yr)*	*Gas (kWh/yr)*
Office	128	97	88,528	11,331,584	8,587,216
Industrial	31	90	9,510	294,810	855,900
Retail	150	55	850	127,568	46,699
Health	70	200	1,200	84,000	240,000
School	25	108	6,783	169,575	732,564
Leisure	152	573	800	121,600	458,400
TOTAL	-	-	107,671	12,129,137	10,920,779
Total (GWh)	-	-	-	*12*	*11*
Domestic	**Benchmarks**		**New development**	**Consumption**	
Category	*Electricity (kWh/dwelling/yr)*	*Gas (kWh/dwelling/yr)*	*# of new dwellings*	*Electricity (kWh/yr)*	*Gas (kWh/yr)*
Detached (incl. bungalow)	4,034	14,835	1290	5,203,465	19,136,862
Semi-detached	3,200	10,100	2420	7,744,000	24,442,000
Mid terrace	3,000	9,800	1787	5,361,000	17,512,600
End terrace	3,100	10,300	809	2,507,900	8,332,700
Flats	2,850	5,850	6370	18,157,308	37,267,308
TOTAL (kWh)	-	-	12,676	38,973,673	106,691,470
Total (GWh)	-	-	-	*39*	*107*

Table 12: Estimated energy demands associated with the anticipated new development

Table 13 below shows the current and future projected gas and electricity consumption in Brighton and Hove for the year 2031.

Fuel	Industrial & Commercial	Domestic	Total
Existing baseline (GWh)			
Gas	385	1,297	1,682
Electricity	600	451	1,051
Energy consumption – New development (2031) (GWh)			
Gas	11	107	118
Electricity	12	39	51
New total (2031) (GWh)			
Gas	396	1,404	1,800
Electricity	612	490	1,102
Percent change (2031) (%)			
Gas	+3%	+8%	+7%
Electricity	+2%	+9%	+5%

Table 13: Estimated energy demands associated with the anticipated new development

The majority of the increase in fuel consumption for both gas and electricity is associated with the new domestic development.

This analysis assumes that the above housing numbers and non-residential floor spaces described in Section 4.1 are delivered. This includes a small allowance for windfall developments (SHLAA, pg. 25).

In addition to the amount and type of new development, results would be affected by changes in the building split, site layouts and densities. These would affect not only the energy consumption of the buildings themselves, but have implications for the amount of additional infrastructure and transportation required.

The results also do not account for the impact of changing fabric energy efficiency standards, which would tend to reduce energy demands for space heating. The NEED benchmarks are based on buildings constructed post-1999, and the non-domestic benchmarks in Guide F are drawn from a range of sources. Therefore, the above results likely represent a relatively high estimate of the levels of new development, and a relatively high estimate of the energy demands for each building type.

This analysis assumes that energy consumption of the present building stock remains at 2015 levels. In reality, it is anticipated that there will be progressive improvements in the energy efficiency of the existing stock and an increase in the uptake of low and zero carbon energy technologies, storage and smart metering and controls.

4.3 Assessing the potential impacts of a changing energy system

The energy consumption figures presented above are based on a 'business-as-usual' scenario in which the energy efficiency, energy consumption and energy delivery systems for each building type do not change significantly over time. This section will discuss the implications of some (though not all) of the potential changes that are expected to take place over the coming decades. These include:

- Electricity grid decarbonisation;
- Uptake of energy efficiency
- Uptake of low carbon heating systems;
- Uptake of electric vehicles;
- Uptake of smart metering and control systems; and
- Battery storage

In some instances, high-level numerical analysis has been carried out in order to provide greater context to the above discussion points. The figures presented in this section do not constitute predictions and are intended only to provide a general sense of the potential scale and direction of change. It is important to note that the scenarios have been assessed separately and do not account for dynamic interactions between trends.

4.3.1 Electricity grid decarbonisation

The emission factor for grid supplied electricity is expected to fall progressively over time in response to a changing mix of generation capacity on the electricity network (including less coal, more renewable energy and a renewal of baseload nuclear power stations). Projected fuel emissions in the HM Treasury/BEIS *'Green Book Supplementary Guidance: Toolkit for valuing changes in greenhouse gas emissions'* (2017)[33] suggest that the CO_2 emissions for domestic grid electricity could fall from the current levels of approximately 0.35 $kgCO_2$/kWh to 0.13 $kgCO_2$/kWh by 2030. This means that even if electricity consumption increases as a result of future development, CO_2 emissions may decrease overall.

Figure 18 below illustrates the potential scale of impact that this could have on total CO_2 emissions for Brighton and Hove. It shows the historic CO_2 emissions for Brighton and Hove through 2015, and thereafter assumes that a small increase in energy consumption will result from the new development as described in the previous section. Two CO_2 trajectories are shown. One assumes that fuel emission factors will remain at current levels, and the other incorporates the BEIS *Green Book* projections for grid electricity. CO_2 emissions for natural gas are assumed to remain stable at 0.184$kgCO_2$/kWh.[34]

[34] The emission factor for mains gas is on a slight upward trend due to an increase in the importation of liquid natural gas and a reduction in North Sea gas supplies. However, in terms of understanding the shifts in carbon savings for different LZCs, the projected change in the gas emission factor is small enough to be ignored relative to the effect of decarbonisation of the electricity grid.

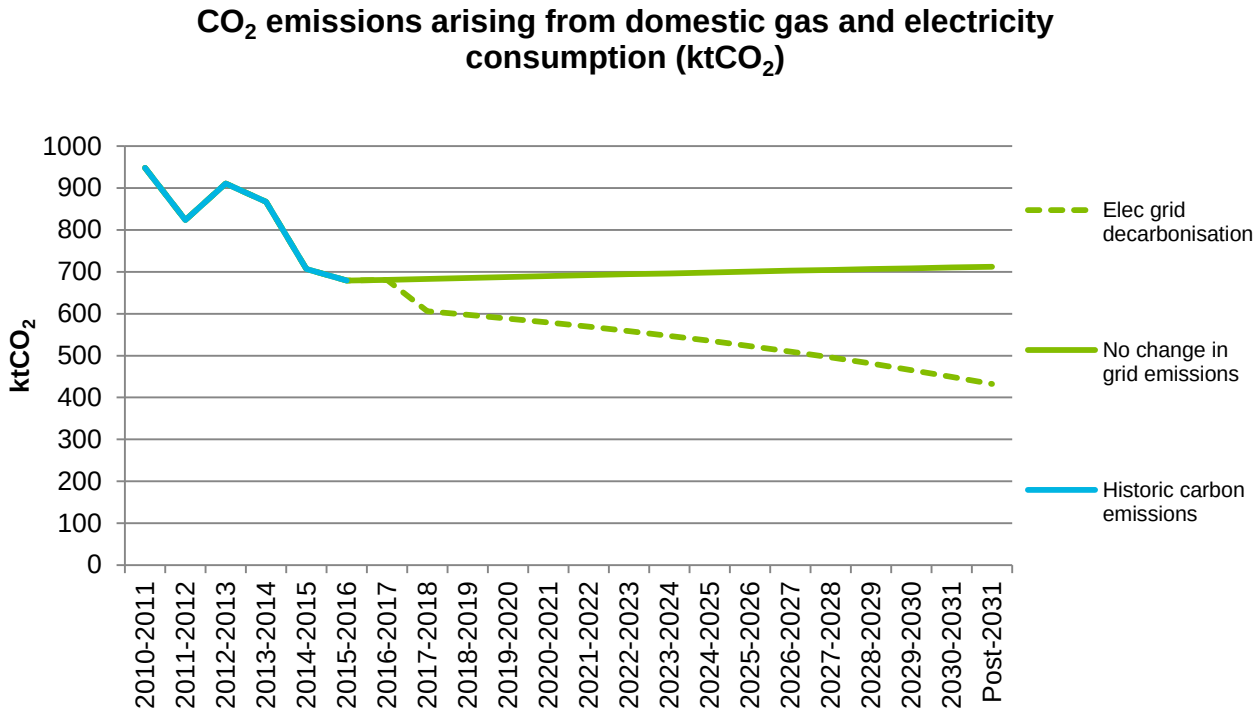


Figure 18: Anticipated impacts of electricity grid decarbonisation on CO_2 emissions

The impacts of new domestic development on gas and electricity consumption would equate to roughly a 5% increase in domestic CO_2 emissions in Brighton and Hove under a business-as-usual scenario. (Assuming that all new domestic development delivers a 19% reduction in CO_2 emissions above Building Regulations 2013 levels, as required by CPP1, the increase would be closer to 4%.) However, as shown above, the projection is highly sensitive to the decarbonisation of the electricity grid and therefore, accounting for the anticipated levels of decarbonisation, domestic CO_2 emissions from gas and electricity consumption would be expected to decrease by 36%.

4.3.2 Energy efficiency

The impacts of new development on energy consumption will depend, at least in part, on the energy efficiency of the new building fabric and services.

It is difficult to anticipate future changes in the energy efficiency standards when one considers, for instance, the introduction of the Zero Carbon Homes policy (see Section 2.1.5) in 2006 and its last-minute withdrawal in 2015, just before it was due to come into full effect. There is also considerable uncertainty surrounding Brexit and the UK's future adherence to the EU Energy Performance of Buildings Directive.

Nonetheless, broadly speaking, in order to meet the legally binding targets of the Climate Change Act 2008 it is anticipated that energy efficiency standards will become more stringent as time goes on. The *Clean Growth Strategy* emphasises the need to improve energy efficiency of buildings; for the existing stock this includes implementing higher standards through MEES (see Section 2.1.10) with a particular focus on reducing fuel poverty and upgrading social housing. Further changes will be implemented through the Building Regulations following an independent review into energy efficiency and fire safety standards.

Although standards will likely be set at a national level, the Committee on Climate Change notes that local authorities can play a particular role in helping to deliver energy efficiency improvements, e.g. through schemes that provide home insulation.

4.3.3 Low carbon heating

The *Clean Growth Strategy* suggests that low carbon heating options in the coming decades will include:

- Electric heating, along with the use of heat pumps;
- Development of heat networks; and
- Transitioning towards a decarbonised gas grid.

These will be discussed in turn.

Electric Heating

The inevitable impact of grid decarbonisation is that the emissions from technologies that use electricity to produce heat will go down over time, and the carbon savings from technologies that displace grid electricity will be reduced. This will make ground source heat pumps and air source heat pumps (that use mains power to 'extract' heat from local ambient heat sources, usually displacing gas heating fuel) more attractive as their net carbon emissions fall. Conversely the carbon savings of combined heat and power (CHP), photovoltaics (PV) and fuel cells (that generate power locally, displacing grid electricity) will reduce, making them less cost efficient options for cutting emissions.

A high-level calculation has been carried out to estimate the changes in electricity consumption that might occur as a result of a large-scale shift towards electric heating with ASHPs. This analysis will specifically examine impacts on domestic electricity and gas consumption based on simplified assumptions about energy use in the building stock.

The **illustrative** scenario is as follows:

- As a starting point, we will assume that all buildings by default receive 100% of their heat from gas and none of their heat from electricity. The gas and electricity consumption for a typical existing building is taken from the median consumption figures provided in *'Regional and local authority electricity consumption statistics: 2005 to 2015'* and *'Regional and local authority gas consumption statistics: 2005 to 2015'* (BEIS 2017). Energy consumption in new dwellings is estimated using the NEED benchmarks as described in previous sections. This will be referred to as the business as usual or 'BAU' scenario.
- Over time, some existing buildings will have their heating systems replaced with electric-only systems that use ASHPs to supply space heating and direct electric (DE) water heating. A proportion of new dwellings will be constructed in this manner from the outset. This will be referred to below as the 'ASHP & DE' scenario.
- In regards to rates of uptake: For existing buildings, it is assumed that approximately 1 in 15 boilers are replaced each year, and that, of those replaced, approximately 1 in 10 would be substituted for the ASHP & DE system. For new dwellings, the CCC central scenario for the fifth carbon budget[35] assumes that 100% of new dwellings would have heat pumps by 2030. For the purpose of this analysis, it is assumed that installations in new builds will increase linearly from 0% in 2015 to 100% in 2030.

Figure 19 below shows the current and projected domestic electricity consumption in Brighton & Hove under the 'BAU' and 'ASHP & DE' scenarios.

[35] https://www.theccc.org.uk/wp-content/uploads/2015/11/Sectoral-scenarios-for-the-fifth-carbon-budget-Committee-on-Climate-Change.pdf

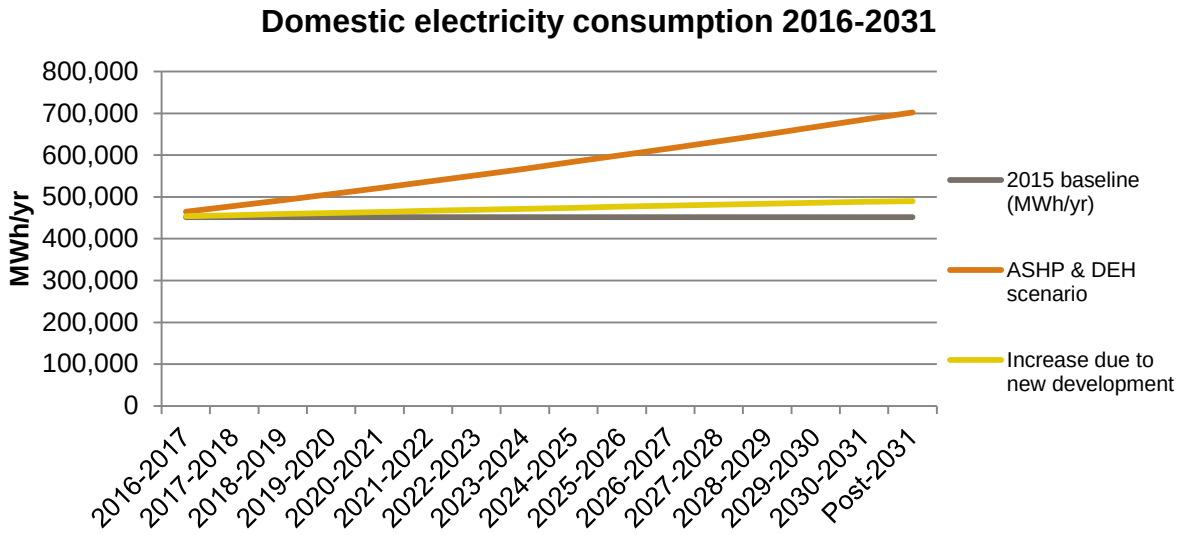


Figure 19: Anticipated impacts of electricity grid decarbonisation on CO_2 emissions

As stated in the previous section, the 2015 baseline electricity consumption was approximately 451,400 MWh. This would increase by approximately 8% by 2031 due to the construction of new dwellings, in the BAU scenario. In the ASHP & DE scenario, it would increase by approximately 56% as gas boilers are replaced with electrical systems.

Figure 20 below shows the current and projected domestic gas consumption in Brighton & Hove under the same scenarios.

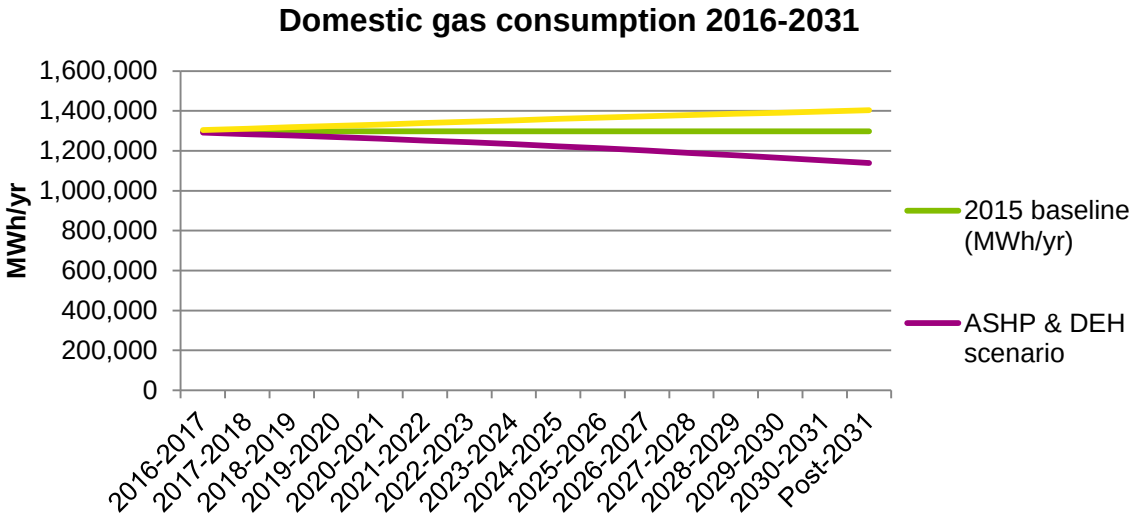


Figure 20: Anticipated impacts of the uptake of ASHP and DEH on the gas consumption in the city

The 2015 baseline gas consumption was approximately 1,297,100 MWh. This would increase by approximately 9% in the BAU scenario and would decrease by approximately 12% in the ASHP & DE scenario.

It is important to recall that this analysis is a standalone case that does not account for many dynamic interactions in terms of technology use and future trends. For instance, although some new developments will utilise heat networks, and could potentially switch to alternative fuels rather than electric heating, this is not reflected in the model.

Note that the BAU scenario is sensitive to:

- The amount of new development, which is expected to be related to a variety of economic factors and planning considerations, and
- The energy consumption of any new development. This is highly dependent on individual use and occupancy patterns, but will also reflect factors such as energy prices and stricter regulations on building and services energy efficiency.

Whereas the ASHP scenario is further influenced by:

- Heat pump uptake rates, which could change rapidly depending on factors such as incentive schemes, energy prices, the cost of technology
- Boiler replacement rates;
- The specific mix of technologies and how heat is delivered, i.e. DEH or a combination of DEH and heat pumps; and
- Changes in technology efficiency or cost, whether of heating systems themselves or due to advances in battery storage.

Heat networks

Local authorities are uniquely placed to aid in the delivery of heat networks. As stated above, the carbon emissions savings associated with the use of gas-fired heat networks will decrease as the electricity grid decarbonises even though these are likely to play a role in the short to medium term. Eventually, the Committee on Climate Change suggests that, *'gas-fired combined heat and power (CHP) will […] become incompatible with national carbon budgets.'* [36] Therefore, it is important to consider how developments can be designed for compatibility with alternative fuel systems.

Decarbonised gas grid

According to the Parliamentary Office of Science and Technology *'POSTNOTE: Decarbonising the Gas Network'* (November 2017), at present over 90% of all UK households are supplied with natural gas and roughly 14% of all carbon emissions in the UK arise from the use of natural gas for heating. It is generally assumed that natural gas will continue to play an important role in delivering heating in the UK in the foreseeable future, but in order to meet the carbon emissions requirements of the Climate Change Act 2008, it will be necessary to significantly decarbonise the gas grid in the longer term.

This could be done in a variety of ways, notably by increasing the use of either biomethane or hydrogen gas. Both of these options could potentially deliver significantly lower carbon emissions. Biomethane is presently injected into the grid in small quantities, but its use is limited by the availability of wet feedstocks and it would likely be unable to meet more than 5-20% of the current gas demand. Assessments of a potential transition to hydrogen gas indicate that there are a range of cost and technical issues to overcome, which would require a considerable increase in the amount and speed of research being undertaken. The use of hydrogen would incur additional costs due to the need to convert appliances and infrastructure for compatibility.

Decarbonising the gas grid is considered a significant challenge and therefore it is difficult to assess the impacts on Brighton and Hove. Barring a technological step-change, we would expect to see more significant changes in the electricity grid and energy efficiency rather than the gas grid.

4.3.4 Electric vehicle uptake

Despite the heavy reliance on petroleum in the transport industry, the electric vehicle market has seen considerable growth in recent years. Indeed, since the launch of the Plug-In Car Grant in January 2011, 119,881 eligible cars have registered across the UK[37]. According to the Society of Motor Manufacturers and Traders (SMMT), total new car registrations decreased by 12.2% from October 2016 to October 2017, but EV registrations increased by 47.5% during this time period. The total number of EV registrations is shown in Figure 21. Note that 2017 data covers the year through

[36] https://www.theccc.org.uk/wp-content/uploads/2012/05/LA-Report_summary.pdf
[37] https://www.smmt.co.uk/2017/11/october-2017-ev-registrations/

October and it is anticipated that there will be approximately 47,000 EV registrations by the end of 2017.

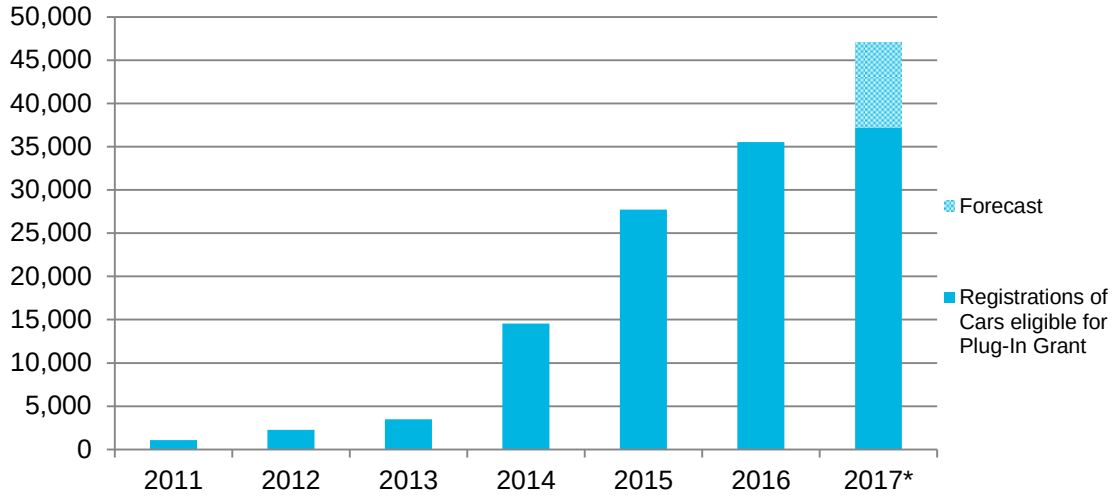


Figure 21: Registration of electric vehicles in the UK

The National Grid report *'Future Energy Scenarios 2017'*[38] suggests that there could be between 1.9 and 9.3 million EVs on the roads by 2030 which *'if not managed carefully […] will create challenges across all sections of the energy system, particularly at peak times'* (p. 20). The use of smart EV charging and, potentially, vehicle-to-grid systems could mitigate some of the effects on peak demand and help to moderate the effects of intermittent LZC electricity generation.

The National Grid report further suggests that electricity peak demand could increase by more than 40% nationally (from around 60GW to around 85GW) by 2050, driven by multiple factors including EV uptake and heat pump demand. Although any increase for Brighton and Hove would depend on a multitude of local and regional factors, it is clear that the impact could be very large.

4.3.5 Uptake of smart meters and energy controls

The Clean Growth Strategy includes a target of making smart meters available to all homes by 2020. The Government has been working with energy suppliers to ensure that these are offered to customers. According to BEIS *'Smart Metering Statistics'* (Quarter 2, 21017), as of June 2017 it is estimated that approximately 7.7 million smart meters were in operation around the UK, in domestic and non-domestic buildings.[39]

One of the key benefits of smart meters is by improving transparency and user access to their own energy data, making it easier to identify areas of waste. Although it is not clear whether or to what extent this affects user behaviour in the long term,[40] the improved data collection could also facilitate the introduction of demand side response and, on a broader scale, help to balance energy demand and supply, particularly important at peak times.[41] In principle, therefore, these have the potential to reduce energy consumption, although the impacts of Brighton and Hove have not been quantified.

4.3.6 Battery storage

There have been significant improvements in battery storage in recent years with implications for both domestic and non-domestic energy consumption. Battery storage could facilitate uptake of LZCs because it would help to moderate periods of intermittency for generation from solar and wind. As stated above, increasing EV uptake and the introduction of vehicle-to-grid systems could have a transformative effect on the way that energy is delivered to buildings. This would also have

[38] http://fes.nationalgrid.com/media/1253/final-fes-2017-updated-interactive-pdf-44-amended.pdf
[39] BEIS (Quarter 2 2017) Smart Metering Statistics https://www.gov.uk/government/statistics/statistical-release-and-data-smart-meters-great-britain-quarter-2-2017
[40] http://fes.nationalgrid.com/media/1253/final-fes-2017-updated-interactive-pdf-44-amended.pdf
[41] BEIS, 'Smart Meters and Demand Side Response' https://www.gov.uk/government/publications/smart-meters-and-demand-side-response

implications for the design of energy infrastructure and allocation of space for plant rooms within buildings, although the space requirements would depend heavily on the types of systems in use. The National Grid 'Future Energy Scenarios 2017' report imagines the impact this might have on the built environment (p. 103):

> *'Many buildings in this world would be able to act as mini power stations, with rooftop solar or small wind turbines, a battery and an integrated building control system linked to multiple smart appliances.'*

5. Opportunities to deliver greater benefits

The previous section discussed some of the key trends relevant to spatial development and planning over the coming years. This section seeks to identify potential opportunities for BHCC to respond to those changes, in regards to LZC technologies, heat networks, and energy efficiency.

To address the implications identified in the previous section there are several opportunities that could be taken within CPP2:

- Increasing the generation of energy from decentralised, low and zero carbon technologies;
- Supporting the delivery of heat networks;
- Setting additional sustainability targets in locations where there is greater potential or greater need to achieve high environmental performance;
- Recognition of opportunities for community-led energy projects;
- Improving the energy efficiency of the building stock; and
- Supporting higher standards of sustainable design and construction.

5.1 Opportunities to deliver more low and zero carbon energy generation

Building Regulation 25A (Part L) requires all new developments to assess the potential to incorporate low and zero carbon (LZC) energy technologies. This section of the report describes the relevant planning considerations and land use constraints that would inform site allocations for LZC energy technologies. It should be read in conjunction with the technical feasibility study presented in the 2013 report.

Note that the presence of a potential planning constraint does not necessarily imply that the technology is unsuitable. From a technical standpoint, if designed and specified correctly to maximise efficiencies and generation potential, most of the technologies listed below could in principle be provided in most locations. Therefore, the following information is primarily intended to highlight potential topics for discussion with BHCC and indicate in relation to technologies and sites.

Appendix E discusses some technologies not included in this analysis and provides reasons for their exclusion.

5.1.1 Solar technologies

Note that ‘solar technologies’ here includes both photovoltaic (PV) and solar hot water (SHW) panels.

Solar energy generation can typically be delivered anywhere there is a suitable surface with adequate solar access (i.e. minimal overshading). The following are considered potential constraints from a planning perspective:

- Conservation areas – consideration of visual impacts of solar panels will be heightened in/adjacent to Conservation Areas (see CPP1 Policy CP15 and PAN09).

In general, greenfield and large new development sites may offer greater potential for solar energy generation; the relative lack of built environment constraints means that there are more opportunities to maximise sustainable design measures from the outset.

Similarly, industrial sites may be more suited to solar technologies as they tend to have large roof areas. As noted in Section 2, a review of Google Earth satellite images indicates that there are already some large arrays on industrial sites within Brighton and Hove.

5.1.2 Air source heat pumps (ASHPs)

As discussed in Section 4, the use of ASHPs may become significantly more common in the coming decades if there is a move to greater use of electricity for heating to replace gas boilers.

The following are considered potential constraints from a planning perspective:

- Conservation areas – consideration of visual impacts of ASHPs will be heightened in/adjacent to Conservation Areas (see CPP1 Policy CP15 and PAN09)

Installation of ASHPs can be undertaken during boiler replacements or as part of new development. Therefore, visual impact aside, they could be integrated into various classes of development in most locations.

Figure 22.Constraints and opportunities - Solar technologies and air source heat pumps

5.1.3 Ground source heat pumps (GSHPs)

Different constraints apply depending on the specific type of GSHP proposed (e.g. horizontal or vertical, open- and closed-loop). Regardless, the key considerations relate to excavations, drilling and ground conditions rather than visual impact. It is important to note that, according to the Environment Agency's *'Groundwater Viability Map'*, nearly all of Brighton and Hove sits above a major aquifer that is designated as 'highly vulnerable'.[42]

The following are considered potential constraints from a planning perspective:

- Location of buried infrastructure e.g. gas pipelines, sewers, cables
- Ground contamination e.g. historic landfill sites[43]
- Archaeological notification areas
- Regionally Important Geological Sites
- Sites of Special Scientific Interest

Depending on uptake, proximity to other open-loop GSHPs could become a constraint due to the potential for thermal interference. The appropriateness of GSHPs would therefore need to be assessed on a site-by-site basis.

[42] Maps available at *http://apps.environment-agency.gov.uk/wiyby/117020.aspx*
[43] Maps available at *https://data.gov.uk/dataset/contaminated-land*

Figure 23. Constraints and opportunities - Ground source heat pumps

5.1.4 Wind

This section will address onshore wind, as offshore wind (such as Rampion Wind Farm) is Crown property and not within the BHCC Planning Authority Boundary.

Discussions with BHCC at the workshop on 3rd November 2017 indicated that opportunities for onshore turbines of any scale are fairly limited given that the greatest wind resource is on higher ground beyond the built up area and therefore fall under South Downs National Park (SDNP) planning authority.

From a technical perspective, the seafront might be considered an exception; supporting text to CPP1 Policy SA1: The Seafront (parag. 3.129) states that, *'There are opportunities to consider small scale renewable energy provision such as solar and wind technologies along the seafront.'*

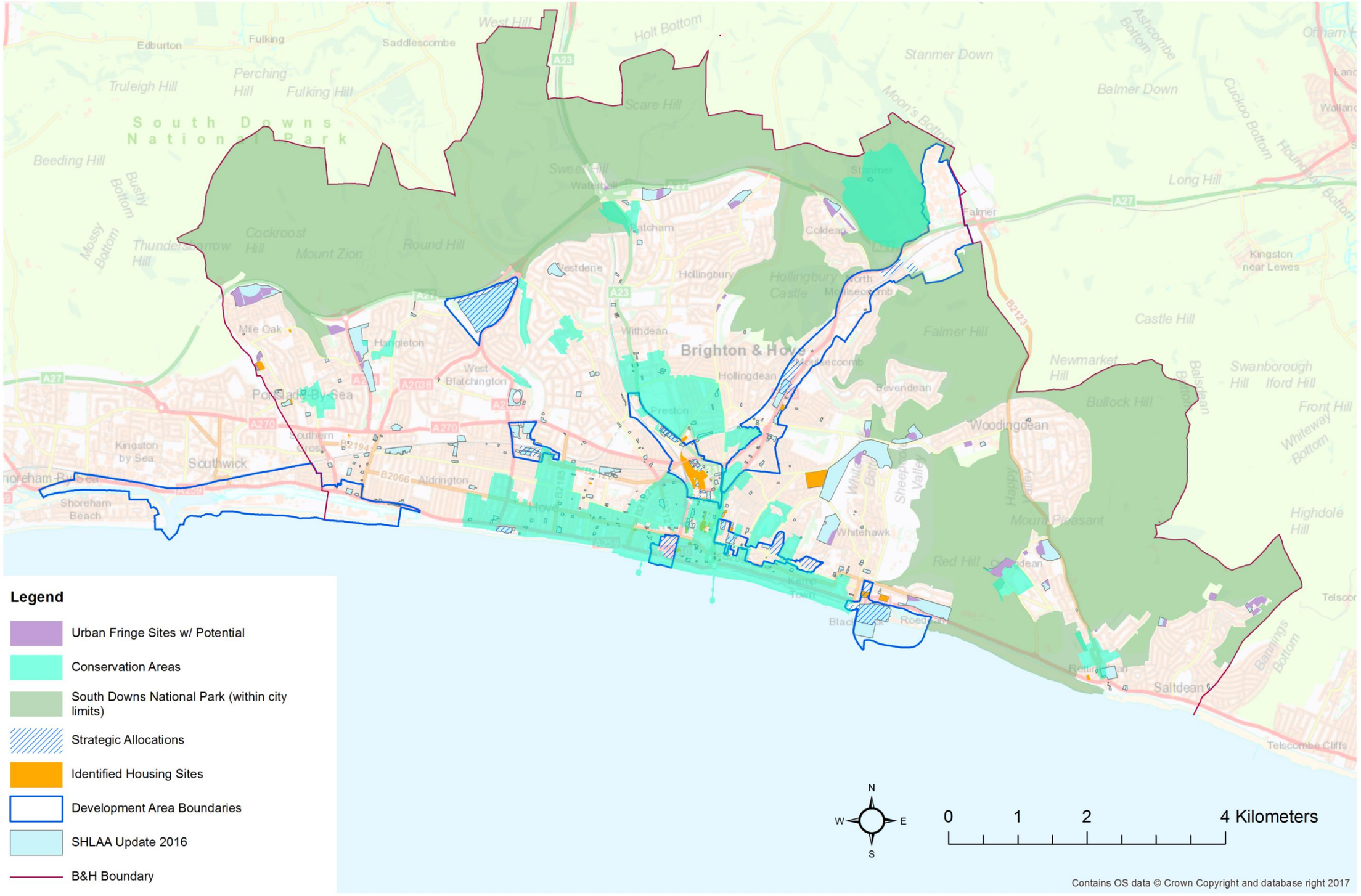
The following are considered potential constraints from a planning perspective:

- Conservation areas – due to the potential visual impact. Note that wind microgeneration is not addressed in PAN 09.

The visual impact associated with the deployment of small-scale wind turbines is highly subjective and typically depends on a variety of factors including the size, number, type, and location of turbines. On industrial sites, for instance within DA8, there may be less concern about visual impacts.

The Written Ministerial Statement HCWS42 (2015) states that, 'local planning authorities should only grant planning permission if […] the development site is in an area identified as suitable for wind energy development in a Local or Neighbourhood Plan.' Therefore, if BHCC wishes to encourage uptake of wind turbines, CPP2 should include clarification as to whether there are specific sites that are considered acceptable and/or the criteria by which they will be assessed for suitability.

Figure 24. Constraints and opportunities - Wind



5.1.5 Biomass

Biomass covers a diverse range of fuels derived from plants, animals or human activity. Biomass burning emits particulate matter and therefore DEFRA's position is not to encourage this practice in urban areas due to air quality concerns.[44]

An exception to this might include for example a case where a highly efficient, modern wood pellet burner is used to replace a coal burner.

The following are considered potential constraints from a planning perspective:

- AQMA – Note that an upwind plume could have acute and long-term effects on sensitive receptors and therefore consideration should be given to whether biomass burning could have an *impact* on an AQMA, regardless of whether or not it is located *within* an AQMA.
- Smoke control zone – see above
- Consideration of visual impacts of flues/storage will be heightened in/adjacent to Conservation Areas (see CPP1 Policy CP15 and PAN09)

On the whole, biomass is not likely to be a preferred option for future development in built up areas.

[44] As stated in a letter from Lord Hunt of Kings Heath, Minister for Sustainable Development, Climate Change Adaptation and Air Quality, on behalf of DEFRA, dated 15 April 2009 (ref: PO126181/EDR)

Figure 25. Constraints and opportunities - Biomass

5.1.6 (Surface) Water source heat pumps

An extract of the National Heat Map (accessed 15/12/17) is shown in Figure 26. It includes the following information:

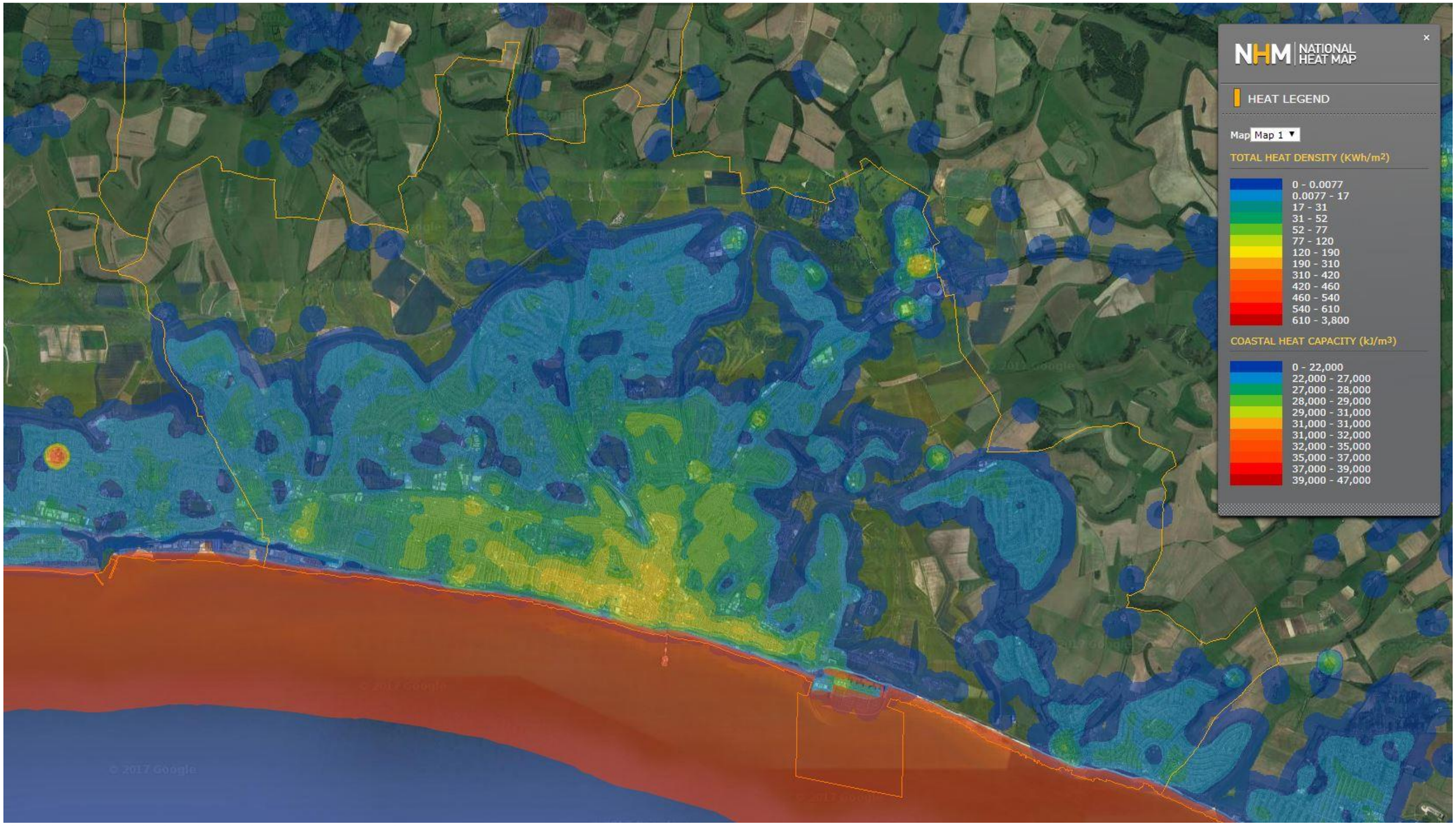
- Total heat demand density (kWh/m^2) per year from all sectors and building types; and
- Coastal heat capacity, i.e. the heat available for extraction using a water source heat pump. Data is presented in (kJ/m^3 which is equivalent to kW at an abstraction rate of 1 m^3 per second.[45]

The map indicates that the majority of heat demand in Brighton and Hove is near the coast, and the there is a considerable coastal heat capacity. This map is provided for information only and does not constitute an assessment of whether WSHPs might be suitable for use in Brighton and Hove. A technical feasibility study would be necessary in order to determine whether there is potential for making use of coastal heat resources using heat pumps.

Furthermore, per the Heat Map explanatory notes: *'A detailed local site assessment will be required before a water-source heat proposal can be considered by the Environment Agency and other regulatory bodies.'* Relevant considerations might include e.g. whether a site is located within a SSSI or Special Area of Conservation, or the presence of protected species.[46]

[45] *http://nationalheatmap.cse.org.uk/doc/user-guide.html#section-14*
[46] *https://www.gov.uk/government/publications/water-source-heat-map-layer*

Figure 26. Heat demand density and coastal heat capacity



© UK Heat Map – Available at: http://nationalheatmap.cse.org.uk

5.2 Opportunities for district heat networks (DHNs)

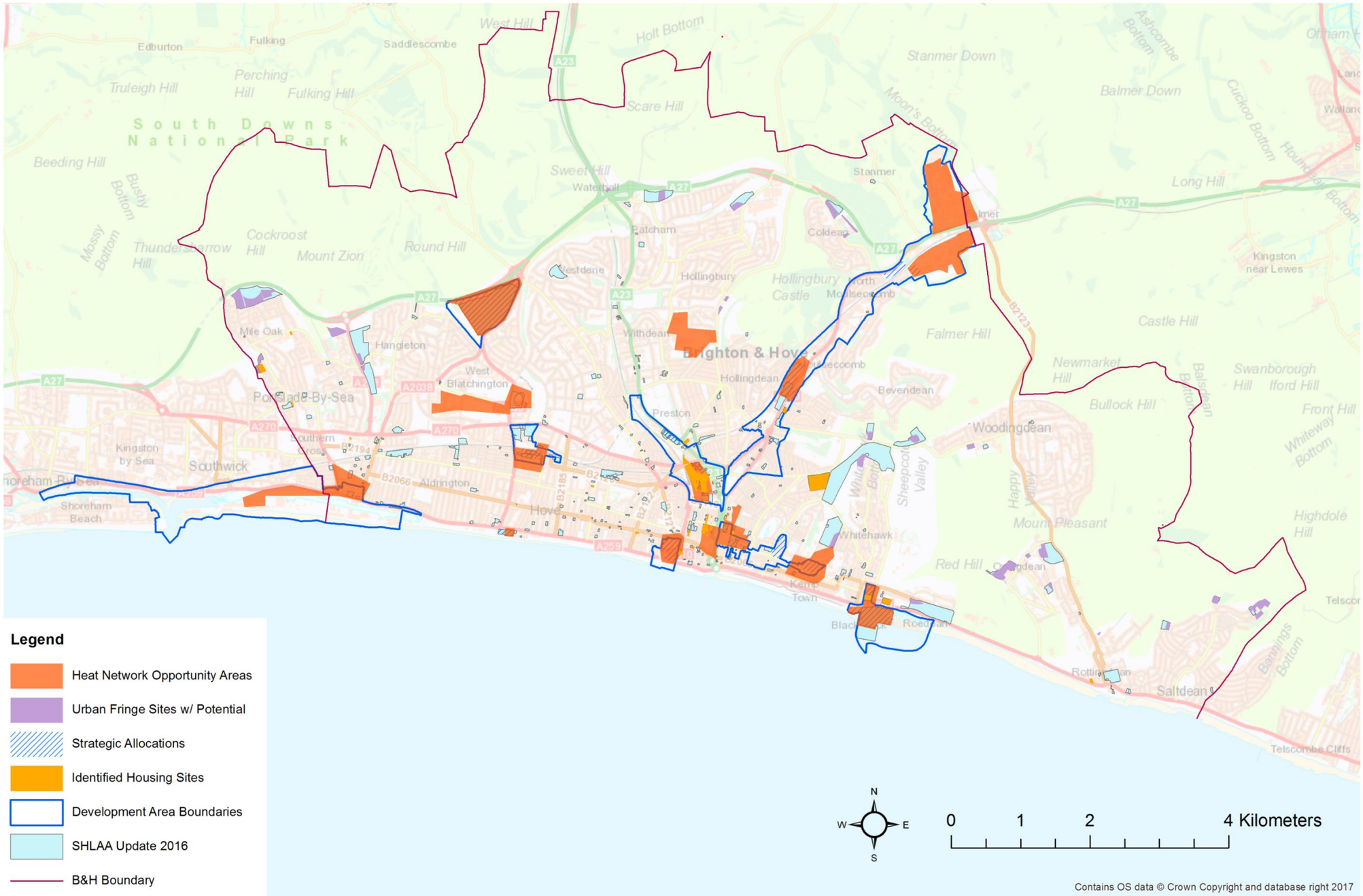
The Brighton and Hove 2013 Energy Study (AECOM, 2013) highlighted potential locations for the possible deployment of heat networks, but noted that further work would be needed to define precisely which buildings would connect. The suitability of a DHN in a given location depends in part on ensuring that all development in the area will be compatible with future connection to a heat network.

Figure 27 shows the potential heat network opportunity areas identified in the 2013 report.

It is understood that BHCC may have carried out further work to evaluate DHN opportunities since the 2013 report was issued. For the purpose of this report, a re-assessment has not been undertaken and therefore the locations shown in Figure 27 are intended for information only and to provide background for the policy recommendations outlined in Section 7.

The Clean Growth Strategy (2017) indicates that DHNs are likely to play a role in the transition to lower carbon heating.

Figure 27. Heat network opportunity areas



5.3 Summary of LZC opportunities by Development Area

The mapping analysis presented above shows that there are significant opportunities to install low and zero carbon energy technologies within new developments in Brighton and Hove. The following table sets out the opportunities and constraints/considerations that apply to each of the assessed technologies for each of the development areas.

Lighter colours indicate no constraints or only minor considerations that are unlikely to present risks to deployment while darker colours indicate more significant considerations. The presence of a constraint or consideration does not necessarily mean that the technology is inherently unsuitable, only that more work may be required to address the constraints. This might affect the size or type of system installed, or its integration with the development.

Technology		Key considerations	DA1	DA2	DA3	DA4	DA5	DA6	DA7	DA8	Notes
Solar	**Photovoltaic**	Visual impacts Layers shown: Conservation area	Includes conservation area	Mostly outside of conservation area	Mostly outside of conservation area	Mostly outside of conservation area	Mostly outside of conservation area	Mostly outside of conservation area	No major constraints identified	No major constraints identified	See PAN 09
	Solar Hot Water	Visual impacts Layers shown: Conservation area	Includes conservation area	Mostly outside of conservation area	Mostly outside of conservation area	Mostly outside of conservation area	Mostly outside of conservation area	Mostly outside of conservation area	No major constraints identified	No major constraints identified	See PAN 09
Heat Pumps	**Air Source Heat Pump**	Visual impacts Layers shown: Conservation area	Includes conservation area	Mostly outside of conservation area	Mostly outside of conservation area	Mostly outside of conservation area	Mostly outside of conservation area	Mostly outside of conservation area	Mostly outside of conservation area	No major constraints identified	See PAN 09
	Ground Source Heat Pump	Constraints include any ground-related designations, contamination, etc. Layers shown: MP_Pipe, IP_Pipe, HP_Pipe, Historic_Lanfdill_Sites_010K, Archaeological_Notification_Areas_ACP, Regionally_Important_Geological_Sites_NC4_ACP, Sites_of_Special_Scientific_Interest_NC2_ACP	Brighton historic core - archaeological notification area along eastern boundary	Unclear what are the existing ground conditions below the Marina	Notification areas: Moulsecoomb in centre; Lewes Rd Barracks southern area and aquifer vulnerability	Northern and southern tip: Archaeological notification area	Aquifer vulnerability	Hove Park archaeological notification area	Aquifer vulnerability	Shoreham Harbour archaeological notification area in majority of the DA	Aquifer vulnerability
	(Surface) Water Source Heat Pump	Must be along seafront. Any installation would require assessments and approval by the Environment Agency. Layers shown: N/a (UK Heat Map)	Seafront	Seafront	Not seafront	Not seafront	Not seafront	Not seafront	Not seafront	Seafront	Not assessed in detail.
Biomass		Air quality concerns Layers shown: 2013 AQMA, Smoke control areas	Entirely in AQMA	No AQMA but see note	AQMA/Smoke Control area towards central Brighton	AQMA/Smoke Control area towards central Brighton	AQMA/Smoke Control area towards central Brighton and along Eastern Rd	AQMA along western border	No AQMA but see note	AQMA along coast	Air quality concerns Also see PAN 09
Wind		Discussions with BHCC indicate only suitable area is along seafront. Visual impact relevant to conservation zones. No map produced.	Seafront BUT conservation zone	Seafront	Not seafront	Not seafront	Not seafront	Not seafront	Not seafront	Seafront	Visual impact. Note: Not mentioned in PAN 09.
Heat Networks		Opportunities were identified in the 2013 Energy Study carried out by AECOM.	See 2013 Energy Study or more recent Heat Network Studies								

5.4 Opportunities for higher sustainability targets in specific locations

There are a number of site-specific factors that offer the potential for new development in specific locations to deliver more in regards to energy and sustainability infrastructure. Based on the review of GIS data provided by BHCC and presented above, we suggest that the following types of locations should be considered for higher targets:

5.4.1 Locations with utility constraints [Figure 28]

Figure 28 indicates that there are utility constraints present in several locations across Brighton and Hove. Where constraints in the capacity of the local power network exist, there would be greater advantages to the use of energy efficiency and LZC energy. These would help to reduce the additional pressures on power demands arising from new development, thus potentially avoiding the need for significant reinforcement.

5.4.2 Locations with environmental designations [Figure 29]

As shown in Figure 29, there are numerous environmental designations within Brighton and Hove. There are sites that could reasonably be expected to deliver more in regards to low carbon and sustainable design in order to mitigate the impacts on the environment. These include sites which have environmental designations but have been allocated for development in the City Plan. It would also include instances where development proposals come forward on sites with environmental designations that meet the tests of CPP1 policy CP10 Biodiversity and emerging draft CPP2 policy on Green Infrastructure and Nature Conservation.

5.4.3 Greenfield sites [Figure 30]

Greenfield sites can offer greater flexibility than other sites in regards to masterplanning, layout, orientation, design of buildings and transport/movement patterns. The relative lack of built environment constraints means that there are more opportunities to maximise sustainable design measures from the outset. As shown in Figure 30, a significant proportion of greenfield sites within Brighton and Hove are in active use as parks and open spaces and carry some type of environmental designation. Where greenfield sites have been allocated for development in the City Plan which impact on designated sites, or where development proposals come forward on designated sites, they would need to meet the tests of CPP1 policy CP10 Biodiversity, CP16 Open Space and emerging draft CPP2 policy on Green Infrastructure and Nature Conservation, there is both an opportunity and a need to achieve better environmental performance in many of these locations.

5.4.4 Locations in the ‘Urban Fringe’ Special Area [Figure 31]

Development on allocated Urban Fringe sites (see Figure 31) could also reasonably be expected to deliver more in regards to low carbon and sustainable design and, as greenfield sites, these locations are also likely to offer greater flexibility in masterplanning and design of buildings to maximise the use of energy and sustainable design measures. Note that development in the Urban Fringe is subject to the tests referred to in CPP1 Policy SA4: Urban Fringe (see Section 2.3.1).

5.4.5 Locations on designated industrial sites [Figure 32]

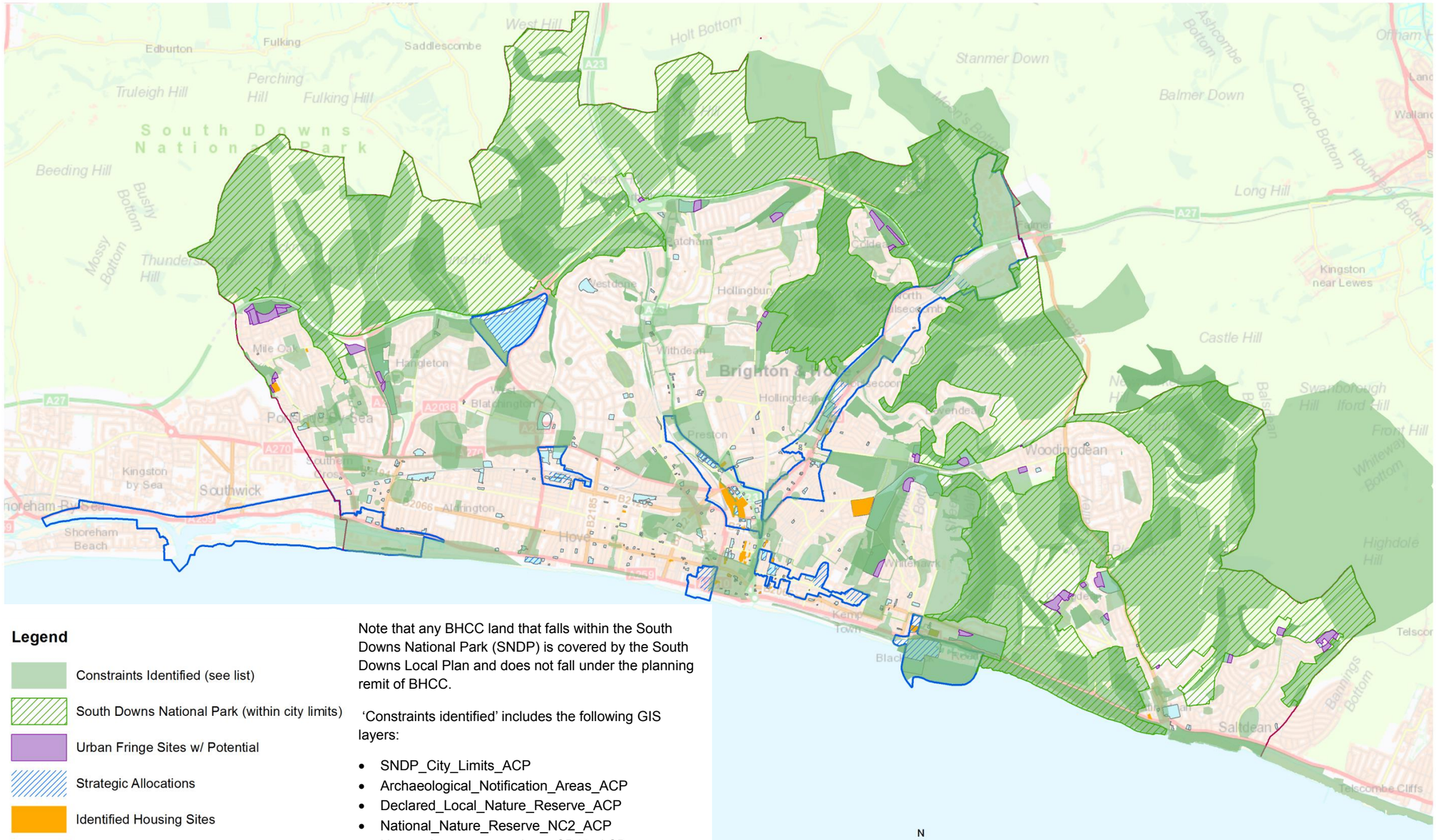
Development taking place in existing designated industrial areas (see Figure 32) is also likely to offer the potential for additional energy and sustainability measures, for several reasons. These locations will have fewer issues associated with visual impact and are likely to contain buildings with features, such as greater roof areas, that will support increased installations of solar energy. Additionally, uses on these sites may be more energy-intensive, in which case the use of LZCs could help to relieve pressure on local power networks. Note that the city energy analysis in Section 3 found that the highest consumption of electricity is from the Industrial sector in Brighton and Hove (see Figure 2). Furthermore, they may produce waste heat or materials that could be used to supply energy onsite or nearby.

5.4.6 Maps

Maps of UK Power Network grid constraints, environmental designations, greenfield sites, urban fringe sites and safeguarded industrial sites are shown on the following pages. In order to provide context, these maps also show the locations of CPP1 Development Area boundaries, CPP1 Strategic Allocations and potential housing sites as identified in the SHLAA (2016).

Figure 28. Utility constraints

Figure 29. Environmental designations



Legend

- Constraints Identified (see list)
- South Downs National Park (within city limits)
- Urban Fringe Sites w/ Potential
- Strategic Allocations
- Identified Housing Sites
- Development Area Boundaries
- SHLAA Update 2016
- B&H Boundary

Note that any BHCC land that falls within the South Downs National Park (SNDP) is covered by the South Downs Local Plan and does not fall under the planning remit of BHCC.

'Constraints identified' includes the following GIS layers:

- SNDP_City_Limits_ACP
- Archaeological_Notification_Areas_ACP
- Declared_Local_Nature_Reserve_ACP
- National_Nature_Reserve_NC2_ACP
- Nature_Improvement_Area_CP10_ACP
- Proposed_Local_Nature_Reserve_ACP
- Regionally_Important_Geological_Sites_NC4_ACP
- Sites_of_Nature_Conservation_Importance_ACP
- Sites_of_Special_Scientific_Interest_NC2_ACP
- Special_Areas_of_Conservation_ACP

Figure 30. Greenfield sites

Note that many of the sites shown are subject to environmental designations (see Figure 29) and/or are in active use as parks and open spaces which may restrict or prohibit development from taking place.

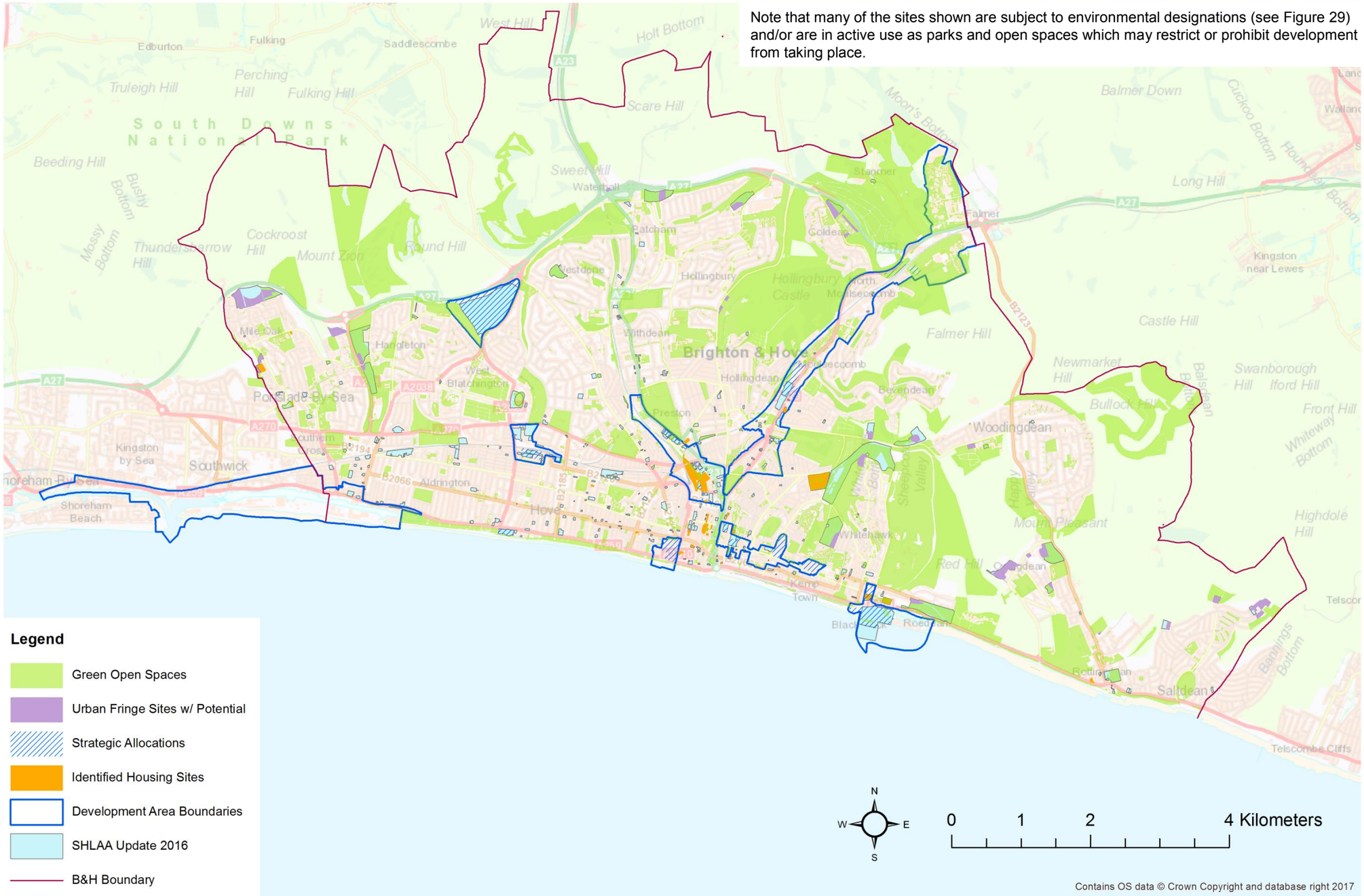


Figure 31. Locations in the 'Urban Fringe' Special Area

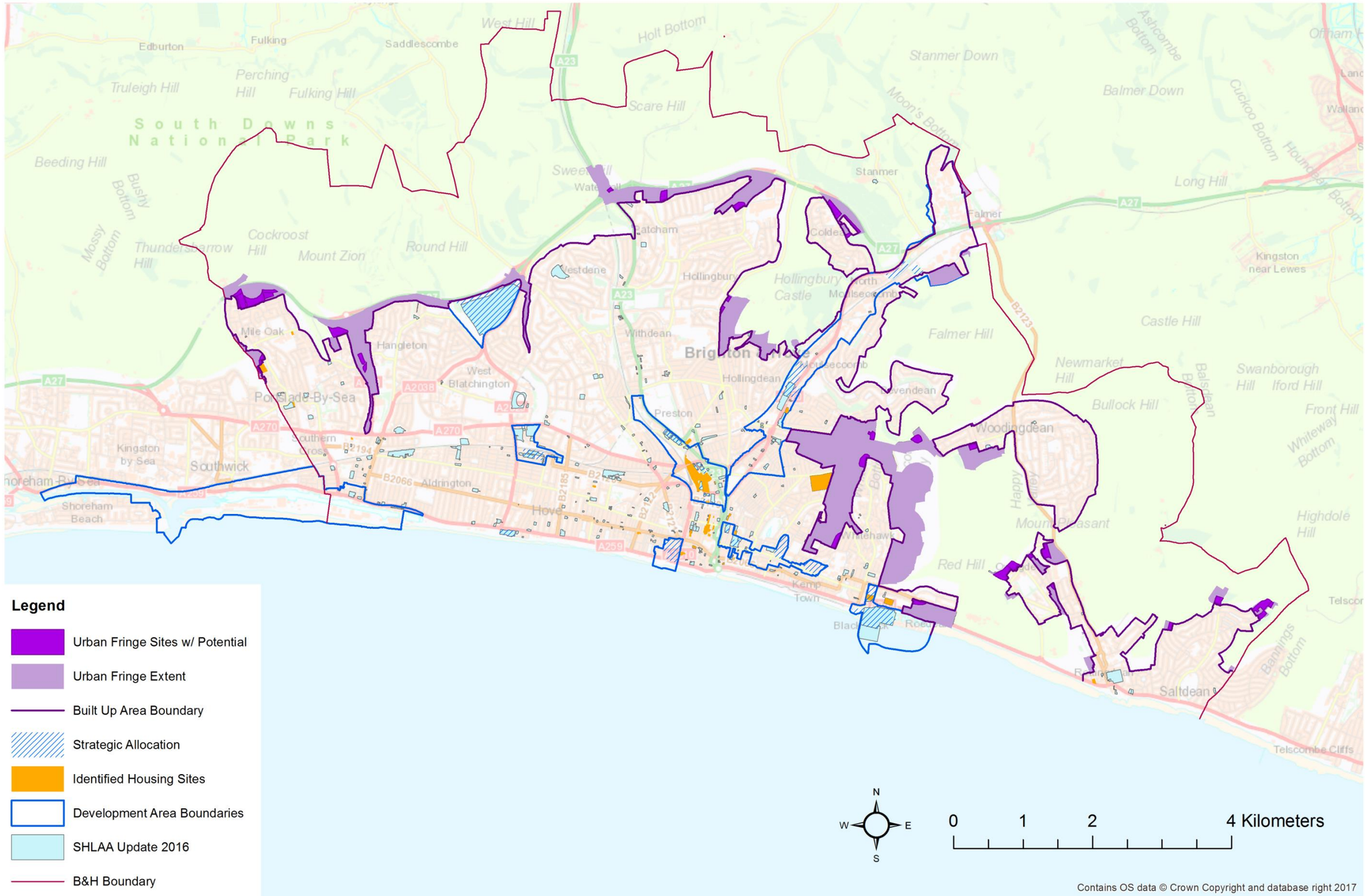


Figure 32. Designated industrial sites

5.5 Community-led delivery of LZC energy systems

This study has identified significant opportunities to deliver low and zero carbon energy generation within Brighton and Hove. There are limitations on the policy requirements that can be placed on developers or building owners but there are other parties, in the form of community groups and local energy co-ops, who may be able to provide the funding to deliver LZC projects.

Based on discussions with BHCC, we understand that there is a strong local appetite for this within Brighton and Hove which could be taken into account in developing renewable energy-related policy within CPP2.

Several recent local development plans in the UK have included wording related to community energy schemes.[47] These are typically contained within broader policies on renewable energy and/or sustainable development rather than as standalone policies, as shown in the extracts below.

North Tyneside Metropolitan Borough Council Local Plan (Jul 2017)[48]

> *Policy DM7.6: Renewable Energy and Low-Carbon Technologies*
> *The Council will encourage the local production of energy from renewable and low carbon sources to help to reduce carbon emissions. The Council will also encourage and support community energy schemes that reduce, manage and generate energy to bring benefits to the local community.*

Central Lincolnshire Local Plan (April 2017)[49]

> *Policy LP19: Renewable Energy Proposals – Proposals for non-wind renewable energy development*
> *[…] Renewable energy proposals which will directly benefit a local community, have the support of the local community and / or are targeted at residents experiencing fuel poverty, will be particularly supported.*

Derby City Council Core Strategy (January 2017)[50]

> *Policy CP2: Responding to Climate Change*
> *The Council will […] encourage the use of renewable and decentralised forms of energy provided that the public benefits of implementing the renewable energy outweigh any adverse impacts on the natural, built or historic environment and do not inhibit the ability of other strategic objectives of the Plan from being realised. Micro-generation and community led renewable energy and heat generation schemes will be welcomed.*

Carlisle District Local Plan 2015-2030 (November 2016)[51]

> *Policy CC3: Energy Conservation, Efficiency and Resilience*
> *[…] Proposals for renewable, low carbon or decentralised energy schemes will be supported provided they do not result in unacceptable harm which cannot be successfully mitigated. This includes support for community led renewable energy schemes.*

[47] Status updates relating to Local Plans are available to download in spreadsheet form at https://www.gov.uk/guidance/local-plans. The document was accessed on 18/12/17 and filtered to include only those plans which were both published in draft form and approved after the 2015 release of the Housing Standards Review.

[48] http://my.northtyneside.gov.uk/sites/default/files/web-page-related-files/local_plan_0.pdf

[49] https://www.n-kesteven.gov.uk/central-lincolnshire/

[50] http://www.derby.gov.uk/media/derbycitycouncil/contentassets/documents/policiesandguidance/planning/Core%20Strategy_ADOPTED_DEC%202016_V3_WEB.pdf

[51] http://www.carlisle.gov.uk/planning-policy/Adopted-Plans/Carlisle-District-Local-Plan-2015-2030

5.6 Opportunities for improving the energy efficiency of the building stock

Ideas for improving the energy efficiency of new and existing buildings within the city were discussed at the preliminary workshop on 3rd November 2017.

These included:

- Requiring a minimum EPC rating for new development falling outside policy CP8;
- Requiring consequential improvements for existing buildings where these are undergoing major extensions or alterations.

5.6.1 Minimum EPC ratings

There are a number of developments that could fall outside the minimum requirements of the targets set by paragraph 1 of CCP1 policy CP8, these include:

- Small non-domestic development
- Conversions (e.g. non-domestic building being converted into domestic use)

One option that could be used to capture these developments and ensure that all new development in the city achieves a good standard of energy efficiency would be to mandate specific EPC ratings.

There is precedent for this in recent Government policy. The Minimum Energy Efficiency Standards (MEES) requires all buildings being sold or rented to achieve a minimum EPC rating of 'E' from April 2018 and the recently published UK Clean Growth Strategy has set out a timetable for the improvement of the building stock to achieve a minimum EPC of 'C' by 2030 (for fuel poor and privately rented homes) and 2035 for other properties. As such, a policy ensuring that new buildings in the city are designed to achieve good EPC ratings from the outset will ensure that they meet these requirements.

The details of the EPC ratings for the existing and new domestic and non-domestic buildings in the city provide a guide to the levels currently being achieved.

5.6.2 Consequential Improvements

A consequential improvements policy could be used to support the improvement in energy efficiency of the existing building stock. This would require all proposals for significant alterations or extensions, where the building owner is required to obtain planning permission, to meet a specific standard of energy efficiency in the property as part of the conditions to receiving permissions for the alteration or extension.

During discussions it was thought that this policy would be difficult to implement and therefore it was decided not to take this forward. This was because in many cases alterations and extensions are permitted development, not requiring planning permission. Whilst the policy would help raise the performance of housing in the city, implementing such a policy may create uneven policy application across the city.

5.7 Opportunities to further support sustainable design and construction

The current policy CP8 includes requirements for BREEAM assessments in major new non-domestic development and the consideration of a number of sustainable design and construction measures. However, with the removal of the Code for Sustainable Homes (CSH) the simple, externally audited assessment and certification process is no longer available to developers or the planning authority to assess the sustainability credentials of new dwellings.

Several ideas were discussed at the preliminary workshop on 3rd November 2017 to address this. These included:

- Requiring large mixed use schemes to achieve BREEAM Communities certification;

- Requiring non-domestic buildings being converted into domestic use to achieve BREEAM Domestic Refurbishment certification; and
- Reviewing the BHCC Sustainability Checklist[52] in order to identify any gaps or ways in which it could be strengthened.

This section of the report provides some initial thoughts on the benefits and drawbacks of these approaches, along with policy context and sample wording where relevant.

5.7.1 BREEAM Communities

BREEAM Communities is suitable for larger developments (comprised of multiple buildings and a mixture of building types), including new area masterplans and regeneration projects. It provides a framework for embedding sustainability into the masterplanning process from the outset of a project. The assessment is carried out in phases, with schemes assessed at the early design and planning stages prior to receiving final certification.

Key advantages include:

- BREEAM Communities prompts designers and stakeholders to consider sustainability issues from the outset of a large-scale project. This, in principle, makes it easier for the project to achieve higher BREEAM ratings at the final stage.
- It is intended to integrate well with the planning process. Anecdotally, it has been said to facilitate the planners' work in assessing the sustainability of a scheme due to the use of a standardised system.
- It includes targets for specific buildings within the scheme to achieve a certain BREEAM rating and therefore would not conflict with Policy CP8.

Although, in principle, BREEAM Communities is suitable for any development, it is considered most appropriate for larger-scale developments (e.g. 200+ units) due to the relative complexity and cost implications of achieving credits.

Uptake in the UK has been very low in comparison with most other BREEAM assessment schemes. Data published to www.greenbooklive.com suggests that there have been just 10 final-stage certificates issued in the UK since 2008. This means that it may be more difficult to communicate the benefits of BREEAM Communities; there is little available information about the cost uplift and a lack of clear evidence or case studies showing that it will help to improve a developer's brand. (It is acknowledged that this is a feedback loop.)

One of the key practical challenges is that larger sites are frequently developed to outline planning stage and then sold off to different developers; it can be difficult to follow through with assessments when responsibility for the design is handed over.

If BHCC wishes to include a reference to BREEAM Communities in CPP2, there are several options available:

1 Encourage the use of BREEAM Communities without specific targets or requirements;

2 Set different targets or requirements, e.g. on a site-specific basis; or

3 Set the same target for all large-scale developments.

In regards to the first option, given the low uptake in the UK it is considered likely that developers would not choose to seek certification if it was presented as optional.

It may be desirable to set a BREEAM Communities target for specific sites within CPP2 (the second option) and those to which the same threshold would apply in CPP1) – although note that there are likely to be mainly housing sites and no more than 6 strategic allocations which might meet the medium/ large definition.

Also note that there is uncertainty regarding the way that sustainability will be addressed in future

[52] http://www.brighton-hove.gov.uk/content/planning/planning-applications/sustainability-checklist

Building Regulations and national policy. If changes are introduced by Government, specific BREEAM targets in CPP2 could be superseded. This is of particular concern for very large sites, given the timescales involved in planning and development. A better approach might be to include information about BREEAM assessment schemes in the form of technical guidance or a supplementary planning document, which could be updated more easily.

Our research so far has found one example of a local authority taking the third approach. Bristol City Council requires all 'super major' developments to undertake a BREEAM Communities assessment and achieve a rating of 'Excellent'. The following is an extract from Policy BCS15 of the Bristol City *Core Strategy* (adopted 2011) [emphasis added]:

> *Sustainable design and construction will be integral to new development in Bristol […] For major development and development for health or education uses, the Sustainability Statement should include a BREEAM and/or Code for Sustainable Homes assessment.* ***Additionally, in the case of a super-major development, a BREEAM for Communities assessment will be required.***
> *From 2016 residential development will be expected to meet Level 6 of the Code for Sustainable Homes.* ***For non-residential development, also from 2016, a BREEAM "Excellent" rating will be expected.***

The Bristol *Core Strategy* defines a 'super-major' development as those comprising 100+ dwellings or exceeding 10,000 m^2 of other floorspace. To date, there has only been one interim BREEAM Communities certificate issued in Bristol; it is not known whether this reflects a low number of super-major sites, low uptake of the scheme, or is a function of the development timescales or other factors.

As shown in Figure 33 below, the majority (8/10) of BREEAM Communities schemes in the UK (post-2008) have received an 'Excellent' or 'Outstanding' rating.[53] It is worth noting that the sample size is small, and therefore it is not clear that such ratings would be feasible for the majority of schemes in Brighton and Hove. On the other hand, setting targets by exception (i.e. 'achieve an "Excellent" rating unless it is shown not to be feasible') can be useful as a means of pushing developers towards improving environmental performance overall.

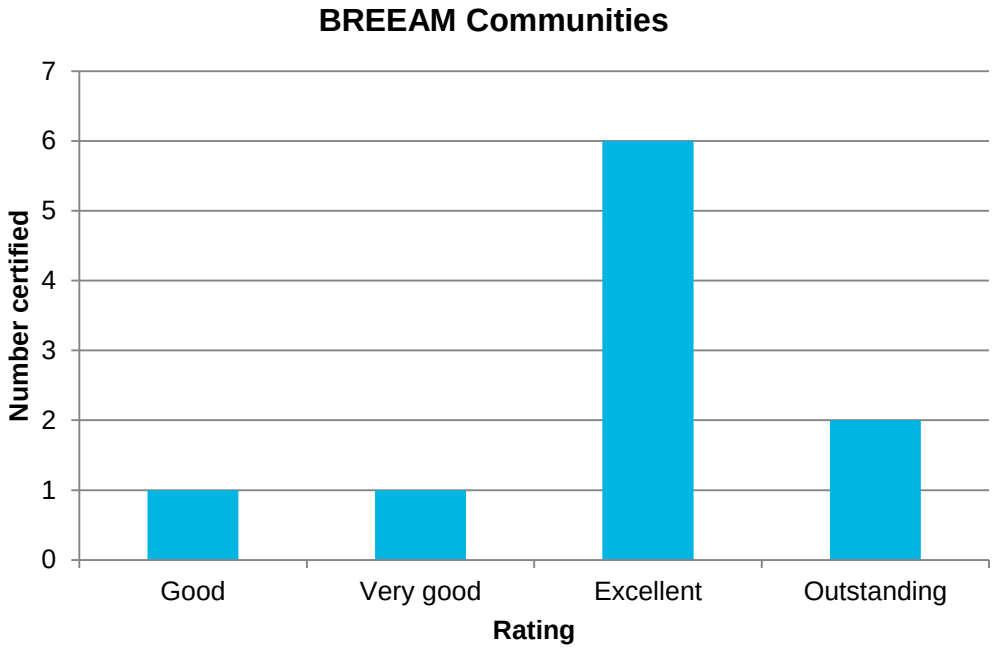


Figure 33: Number of BREEAM Communities certifications in the UK since 2008.[1]

At present, BREEAM Communities is rarely applied in the UK, but it might be appropriate for specific sites where there is a particularly large amount of new development planned, and/or greenfield sites

[53] Source: www.greenbooklive.com

where there are greater opportunities to deliver high levels of performance. To give an example, DA7 Toads Hole Valley would meet this definition though the CPP1 policy and SPD are already adopted for this site and therefore to require this through a CPP2 policy to this site may be difficult.

5.7.2 BREEAM Domestic Refurbishment

BREEAM Domestic Refurbishment replaced the Ecohomes assessment scheme in 2012. It is applicable to existing domestic buildings undergoing refurbishment, as well as change of use developments. The scheme offers some flexibility in the method of assessment, e.g. providing a different route to certification for smaller projects (<£100K or <5 dwellings), and giving consideration to developments in conservation areas and/or listed buildings.

Key advantages include:

- There is currently a loophole in CP8 with regards to existing residential buildings; BREEAM Domestic Refurbishment would close this loophole.
- Rather than setting a single target for energy or CO_2 emissions, the scheme awards energy credits by:
  - accounting for improvements in energy efficiency;
  - measuring energy performance against a set of benchmarks, with minimum standards differing for listed buildings or those in conservation areas; and
  - assessing the energy use per m^2 of the property.

  In other words, the scheme takes into account the original and improved performance of the building and awards credits accordingly. This is a more tailored approach than is offered by UK Building Regulations.

There have been several hundred BREEAM Domestic Refurbishment projects certified in the UK since 2008.[1] Based on AECOM's experience, it is often feasible for developments to achieve an 'Excellent' rating provided that sustainability is integrated into the design process from the outset.

Assessments are often carried out in response to specific planning requirements. A review of local development plans submitted and approved since the Housing Standards Review was published in 2015 indicates that, where BREEAM assessments are required, the policy wording often does not specify *which* BREEAM assessment scheme should be applied. An exception is the London Borough of Camden *Local Plan* (July 2017)[54] which includes the following text:

> Policy CC2: Adapting to Climate Change – Sustainable Design and Construction Measures
>
> *The Council will promote and measure sustainable design and construction by […] encouraging conversions and extensions of 500 sqm of residential floorspace or above or five or more dwellings to achieve "excellent" in BREEAM domestic refurbishment.*

In some local authorities with less recent local development plans, the requirement to undertake a BREEAM Domestic Refurbishment assessment was introduced as a result of older Ecohomes policies being withdrawn. One example is provided in the London Borough of Richmond upon Thames *Core Strategy* (April 2009)[55] extracted below:

> Policy CP1: Sustainable Development
>
> *[…] Development will be required to conform to the Sustainable Construction checklist, including the requirement to meet the Code for Sustainable Homes level 3 (for new homes), Ecohomes "excellent" (for conversions) or BREEAM "excellent" (for other types of development). This requirement will be adjusted in future years through subsequent DPDs, to take into account the then prevailing standards in the Code for Sustainable Homes and any other National Guidance, and ensure that these standards are met or exceeded.*

[54] https://www.camden.gov.uk/ccm/navigation/environment/planning-and-built-environment/planning-policy/local-development-framework/
[55] http://consult.richmond.gov.uk/portal/planning_policy/core_strategy/acs?pointId=d1494703e394#section-d1494703e394

The Richmond upon Thames planning website[56] contains the following supplementary information:

> *For conversions, Core Strategy Policy CP1 continues to apply; note that the reference to Ecohomes 'Excellent' (for conversions) was superseded by the BREEAM Domestic Refurbishment scheme in 2012. Therefore,* ***as BREEAM ratings were unaffected by the Government Housing Standards Review changes, conversions (where relevant) are expected to meet BREEAM Domestic Refurbishment 'Excellent' rating.***

As noted in the previous section, it may be preferable to include references to BREEAM Domestic Refurbishment in a supplementary planning document as an example of good practice which is encouraged. This would avoid having to update the main policy in the event that it is modified or superseded. The London Borough of Wandsworth *Local Plan - Core Strategy* (adopted March 2016) includes the following wording which addresses this prospect:

> *BREEAM assessments for non-residential development may be replaced by national standards for non-domestic buildings in the future. I****n all cases where assessment methods are changes or superseded, the appropriate replacement standards will be used.***

5.7.3 BHCC Sustainability Checklist

The Sustainability Checklist coves a comprehensive range of topics and could therefore provide a valuable resource for developers and applicants. There are several ways in which its impact could be maximised and some suggestions are provided below:

- Promote the Checklist as more of a design guide than a tick-box exercise. For instance:
  - Allow users to view the whole document at once (e.g. as a downloadable PDF or single web page);
  - Allow users to view the document without entering contact or project details; or
  - Move the links to additional information to the top of each section rather than keeping them at the bottom.
- Bring cross-references to policy wording 'front and centre' in order to emphasize that sustainability is a requirement, not an option.

This approach might passively encourage developers and designers to consider more sustainable options without the need for additional policy wording.

An example of a checklist that doubles as design guidance can be found in the *'Building Futures: Sustainable Design Toolkit'* which has been used by authorities in Hertfordshire.[57]

[56] https://www.richmond.gov.uk/sustainable_construction_checklist
[57] https://www.hertfordshire.gov.uk/microsites/building-futures/a-sustainable-design-toolkit/toolkit-pdfs.aspx

6. Conclusions

6.1 Policy position

6.1.1 Current policy in CPP1

Policy CP8 in City Plan Part 1 provides a strong basis for the delivery of good performance with regards to energy and sustainability in new development in Brighton and Hove. However, there are a number of gaps in policy CP8 which mean that some development does not meet the required standards with respect to energy and sustainability. These occur for specific types of residential and non-residential development in the following cases:

- Residential development:
    - The 19% carbon reduction target against Part L 2013 and 105l/p/d water consumption target only applies to new residential development and therefore residential conversions and changes of use do not have specific targets.
- Non-residential development
    - There is no specific energy or CO_2 reduction target. The BREEAM 'Very Good' requirement does not mandate any specific energy performance, although the 'Excellent' rating does require a minimum of 4 credits under Ene01 which represents an improvement on the minimum required by Building Regulations Part L (although it uses a different calculation methodology).
    - The BREEAM targets only apply to retail developments over 150sqm and other non-residential development over 235sqm so developments under these sizes do not need to comply.

In addition to the above gaps, we note the following:

- Policy CP8 states that, *'Technical guidance and clarification will be produced to help planning applicants address this policy,'* but no such document has been produced at the time of writing.
- There is limited information and evidence on the actual delivery and operation of the energy and sustainability measures proposed in planning applications to comply with policy CP8, although this is partly due to the limitations on the planning body.
- Policy CP8 sets out standards for all applicable development within Brighton and Hove, but there are a number of locations where higher levels of energy and sustainability performance, particularly the delivery of renewable energy, could be delivered and there is currently no mechanism to require or encourage this.

The analysis presented in this report provides ideas on approaches to address these policy gaps and lists some alternative options for strengthening overall requirements on energy and sustainability.

Although there are limitations to what can be required by policy due to the rulings in the Housing Standards Review, delivering greater levels of energy efficiency and decentralised, low and zero carbon energy generation should be at least encouraged.

On this basis, we feel that CPP2 should seek to strengthen and enhance existing policy CP8 in the following ways:

- Address gaps in the policy to ensure that all development in Brighton and Hove is delivered to high standards of energy and sustainability performance, this includes:
    - Making the 19% CO_2 improvement target applicable to all new developments;
    - Adopting a minimum EPC standards to building types not covered by Building Regulations Part L1A/2A (such as residential conversions and changes of use);

- Encourage or require higher performance in specific areas where either greater opportunities exist or where there is greater need for the mitigation of environmental impacts;
- Provide more support to developers on how to achieve and demonstrate compliance through clear guidance; and
- Ensure proposed energy and sustainability measures are delivered and realise the benefits for future residents and the wider community for example through the requirement to achieve minimum EPC ratings on completion.

6.1.2 Changes to the legislative landscape since the publication of CPP1

Since the adoption of CPP1 in March 2016 there have been a number of significant policy developments that have strengthened the need to address energy and sustainability in new development. These developments are discussed in Section 2 of this report.

In particular, the Clean Growth Strategy has set out a strategy for delivering economic growth while also reducing CO_2 emissions. This includes action on the following areas:

- Improving energy efficiency of new and existing buildings (including a target to deliver EPC ratings of C in as many homes as possible by 2030/2035);
- Supporting the uptake of low carbon heating technologies to deliver decarbonisation of heat, which will require replacing existing gas-boilers in all existing buildings with either heat networks, electric heating technology or alternative systems running off zero-carbon fuels delivered over the exiting gas network;
- Increasing the delivery of clean, smart and flexible power; and
- Accelerating the shift to electric vehicles which could result in significant increases in power demand in urban areas.

New development in Brighton and Hove will need to support these objectives and ensure that new buildings are designed to be future-proofed against these changes to the national energy system. In practical terms, this means that all new development will need to incorporate of high standards of fabric performance and energy efficiency as well as the installation of smart, decentralised, low and zero carbon energy technologies.

6.2 Baseline assessment

6.2.1 Current energy demands and CO_2 emissions in Brighton and Hove

National energy data has been used to understand the baseline of energy consumption and CO_2 emissions by sector and fuel type within Brighton and Hove.

The data shows that the highest energy demands and CO_2 emissions are in the domestic sector and in terms of fuel the highest demand is for gas. Since gas use in domestic properties is primarily for heating, this suggests that the greatest opportunities for reducing energy use and CO_2 emissions in Brighton and Hove are likely to come from improving the fabric performance and heating systems of the existing housing stock. For the new development proposed in CPP2 it demonstrates the importance of delivering high standards of energy efficiency and the correct selection of heating technology.

Industrial and commercial energy use and CO_2 emissions are primarily derived from the consumption of electricity. This suggests that the most significant opportunities in this sector are likely to be achieved by improving the efficiency of lighting, heating, ventilation and air-conditioning systems and controls as well as on-site low carbon power generation.

Road transport, which is currently almost entirely based on the use of petroleum, is also a significant source of energy use and CO_2 emissions in the city. Improvements in this sector are likely to result mainly from the gradual improvement in vehicle efficiency and the increased uptake of hybrid and electric vehicles.

The energy demands and CO_2 emissions have also been mapped to show the density of demand in different locations across the city.

6.2.2 Current energy efficiency of buildings in Brighton and Hove

The national Energy Performance Certificate (EPC) database has been used to understand the current energy performance of the existing building stock within Brighton and Hove.

The database shows that in terms of EPCs carried out on existing domestic properties, 74% are currently achieving a rating of D or above. The 'potential' ratings, which provide the rating that could be achieved following some relatively straightforward energy efficiency measures, show that 73% of properties could be upgraded to a C rating. Given the importance of the existing domestic stock to the energy demands and CO_2 emissions in the city, this is an encouraging sign that future improvement is possible.

For newly constructed domestic properties in the city, the database shows that 91% have achieved an EPC rating of C and 68% have achieved an EPC rating of B. As previously noted, in order to mitigate the impacts associated with the new development proposed in CPP2, higher standards of energy efficiency will be required in newly constructed dwellings.

In regards to non-domestic buildings, the database shows a greater range of performance, with only 57% of existing non-domestic buildings achieving an EPC rating of D or above. This suggests that significant improvement is required in this sector. The MEES policy, which comes into effect on 1st April 2018 and requires eligible buildings to achieve an EPC rating of E or above before they are sold or rented, may have an impact on these results. The Clean Growth Strategy includes an ambition for all buildings to be C rated by 2030/2035.

For new non-domestic buildings, the data shows that 78% achieve an EPC rating of B or better, which provides a source of encouragement for the future performance of the non-domestic stock.

6.3 Potential impacts of proposed development

The analysis in Section 4 discusses the potential impacts of proposed development on the energy consumption and CO_2 emissions in Brighton and Hove. This analysis demonstrates that, on current business as usual assumptions, the proposed new development would increase both energy consumption and CO_2 emissions. This would therefore need to be mitigated through good design, including the use of energy efficiency and incorporation of decentralised, low and zero carbon energy technologies.

The discussions also highlights the potential impacts of other future changes to the national energy system, including the decarbonisation of heating, greater energy efficiency, electric vehicles, smart metering and control systems and more decentralised energy generation and storage. It is anticipated that some of these changes will be significant and may take place in the near future, with implications for the design of buildings and local utility infrastructure.

Although predicting these changes is highly complex, given the levels of uncertainty and the multiple interactions surrounding each of them, buildings that are designed to greater levels of energy efficiency, and with integrated low carbon energy systems and smart controls, will be much better adapted to these future changes.

6.4 Opportunities

The analysis in Section 5 identified a number of opportunities for improving the delivery of energy and sustainability measures through CPP2, as follows:

- Increasing the generation of energy from decentralised, low and zero carbon technologies;
- Supporting the delivery of heat networks;
- Recognition of opportunities for community-led energy projects

- Setting additional sustainability targets in locations where there is greater potential or greater need to achieve high environmental performance;
- Improving the energy efficiency of the building stock; and
- Supporting higher standards of sustainable design and construction.

6.4.1 Increasing the generation of energy from decentralised, low and zero carbon technologies

Building Regulation 25A requires all new developments to assess the potential to incorporate low and zero carbon energy technologies. The analysis presented in section 5.2 provides a guide to the opportunities and constraints for delivering these technologies across the city, with particular focus given to the eight development areas.

This analysis clearly shows that there are opportunities across the city for delivering decentralised, low and zero carbon energy technologies within new development. Although some sites are in locations where the use of specific technologies may require considerations and have implications for the design of buildings, there are several technology options available to developers and through careful design any constraints can be mitigated.

The analysis also shows that there are specific locations across the city where higher levels of decentralised, low and zero carbon energy technologies could be delivered. To ensure that the UK meets its commitment to deliver an 80% reduction in CO_2 emissions by 2050 means that such opportunities should be taken. The NPPF supports the and recent Government Policy

6.4.2 Supporting the delivery of heat networks

BHCC has carried out a number of studies to identify the opportunity for delivering heat networks within Brighton and Hove. The Renewable and Sustainable Energy Study (2013) carried out a high-level assessment and identified a total of 14 Heat Network Opportunity Areas. Further studies, supported by the Department of Business, Energy and Industrial Strategy (BEIS) have carried out more detailed investigations into the technical feasibility and financial viability of some of these opportunities.

New development in locations within or near to the heat network opportunity areas should be required to consider designing heating systems to ensure that they can connect to these networks, either upon delivery (if the network is operational) or in the future. The viability of heat networks depends upon the scale of the heat demand they serve so new developments can play an important role in helping to deliver heat networks by providing loads that can be easily connected.

In practice designing buildings to enable connection is relatively straightforward to achieve. For non-domestic buildings this simply requires consideration of the location of the plant room and access for external pipework, space within the plant room for a heat exchanger, connections on the flow and return pipework and a consideration of the internal heating system and controls. For residential developments, where this is most likely to apply to large blocks of flats, it would require a communal heating system to be installed and for the space heating system within the dwellings to be designed for lower temperatures of operation (using larger radiators or underfloor heating) and variable volume control.

Further detailed information on these measures can be found in published guidance such as the CIBSE/ADE Heat Networks Code of Practice[58] and the London Heat Network Manual[59]

6.4.3 Setting higher targets for specific types of sites

This study has shown that there are locations within Brighton and Hove that could be expected to deliver higher levels of CO_2 emission reduction, either because there are more opportunities in the design of the development to deliver higher levels of savings (through passive design, fabric and

[58] https://www.cibse.org/knowledge/knowledge-items/detail?id=a0q200000090MYHAA2
[59] https://www.london.gov.uk/sites/default/files/london_heat_map_manual_2014.pdf

energy efficiency measures or the installation of LZCs) or because the character of the locations require a greater effort to reduce environmental impacts.

The locations identified on this basis are as follows:

- Development sites located within CPP1 development areas
- Development sites located within allocations in the urban fringe
- Development sites located within a designated site of nature conservation/geodiversity importance (either allocated sites or where proposal meet the tests of SA4, CP10 in CPP1 and emerging draft CPP2 Policy on Green Infrastructure and Nature Conservation) or which could impact on a designated site.
- Development sites located within identified industrial areas.

We believe that to maximise the installation of clean energy technology in BHCC, development in these locations should be encouraged to deliver higher CO_2 reductions through the application of LZCs, beyond the minimum target set for all development within BHCC.

This could either be achieved by working with developers in these locations to maximise the potential of the sites or by defining Low Carbon Opportunity Zones and specifying the process that needs to be undertaken to demonstrate that the additional opportunities in these areas have been explored and delivered where feasible.

6.4.4 Improving the energy efficiency of the building stock

The analysis presented in Section 3.3 on the EPCs for buildings within Brighton and Hove provides details of the energy efficiency standards of the building stock in the city. Given the importance of addressing energy consumption from domestic and non-domestic buildings, opportunities to improve the performance of existing and new developments should be taken. This could be achieved by introducing minimum standards on EPC ratings for existing and new buildings that come through the planning system.

6.4.5 Supporting higher standards of sustainable design and construction

Policy CP8 includes a target for new non-domestic development to achieve BREEAM standards. This requires non-major projects to achieve a 'Very Good' rating and major developments to achieve an 'Excellent' rating. Although CP8 also sets out some requirements for domestic new build developments, with the removal of the Code for Sustainable Homes there is no longer an audited assessment process in place for other domestic developments including conversions.

This study has considered opportunities to supplement the requirements of CP8 by applying BREEAM assessments under the following circumstances:

- BREEAM Communities for major mixed-use developments – to ensure that, where large amounts of development takes place, sustainability is integrated into the design from the outset and rigorously audited; and
- BREEAM Domestic Refurbishment for change of use and conversions – as these are not presently covered by Policy CP8.

By including specific BREEAM requirements within policy wording of CPP2, there is a risk that the policy would become outdated in the event of the scheme being modified or superseded. Providing further technical guidance on specific sustainability issues, in a format separate to CPP2 (and as described in CPP1 Policy CP8) could offer greater flexibility for BHCC to request that developers consider specific measures without incurring this risk. On the other hand, for particularly large and complex schemes or those that fall into the loopholes in CP8, it may be desirable to follow an established auditing and external assessment process.

At present, BREEAM Communities is rarely applied in the UK, but it might be appropriate for specific sites where there is a particularly large amount of new development planned, and/or greenfield sites

where there are greater opportunities to deliver high levels of performance. To give an example, DA7 Toads Hole Valley would meet this definition.

BREEAM Domestic Refurbishment is more common in the UK but opportunities for refurbishment schemes may be harder to predict and therefore it may be more appropriate to consider on a case-by-case basis.

On the whole, it is our view that references to BREEAM may be most appropriate for inclusion in a supplementary technical guidance document or SPG, as this would provide more flexibility and scope for updates as needed.

7. Recommendations for City Plan Part 2

7.1 Overview

On the basis of the analysis conducted as part of this study and the conclusions set out in the previous section, we propose that the following recommendations should be considered for City Plan Part 2 (CPP2) in regards to energy and sustainability:

1. **Extend the minimum CO_2 reduction target to apply to all developments and consider a trajectory for greater reductions in the future**
2. **Set a minimum target for fabric and energy efficiency performance**
3. **Require all developments to provide details of the low and zero carbon energy technologies installed and the estimated reduction in CO_2 emissions these will deliver**
4. **Encourage higher performance in developments taking place in areas with greater potential for the application of LZCs or where impacts to the local environment are greater and consider establishing low carbon zones**
5. **Include a requirement for all developments to complete an energy statement to demonstrate compliance with the relevant policies**
6. **Include a requirement for all developments to achieve a minimum EPC rating prior to starting onsite and on completion**
7. **Include a requirement for all suitable developments in heat network opportunity areas to incorporate the necessary infrastructure to enable future connection**
8. **Consider establishing a carbon offset scheme to enable developments that cannot meet the carbon reduction policy on-site to achieve compliance**
9. **Encourage developers to work with community groups to deliver energy projects as part of new developments**
10. **Consider expanding the BREEAM target to cover other development types**
11. **Consider strengthening the sustainable design and construction requirements**
12. **Produce a technical guidance to support developers in complying with the policy requirements**

The following pages set out our proposed approach for each of these recommendations and include the following information:

- **Basis of the proposed approach** – provides the aims and justification for the recommendation being made.
- **Proposed approach** – sets out the way in which we suggest that the recommendations are delivered, including potential policy wording where relevant.
- **Evidence base** – provides details of the evidence to support the recommendation, either based on work presented in this study or existing local/national data or policies, to support the approach being proposed.
- **Viability** – provides references to sources of data that can be used to support a viability assessment of the proposed approach.
- **Implications for implementation and compliance** – provides details of how the requirement might be discharged by developers and how it can be assessed by planners.

7.2 Recommendation 1: Extend the minimum CO_2 reduction target to apply to all developments and consider a trajectory for greater reductions in the future

Basis

Currently, the minimum 19% CO_2 reduction target required by policy CP8 applies to developments of new residential dwellings only. A mandatory carbon reduction is required to achieve BREEAM Excellent rating but there is no mandatory carbon reduction target required for the BREEAM Very Good rating. Other development types may also fall outside this requirement.

To mitigate carbon emissions associated with all new development within BHCC and meet local and national policy objectives with respect to the reduction of CO_2 emissions, there should be a minimum requirement that applies to all types of development. Also, in order to meet the national and local carbon reduction targets, greater CO_2 emission reductions will need to be delivered in the future so the Council should consider how this target can increase in the future.

Proposed approach

We recommend including a new DPD policy within CPP2 (enhancing policy CP8 Sustainable Buildings in CPP1) to expand the existing 19% CO_2 reduction target in policy CP8 to cover all new development within the city. The following wording is suggested:

All new development is required to achieve <u>at least</u> a 19% improvement in the carbon emission targets set by Part L 2013.

A footnote should be included at the end of this wording with a link to a statement that the Council reserves the right to amend this target if there are changes to Part L of the Building Regulations or the approved calculation methodology.

The Council will need to consider the options for increasing this target in the future, potentially using a trajectory to deliver an end-point of very low/zero emissions in all new buildings. This will need to respect proposed changes to national policy and future building regulations and will require more detailed technical analysis and financial viability testing to develop.

Evidence base and viability

The analysis presented in this report has demonstrated the importance of mitigating the additional impacts on energy demands and CO_2 emissions associated with the proposed new development in the city.

This proposal supports and enhances the existing policy CP8 so there should be no change to the viability associated with this policy for residential development. The evidence of previous compliance with the 19% improvement target also provides support for this policy. For most non-domestic building types it should be relatively straightforward to achieve this target with minimal additional costs. For owner occupiers, there would be a significant incentive from reduced lifecycle costs (due to savings in energy bills and revenues from incentive schemes), for developers looking to sell or rent the buildings, the incentive would be the improved rentability.

If a developer can demonstrate that there is a technical or financial reason why this target cannot be achieved then they would be expected to deliver as close to this target as possible. If a carbon offset scheme is set up (see recommendation 8) then this could be applied to the residual CO_2 emissions to enable the development to achieve compliance. An offset scheme would also support future targets towards very low/zero emissions.

Implications for implementation and compliance

Developers should be required to clearly demonstrate the performance of the development by providing the details (and relevant evidence) of the estimated DERs/BERs and TERs (based on sample modelling) in the energy statement accompanying the planning application. Prior to start on site the relevant ‘Design Final’ SAP/SBEM outputs should be requested to demonstrate this and prior to practical completion the ‘As-Built Final’ outputs should be requested. In the case of blocks of flats or terraced housing, block averaging can be used and in the case of larger developments area-weighted figures may be more appropriate.

For BHCC, the proposed approach will require resource within the planning department to undertake the compliance checking and monitoring. However, this could be mitigated with clear guidance to developers to standardise the data and evidence submitted as part of the planning application, start on site and practical completion.

For developers, the proposed approach will require additional details to demonstrate compliance but again, this would be mitigated by providing the suggested technical guidance on the expectations for the approach to compliance and submissions for planning and building control.

7.3 Recommendation 2: Set a minimum target for fabric and energy efficiency performance

Basis

Fabric and energy efficiency measures are the most effective way to reduce energy demands, CO_2 emissions and costs for occupant of new buildings. These benefits are also more reliable as they are less reliant on the long-term operation and maintenance of equipment.

Ensuring that all new development meets good minimum standard in regards to the performance of the fabric and building services will ensure that all buildings require less energy to run and deliver environmental and financial benefits to the end users and wider community during their lifetime.

Proposed approach

All development should be required to meet a minimum level of fabric and energy efficiency. We would recommend adding wording to the new DPD policy proposed in Recommendation 1 to require this. We would suggest something similar to the following wording:

To ensure a high standard of fabric and energy efficiency performance all new development will be expected to exceed the carbon emission targets set by Part L 2013 through fabric and energy efficiency measures alone. The 19% CO_2 improvement target should then be achieved through further fabric and energy efficiency and/or the use of decentralised, low and zero carbon energy technologies.

Evidence base and viability

The analysis presented in this report has demonstrated the importance of mitigating the additional impacts on energy demands and CO_2 emissions associated with the proposed new development in Brighton and Hove.

It is assumed that, as the suggestions here are supporting the existing policy CP8, there should be no change to the viability associated with this policy. The evidenced of previous compliance with the 19% improvement target provide support for this policy.

The viability of this policy is also supported by the viability assessments associated with Building Regulations Part L (2013). The targets set in Part L have been devised in a way that it is possible to deliver compliance through reasonable fabric and energy efficiency measures alone. In the case of residential dwellings, the technical appendix for SAP (the approved calculation methodology), sets out a detailed recipe for delivering compliance, referred to as the 'Reference Values'[60]. Similarly, in the case of non-domestic buildings the notional building performance provides a guide to the specification required to achieve compliance.

Implications for Implementation and Compliance

Developers should be required to provide separate details (and relevant evidence) of the estimated DERs/BERs at planning for the proposed development assuming a base case heating system of individual/communal gas boilers and no onsite LZCs in order to demonstrate the performance, relative to the TER, for the fabric and energy efficiency measures alone.

As with the previous recommendation, for the Council this approach is likely to require some additional resource within the planning department to undertake the necessary compliance checking and monitoring and would require developers to provide additional details to demonstrate compliance, both of which could be mitigated by providing the suggested technical guidance to show how compliance can be achieved and help to standardise the reporting.

[60] See Appendix R page 108 of https://www.bre.co.uk/filelibrary/SAP/2012/SAP-2012_9-92.pdf

7.4 Recommendation 3: Require all development to provide details of the low and zero carbon energy technologies installed and the estimated reduction in CO_2 emissions these will deliver

Basis

BHCC is seeking to maximise the delivery of low and zero carbon (LZC) energy technologies associated with new development in the city. It is anticipated that developers will use LZCs to meet the CO_2 reduction and BREEAM targets. Understanding what has been proposed will be important to support the Council in recording the types of technologies used and the scale of installations within Brighton and Hove.

These records will help to verify the installation of the proposed systems and will also be important for supporting higher targets in the future by providing evidence of what has been achieved on delivered schemes.

Proposed approach

All development should be required to provide specific details of the low and zero carbon energy technologies installed as part of the development. This should include details of the type of technology, the nature of the installation, the size/capacity of system installed and the estimated reduction in CO_2 emissions as well as providing evidence to substantiate the commitments.

We would recommend adding wording to the new DPD policy within CPP2 to require this. The following wording is suggested:

All new developments will be required to provide details of the low and zero carbon energy technologies used including the size/capacity of the systems and the estimated CO_2 savings that will be achieved.

Detailed information relating to the specific information required, format and presentation of this information should be set out in a technical guidance document (see recommendation 12) to ensure consistency of reporting and evidence requirements.

Evidence base and viability

It is assumed that as the suggestions here are supporting the existing policy CP8 that there should be no change to the viability associated with this policy.

Some of this information is already collected in the Sustainability Checklist so it is anticipated that the additional requirements for details of the CO_2 savings, drawing/specifications and evidence of installation are unlikely to require much additional work.

Implications for Implementation and Compliance

Developers should be required to clearly demonstrate the details of the LZC technologies being installed which can then be conditioned and checked before start on site and at practical completion. A further step that could be taken in the future would be to ask for actual outputs of the systems over the first years of operation.

As with the previous recommendations, for the Council this approach is likely to require some additional resource within the planning department to undertake the necessary compliance checking and monitoring and would require developers to provide additional details to demonstrate compliance, both of which could be mitigated by providing the suggested technical guidance to show how compliance can be achieved and help to standardise the reporting.

7.5 Recommendation 4: Encourage higher performance in developments taking place in areas with greater potential for the application of LZCs or where impacts to the local environment are greater and consider establishing low carbon zones

Basis

The minimum CO_2 reduction target in CP8, which we have suggested expanding to cover all new developments, will apply across the city to all development regardless of location. As shown in this study, there are some locations within the city that are deemed to have either greater potential for the installation of LZCs and areas which justify greater efforts to reduce environmental impacts. In these locations developers should be encouraged to assess the potential to deliver higher CO_2 savings through greater passive design, fabric and energy efficiency measures and LZC technologies.

Proposed approach

We would recommend including text in CPP2 to encourage higher levels of CO_2 emission reduction, in specific locations. Based on the analysis conducted as part of this study we would suggest that these locations could include:

- Development sites located within CPP1 development areas;
- Development sites located within allocations in the urban fringe;
- Development sites located within a designated site of nature conservation/geodiversity importance (either allocated sites or where proposal meet the tests of SA4, CP10 in CPP1 and emerging draft CPP2 Policy on Green Infrastructure and Nature Conservation) or which could impact on a designated site; and
- Development sites located within identified industrial areas.

In these locations we would consider there to be greater opportunities for passive, fabric and energy efficiency measures and for the installation of low and zero carbon energy technologies and/or a greater need for more sustainable development. We would suggest the following text within the new DPD proposed in Recommendation 1:

Development sites located within the following specific strategic locations [insert agreed list or map] will be expected to assess the opportunities to deliver greater reductions in CO_2 emissions through the use of passive design, fabric standards, energy efficiency measures and LZC technologies

An alternative to labelling these areas as ‘specific strategic locations’ would be to define them as ‘low carbon opportunity zones’ and then indicate (in the DPD or the associated technical guidance) where these areas are (potentially with a map) and also set out what would be expected for developments within these zones.

It would be difficult to specify a target for the level of renewable energy required without further analysis, due to the variations in technical and financial impact of different development scales and building types. Recommendation 3, which would require developers to specifically publish the details of the proposed LZC installations, including the capacities and CO_2 savings, could be used to check that opportunities for LZC installations had been maximised and work with developers to identify other options. This information could also be collected and, over time, be used to create an evidence base for setting a higher target.

Evidence base and viability

Section 1 of this report sets out the policy support for increasing the installations of decentralised, low and zero carbon energy generation. Amongst other legislation, this is supported by the Climate Change Act (2008), Energy Act (2008) and National Planning Policy Framework (2009). Most recently, the Clean Growth Strategy calls on measures to deliver more energy efficient buildings with increased LZC energy generation.

The analysis presented in Section 4 of this report sets out the impact of the proposed new development on the future energy demands and CO_2 emissions while the analysis presented in Section 5 of this report shows that there is significant opportunities to deliver LZCs across the city and within all the planned development areas.

It will be the developer's responsibility to assess the viability of installing more LZCs in specific locations. Policy recommendation 5 (see section 7.6), which proposes support for community ownership of LZCs, could provide support for this policy by enabling third parties to provide the capital costs for additional measures.

Implications for Implementation and Compliance

For the Council this approach is likely to require some additional resource within the planning department to identify whether additional CO_2 savings from passive measures, fabric, energy efficiency and LZCs are possible on applicable developments and to support developers in assessing the options.

For developers, policy CP8 already requires developers to assess the opportunities to deliver CO_2 reductions from passive measures, fabric, energy efficiency and LZCs. Building Regulations 25A already requires developers to assess the potential for using LZC technologies and specifically refers to investigating cogeneration, district heating/cooling, heat pumps and renewable energy technologies.

To support developers, we would recommend that BHCC provide supplementary technical guidance for developers on what is required for submission in the energy strategy accompanying the planning application. This should include details on how to demonstrate compliance, including how the energy calculations should be undertaken and what modelling outputs are required to provide evidence of compliance.

7.6 Recommendation 5: Include a requirement for all developments to complete an energy statement to demonstrate compliance with the relevant policies.

Basis

Requiring all new development to submit an Energy Statement, and providing clear guidance of the required format and content of this document, will better ensure that all new development complies with the requirements of policy CP8 and the new DPD policies.

Proposed approach

All developments to prepare energy statements to accompany planning applications to demonstrate the following:

- Estimated carbon emission baseline based on Building Regulations Target Emission Rates (TERs) [The Baseline]
- Estimated carbon emissions from the development based on fabric and energy efficiency measures alone (i.e. using the building/dwelling emission rates (DERs/BERs) assuming standard heating, ventilation and cooling systems and excluding low and zero carbon energy technologies) [Fabric Performance]
- Estimated carbon emissions from the development with all the proposed services and low and zero carbon energy technologies [Overall Performance]

Suggested wording for this policy is set out below:

All developments will be required to provide an energy statement to demonstrate compliance with this policy. A technical guidance document will be produced to provide support on the specific information required in these documents.

Further details associated with the suggested technical guidance document are set out in Recommendation 12.

The other importance of this requirement is to record details of the approach to compliance and CO_2 savings achieved by different developments. This will provide BHCC with a detailed overview of what is being delivered by different developments across the city and over time this will provide an evidence base to support future policy in this area.

Evidence base and viability

The analysis presented in this report has demonstrated the importance of mitigating the additional impacts on energy demands and CO_2 emissions associated with the proposed new development in the city.

It is assumed that as the suggestions here are supporting the existing policy CP8 that there should be no change to the viability associated with this policy.

Implications for implementation and compliance

Developers will already be producing a response to Policy CP8 as part of planning applications and therefore it is assumed that this requirement this will not require additional resource. In fact the proposed technical guidance should make the process easier for both developers to demonstrate compliance and BHCC to check compliance by standardising the required reporting.

7.7 Recommendation 6: Include a requirement for all developments to achieve a minimum EPC rating prior to start on site and on completion

Basis

Ensuring that all new buildings are delivered to high standards of performance with regards to energy consumption will have significant benefits for the future occupants in the form of reduced energy costs, helping to address fuel poverty. This is particularly important given the potential increase in costs of energy in the future. The EPC rating provides a guide for consumers on the costs of running a home or building and enables the relative assessment of different dwellings or buildings. Although this is linked to the same models that are used to assess the CO_2 emissions the two cannot be completely aligned due to the different factors that are applied to derive the costs of CO_2 emissions from the energy consumption, depending on the fuel used.

The Minimum Energy Efficiency Standard (MEES) regulations, which aim to improve the performance of buildings, will require all applicable properties for sale and rent in the UK to achieve an EPC of E or better by April 2018 and the Clean Growth Strategy has set a trajectory for further improvement, with a target for as many buildings as possible to achieve an EPC of C by 2030/35.

Proposed approach

We would recommend including text in CPP2 to set a minimum EPC rating of B for all new buildings in Brighton and Hove. This would include conversions and changes of use unless it can be demonstrated that this is not feasible.

Evidence base and viability

The evidence to support this policy is contained in the analysis in Section 3 of this report which demonstrates that the vast majority of new domestic and non-domestic buildings in the city are currently achieving a B rating or higher.

Given that most new developments in the city are currently achieving this rating (or higher) it is assumed that this target will not have an impact on the viability of development.

Implications for Implementation and Compliance

Developers should be required to confirm the predicted EPC ratings for all buildings when submitting a planning application and a condition should be placed on planning approval requiring the submission of the final EPC to the planning authority on completion.

This requirement would put a small additional administrative burden on the planning authority to check the EPCs but this would be very simple to review and the calculation methodology is audited by a third party so this is deemed to be minor.

For developers it is assumed that no additional work would be required as it is a legal requirement to produce a draft EPC[61] before work starts on site and a final EPC at completion for submission to building control so issuing another copy to the planners would not incur additional resources.

[61] For residential developments this is known as a PEA (Predicted Energy Assessment)

7.8 Recommendation 7: Include a requirement for all suitable developments in a heat network opportunity area to incorporate the necessary infrastructure to enable future connection

Basis

BHCC have undertaken a number of studies to assess the potential for delivering heat networks in the city. The Renewable and Sustainable Energy Study[62] provided a high level assessment of the heat demands across the city and identified a number of locations where heat networks could be viable. Further site-specific studies have subsequently been completed to assess the opportunity and define the potential heat network infrastructure that could be delivered in these locations.

The delivery and expansion of heat networks relies upon the connectivity of potential heat loads and new development can facilitate this through the design of new buildings to connect or enable future connection and thereby support the creation and expansion of networks.

Proposed approach

We would recommend including further details on the expectations for delivering heat networks and heat network connectivity within CPP2. This could be included within the DPD policy proposed in Recommendation 1 or a separate Heat Network policy.

The proposed policy should include information about the Heat Network Opportunity Areas (potentially using the map from the Renewable and Sustainable Energy Study) and details of how developers need to demonstrate compliance. The policy wording could be reduced if the detail was provided in the suggested technical guidance document (see Recommendation 12).

Proposed policy wording, initially prepared by BHCC and then reviewed and edited by AECOM, is presented in Appendix F.

Evidence base and viability

The evidence base for this recommendation comprises the city-wide heat network viability study contained in the Brighton and Hove Renewable and Sustainable Energy Study (2013)[63] and the subsequently BEIS funded assessments of specific heat network opportunities. This work identifies specific locations within the city with the potential for heat networks to be developed. For those locations where HNDU funded studies were carried out, further detailed technical and financial viability assessments are available.

For commercial buildings the costs for designing a building to enable future connection to a heat network should be no greater than the alternative approach. The likely requirements include the location of the plant room, provision of space within the plant room for a heat exchanger, capped off connections to the flow and return pipework, lower temperature heating systems and the choice of control systems. For residential buildings there could be additional costs associated with the communal heating network within blocks of flats if compared to individual heating systems.

Implications for Implementation and Compliance

Details on how developers could be expected to demonstrate compliance would need to be provided in the policy wording and/or associated technical guidance document.

[62] http://www.brighton-hove.gov.uk/sites/brighton-hove.gov.uk/files/downloads/ldf/BrightonandHove_Energy_Study_Jan2013.pdf
[63] http://www.brighton-hove.gov.uk/sites/brighton-hove.gov.uk/files/downloads/ldf/BrightonandHove_Energy_Study_Jan2013.pdf

7.9 Recommendation 8: Consider establishing a carbon offset scheme to enable developments that cannot meet the carbon reduction targets on site to achieve compliance

Basis

Although the 19% carbon reduction target is considered to be feasible for most building types and in most locations, there may be exceptional cases where for technical or financial reasons the target is difficult to achieve. In these cases a carbon offset arrangement could be used to assist developers in demonstrating compliance.

Setting a carbon price could also assist in supporting a trajectory for future carbon reduction in all new buildings towards very low/zero carbon (see Recommendation 1). This is the approach that has been taken by the GLA in London, which currently has a zero-carbon target for residential development. This target requires a minimum on-site carbon reduction of 35% (beyond Part L) with the residual emissions to deliver the 'zero' target achieved by a payment into a carbon offset scheme. The suggested price for this is currently £1800/tonne (based on a carbon price of £60/tonne applied over 30 years), although individual Boroughs are allowed to set their own prices. This approach acknowledges that the technical feasibility and financial viability of delivering zero carbon on-site is very challenging and there are more cost effective ways of delivering carbon savings, particularly improvements to the existing building stock, so this is a more effective use of the money.

Proposed approach

We recommend that BHCC look at the option of setting up a carbon offset scheme. There is the option of including text within the proposed DPD policy to state that 'a carbon offset scheme is being investigated for use where it can be demonstrated that the minimum CO_2 reduction target cannot be met on-site'. This would provide the basis for implementing this at a later date and further detail could then be provided within an updated version of the technical guidance document.

In terms of setting the price for the offset scheme the authority would need to carry out an assessment of the options and assess the viability of these. The GLA currently uses the central price for non-traded carbon used in the Treasury Green Book (which was £60/tonne when applied) but is proposing to use the high price (currently £95/tonne) in the draft New London Plan[64].

Evidence base and viability

Further work would be required to undertake an assessment of the viability of an offset price and provide the evidence base for including this within the policy. This work would also need to identify potential projects for funding and determine the costs and carbon savings that could be achieved.

Implications for implementation and compliance

The operation of the fund would need to be determined including details of how it would be administered, how and when payments would be made and also how the money would be spent.

[64] https://www.london.gov.uk/sites/default/files/london_carbon_offset_price_-_aecom_.pdf

7.10 Recommendation 9: Encourage developers to work with community groups to deliver energy projects as part of new developments

Basis

This study has demonstrated that there are significant opportunities to deliver low and zero carbon energy generation within Brighton and Hove. However, there are limitations on the policy requirements that can be placed on developers or building owners due, in part, to the additional capital costs and the impact this might have on the viability of the project.

There are other parties however, in the form of community groups and local energy co-ops, who may be able to provide the funding to deliver LZC projects if there are long-term benefits to be gained from their operation. This concept could support Recommendation 4, which aims to encourage developers to deliver more LZCs on developments in specific locations, by providing support for developers in achieving this by working with 3rd parties that would be able to support the financial investment required.

Proposed approach

We would recommend including text in CPP2 either as part of the DPD policy suggested in Recommendation 1 or a separate Community Energy policy (a draft of which has already been prepared by BHCC and included in Appendix G), to support community energy projects and encourage developers to work with community groups to support the installation of LZC technologies on new developments. This could include the LZCs installed on new or existing buildings that are funded and owned by community groups and local energy co-operatives.

This opportunity could be stimulated by encouraging developers to assess the total potential for decentralised, low and zero carbon energy technologies on proposed development and working with relevant local organisations to see whether these could be delivered by developers working together with these groups. Further details of how this could be achieved and a process for undertaking this could be provided in supporting technical guidance.

Evidence base and viability

It is assumed that this policy would incur no additional costs for developers as the finance for the additional LZCs would be provided by a third party.

Some additional time may be required to undertake the discussions with third parties and there could be some soft costs associated with the legal agreements but there are several precedents for this arrangement (e.g. Brixton Solar), so we would not anticipate this to be a barrier to viability and may actually improve viability, for example by reducing capital costs through increased economies of scale associated with a larger installation.

Implications for Implementation and Compliance

To comply with this policy, developers could be required to show that they had fully considered the potential for LZC technologies and engaged with relevant parties to assess whether there were opportunities for the installation of LZCs owned and operated by community groups.

To demonstrate compliance the energy strategy submitted at planning could be required to show the results of the LZC assessment, including the maximum potential installation of photovoltaics, and also evidence of communications with relevant local groups.

To support this policy initiative we would recommend that BHCC provide technical guidance document for developers with details on how to demonstrate compliance, including the structure of the LZC feasibility assessments and contact details for relevant local community groups and energy co-ops. This guidance could form part of an SPD or technical guidance document.

7.11 Recommendation 10: Consider expanding the BREEAM target in to cover other development types

Basis

The current BREEAM target in policy CP8 only covers new non-residential development above a certain floor area threshold. While we would consider the minimum floor area threshold to be appropriate, there is scope to make a more specific reference to other types of BREEAM assessments to cover different development types, specifically large multi-use development sites and large residential conversions.

Proposed approach

This could be achieved by including a DPD policy within CPP2 to enhance the current policy CP8 in which the BREEAM targets could be extended to cover these other development types. The table currently shown in policy CP8 could be expanded to make specific reference to BREEAM New Construction, BREEAM Communities and BREEAM Refurbishment and Fit-Out schemes, and make it clear what type of assessment would be required for different development types and scales.

Further work may be required to define the target rating required and development size criteria for these development types.

Evidence base and viability

For developments that do not currently require a BREEAM rating there would be additional costs associated with compliance. This would include costs for the administration costs payable to the BRE, costs for an assessor to undertake the assessment and additional costs associated with the measures required to achieve the required rating.

There is published data from the BRE and others which suggest that the additional costs of meeting ranges from 0.13-0.34% (of total construction cost) BREEAM Very Good and 0.87-1.71% for an Excellent rating[65].

Further work may be required to assess the specific viability of the target rating and development size criteria for development in Brighton and Hove.

Implications for Implementation and Compliance

To comply with this policy, developers would be required to register the development with the BREEAM scheme and appoint an assessor to carry out the assessment. Certification, at design stage and post-construction, demonstrating compliance with the relevant target would need to be achieved and copies provided to BHCC discharge the planning condition.

For BHCC this would not require any additional resources to check compliance as the scheme is audited by the BRE who would verify that the scheme met the requirements and provide a certificate to demonstrate compliance.

[65] https://tools.breeam.com/filelibrary/Presentations/DeliveringSustainableBuildingsSlides.pdf

7.12 Recommendation 11: Consider strengthening the sustainable design and construction requirements

Basis

Policy CP8 in CPP1 sets out a list of sustainable design and construction requirements for all new developments. The Sustainability Checklist associated with the policy sets out a series of questions for the developers to answer to demonstrate how they will be addressing the requirements.

This policy review offers an opportunity to review the list of sustainable design and construction requirements in the policy and consider whether these need to be updated and also whether the questions in the checklist need to be updated to reflect this.

Proposed approach

We would recommend reviewing the list of sustainable design and construction requirements and the sustainability checklist to ensure this adequately covers the objectives of the policy and aligns with current national and local policies.

As part of this process it would be useful to assess the performance of consented developments. Collating the results of the completed Sustainability Checklists should provide a good indication of the measures that are more/less commonly included and provide an indication of areas that might need to be strengthened (or relaxed).

Evidence base and viability

Developments are already required to complete the Sustainability Checklist to comply with policy CP8. Updates to this checklist are unlikely to add much additional cost or resource requirements.

Implications for implementation and compliance

The current Sustainability Checklist provides a simple tool for developers to demonstrate how they are meeting the sustainable design and construction requirements in CP8 and for BHCC planners to assess this. It is anticipated that any updated requirements could utilise the same tool.

7.13 Recommendation 12: Produce a technical guidance document to support developers in complying with the policy requirements

Basis

As noted in several of the previous recommendations, a technical guidance document would support developers in better understanding the requirements complying with the policies, approaches to take and how to demonstrate this in their planning applications. It would also help to standardise the energy and sustainability statements submitted at planning to enable BHCC to verify compliance more easily.

A technical guidance note could also be updated more easily than the policy itself in order to reflect changes in national policy or revisions to calculation methodologies and assessment, such as the proposed updates to SAP and BREEAM.

Proposed approach

We would recommend producing a technical guidance document alongside CPP2 to clearly show how developments are required to demonstrate compliance with the relevant planning policies in relation to energy and sustainability. As noted in the previous recommendations, the DPD policy itself could then make reference to this document.

The technical guidance should include the following:

- A more detailed description of the policy requirements (providing more specific details and clarifications than can be presented in the policy wording);
- Guidance on measures to deliver compliance with the energy targets;
- Detailed description of the approach to carrying out the energy calculations, specifying the process required, modelling and calculations to be undertaken and clarifying the assumptions to be used;
- Detailed description of the specific outputs of the energy calculations including templates of the results tables to be completed;
- Details of the supporting information required to verify the proposed approach, including tables showing the proposed performance specification, relevant drawings and outputs of the modelling (SAP/BRUKL documents);
- More detailed description of the sustainable design and construction requirements and guidance on measures to deliver compliance; and
- An updated checklist/proforma for developers to complete to demonstrate the approach being taken and performance against the sustainable design and construction requirements.

Evidence base and viability

As noted in the previous recommendations it is hoped that a clear and informative technical guidance document would support developers in providing details of measures that can be adopted to deliver compliance and standardise the required outputs to demonstrate compliance has been achieved.

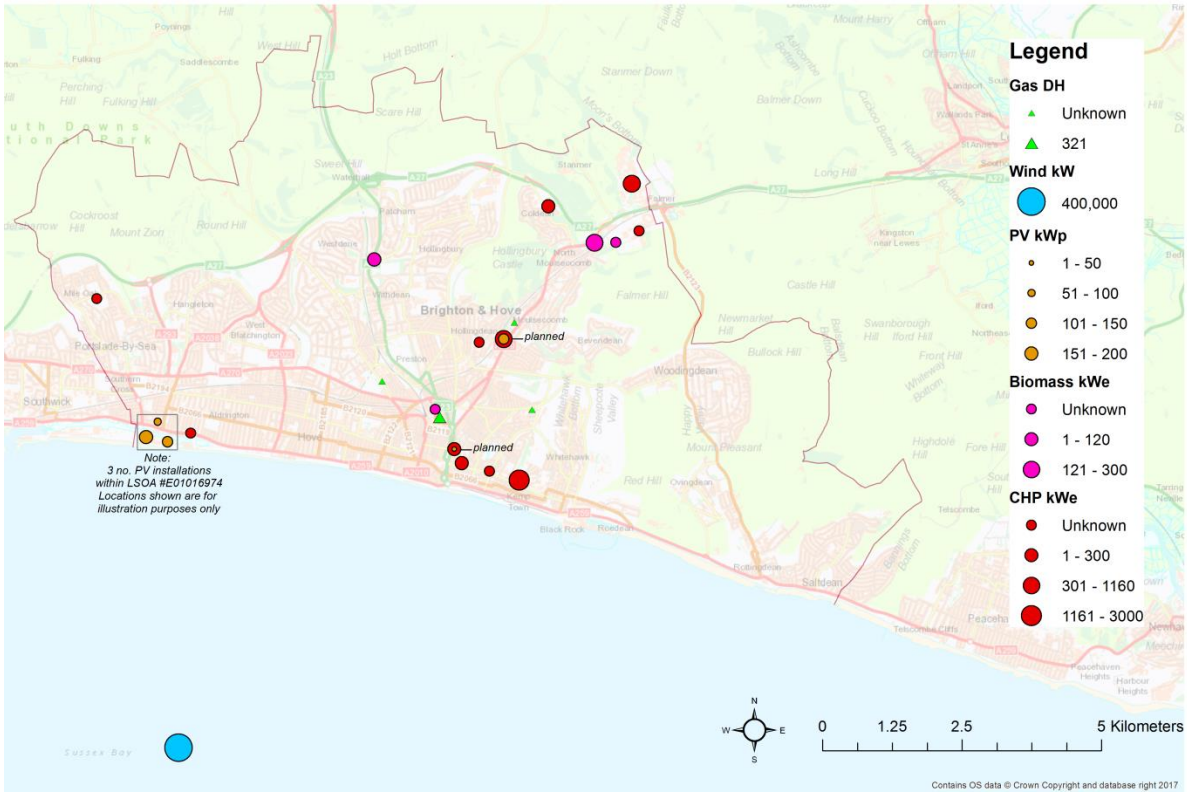
Implications for Implementation and Compliance

The technical guidance is intended to make both compliance and verification more straightforward to assist both developers and BHCC in delivering the policies in CPP2.

Appendix A LZC energy installations in Brighton and Hove

The map below shows **indicative** locations of the low and zero carbon energy installations that have been identified within Brighton and Hove, as listed in Table 9. When interpreting this map, please refer to Section 3.4.1 which outlines the limitations of the approach to data collection.

Note that, although care has been taken to ensure that the information is accurate, in some instances it has not been possible to confirm whether an installation is still in use or planned, what the installed capacity is, or the precise location.



The RHI database indicates that there are 62 domestic installations and <5 non-domestic installations within Brighton and Hove; however, a breakdown of technology types is not provided. For information, the nation-wide split of technology types is shown below.

Technology type *Source: OFGEM - RHI deployment data, January 2018*	**Nationwide (% of total)**	**Nationwide (number)**
Small Solid Biomass Boiler (< 200 kW)	71%	12,741
Medium Solid Biomass Boiler (200-1000 kW)	17%	3,042
Large Solid Biomass Boiler (> 1000 kW)	0%	60
Small Solar Thermal (< 200 kW)	2%	280
Small Water or Ground Source Heat Pumps (< 100 kW)	4%	684
Large Water or Ground Source Heat Pumps (>100 kW)	1%	154
Biomethane	0%	82
Biogas	3%	506
Air Source Heat Pumps	2%	367
CHP	0%	39
Deep Geothermal	0%	0
Total	100%	17,955

Appendix B Development Areas

This Appendix provides further details of the amount of new development in each of the eight Development Areas (DAs). Note that the calculations presented above account for non-DA sites.

Domestic developments: City Plan Part 1 (parag. 2.19) states:

> *'Spatially the majority of new housing, employment and retail development will be located on brownfield (previously developed) sites within the city's built up area and directed to eight specific development areas (DA1-8). These […] are areas which offer significant capacity for new development and are areas where new development and/or regeneration will secure substantial benefits for the city.'*

However, the CPP1 also encourages development to come forward across the rest of the city on suitable brownfield site opportunities (CPP1, parag. 2.23).

New dwelling completions by development area (DA) only are taken from Table A (SHLAA, 2017) and shown in Table 15, Figure 34 and Figure 35 below.

DA number	*2010-2016*	2016-2021	2021-2026	2026-2031	Post-2031	Total
DA1	*13*	0	0	8	0	8
DA2	*195*	244	635	367	500	1746
DA3	*99*	420	157	257	0	834
DA4	*285*	277	197	241	85	800
DA5	*9*	208	160	136	0	504
DA6	*15*	215	450	103	104	872
DA7	*0*	149	400	220	0	769
DA8	*8*	154	0	0	0	154
Total new dwellings	*624*	1667	1999	1332	689	5687
Increase from 2015	-	1667	3666	4998	5687	5687

Table 14: Anticipated number of new dwellings in Brighton and Hove by development area

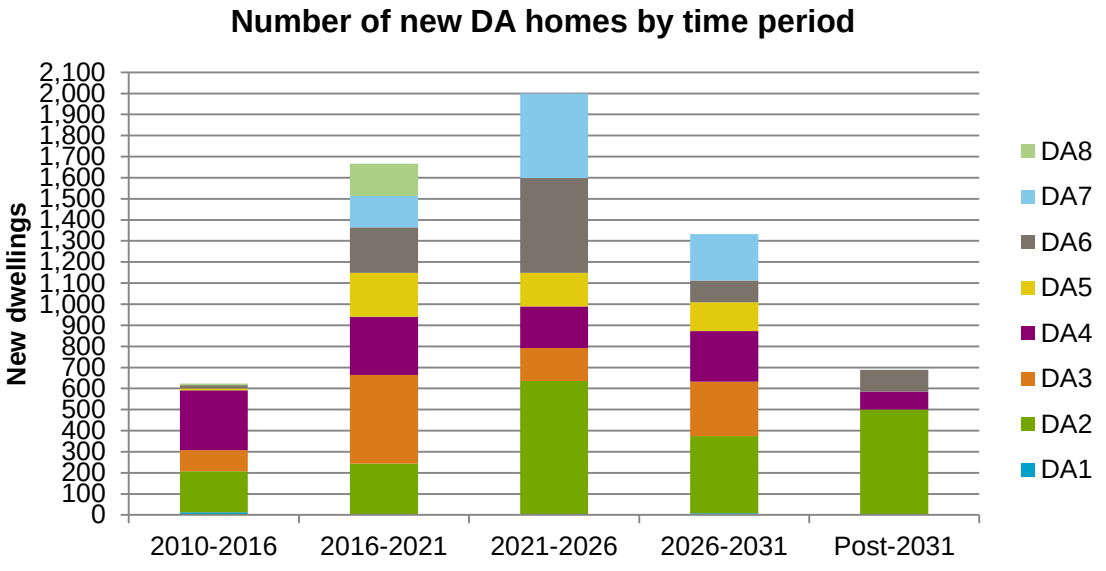


Figure 34: Anticipated number of new dwellings in Brighton and Hove by timeframe and development area

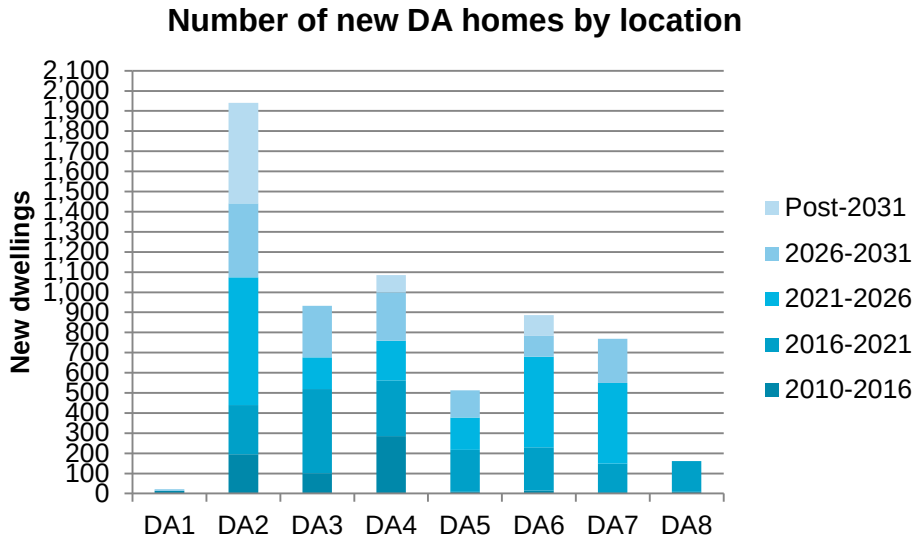


Figure 35: Anticipated number of new dwellings in Brighton and Hove by development area and timeframe

Non-domestic developments: The projected breakdown of new non-domestic floorspace by DA and time period is shown in Table 15 below. The majority of space (81,528 m^2) is expected to be designated for office use within DA3, DA4, DA5 and DA7. A smaller amount (9,510 m^2) of industrial space is provided for within DA2 and DA8.

	Offices [B1a/b] (m^2)			Industrial [B1c/B2/B8] (m^2)		
DA	**2014-2020**	**2019-2025**	**2024-2031**	**2014-2020**	**2019-2025**	**2024-2031**
DA1	-	-	-	-	-	-
DA2	-	-	-	-	-	2,000
DA3	5,000	10,600	-	-	-	-
DA4	9,728	8,000	-	-	-	-
DA5	3,200	20,000	-	-	-	-
DA6	-	-	-	-	-	-
DA7	5,000	10,000	10,000	-	-	-
DA8	-	-	-	1,618	3,755	2,137
Sub-total	22,928	48,600	10,000	1,618	3,755	4,137
TOTAL		**Offices: 81,528**			**Industrial: 9,510**	

Table 15: Assumed new non-domestic floorspace in DAs 1-8

Appendix C Derivation of NEED benchmarks

Energy demands in new domestic developments have been estimated by assuming that the unit split in Brighton and Hove reflects the 2011 Census, and that energy demands will be roughly equal to the NEED median consumption figures for post-1999 dwellings.

The 2011 Census lists the following properties for Brighton and Hove:

2011 Census data

Dwelling Type	No.	% split
Total household spaces	126,827	100%
Whole house	63,072	50%
Detached (inc. bungalows)	*12,897*	*10%*
Semi-detached	*24,174*	*19%*
Terraced (inc. end terrace)	*26,001*	*21%*
Flat, maisonette or apartment	63,700	50%
Misc.	55	0%

Available from:
https://www.bhconnected.org.uk/sites/bhconnected/files/City%20Snapshot%20Report%20of%20Statistics%202014%202.pdf

NEED categorises property types and lists their typical energy consumption as follows:

NEED categories

Dwelling Type	% split	Median gas consumption, post-1999 dwellings (kWh)	Median elec. consumption, post-1999 dwellings (kWh)
Detached	23%	15500	4200
Semi detached	12%	10100	3200
End terrace	10%	10300	3100
Mid terrace	13%	9800	3000
Bungalow	4%	10700	3000
Converted flat	2%	6700	3700
Purpose built flat	37%	5800	2800

Available from: https://www.gov.uk/government/statistical-data-sets/need-table-creator

Note that these sources categorise dwelling types in slightly different ways. So, for instance, where the Census lists 'Detached (inc. bungalows)', it has been assumed that the proportion of bungalows compared with other detached houses reflects the national split of unit types as described in NEED. Then, a weighted average is taken of the median consumption figures for detached houses and bungalows.

The Census 'miscellaneous' category has been excluded as it contains a very small number of dwellings.

Appendix D ASHP uptake scenario

Having estimated the energy *consumption* for dwellings that use both gas and electricity, the space heating energy *demand* (i.e. accounting for system efficiencies) has been estimated based on the following assumptions:

- **ASHP Coefficient of Performance (COP):** 2.5. This is the minimum permitted under UK Building Regulations.[66]
- **Boiler efficiency:** 88%. This is the minimum efficiency for gas-fired condensing combi boilers permitted under UK Building Regulations. Based on AECOM's experience in working with major housing developers, higher boiler ratings are often specified in order to meet Part L CO_2 reduction targets, but research indicates that in use efficiencies are frequently lower than design values, and therefore the minimum efficiency has been used.[67]
- **Average boiler lifespan:** 15 years, per CIBSE Guide M (2014). On this basis, 1 in 15 boilers (6.6%) are replaced each year.
- **Split of gas consumption for space heating and hot water:** Estimated 85% for space heating and 15% for hot water, based on Table 3.07, *'Domestic energy consumption by end use and fuel, 2016'* in the supporting dataset for DBEIS *'Energy Consumption in the UK: 27 July 2017'*[68]

An estimate is made of the typical fuel consumption for a dwelling that receives 100% of its heat from gas boilers and 0% of its heat from electricity. This is then compared against the consumption of a dwelling that is fitted with an ASHP to provide space heating and direct electric heating for hot water. The difference in energy consumption is multiplied by the number of units that are expected to switch heat delivery systems (in the case of existing buildings) or be constructed with electric-only systems (in the case of new dwellings) each year.

Rates of ASHP uptake:

According to the Committee on Climate Change, *'Next steps for UK heat policy'* (October 2016),[69] there has been a recent 'plateau' of approximately 20,000 ASHP installations per year. As there are approximately 27 million homes in the UK, this means that 0.07% of homes receive a heat pump each year. Assuming that all of these installations are carried out when a boiler is replaced (estimated above as 6.6% per year) this would suggest that, of the boilers replaced, roughly 1 in 10 is replaced with an ASHP.

For new dwellings, the CCC central scenario for the fifth carbon budget[70] assumes that 100% of new dwellings would have heat pumps by 2030. In this analysis, for the sake of simplicity it is assumed that as of 2015 there are no new builds with ASHPs, and that this increases linearly to 100% by 2030.

[66] HM Government 'Domestic Building Services Compliance Guide' (2013) available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/453968/domestic_building_services_compliance_guide.pdf
[67] https://www.gov.uk/government/publications/in-situ-monitoring-of-efficiencies-of-condensing-boilers-and-use-of-secondary-heating-trial-final-report-2009
[68] https://www.gov.uk/government/statistics/energy-consumption-in-the-uk
[69] https://www.theccc.org.uk/publication/next-steps-for-uk-heat-policy/
[70] https://www.theccc.org.uk/wp-content/uploads/2015/11/Sectoral-scenarios-for-the-fifth-carbon-budget-Committee-on-Climate-Change.pdf

Appendix E Other LZC energy technologies

This section briefly discusses some LZC energy technologies that were excluded from the spatial analysis in Section 5.1.

- **Offshore wind**

Offshore installations would fall outside of the remit of BHCC Local Authority. There is currently a large-scale wind farm (Rampion Wind Farm) off the coast of Brighton, with a capacity of 400MW.

- **Large-scale onshore wind**

Discussions with BHCC at the workshop on 3rd November 2017 indicated that opportunities for onshore turbines of any scale are fairly limited given that the greatest wind resource is on higher ground beyond the built up area and therefore fall under South Downs National Park (SDNP) planning authority.

- **Energy from waste (EfW) and biogas**

Waste covers local authority collected waste and commercial/industrial waste. Both can be used to derive power via combustion, pyrolysis, gasification or anaerobic digestion. Biogas covers both landfill gas and sewage gas.

The same air quality concerns surrounding biomass apply to any waste fuels that emit particulate matter. In addition, depending on the fuel source, there may be odour issues.

Sites that could theoretically provide potential opportunities for EfW include:

- Material recovery facilities
- Landfill sites
- Waste transfer stations
- Sewage systems

In practical terms, EfW technologies relate not only to the availability of fuel, but also require the alignment and interests of potential delivery partners. On this basis, it is considered beyond the scope of this report to assess individual sites or to comment on the overall suitability of this group of technologies.

Note that it is considered unlikely that any of the historic landfill sites indicated have any realistic potential for deriving energy and waste as the they are all either built on public parks, are located within South Downs National Park, etc.

Hydroelectric power

According to the British Hydrological Association, as of 2011 there were no hydropower installations in Brighton and Hove.[71] The majority of installed capacity in the UK is located in Scotland[72] and this report has not identified any data relating to potentially suitable sites in the area. Therefore, hydroelectric power has not been considered further.

[71] http://www.british-hydro.org/downloads/UK_Installations/BHA%202011.pdf
[72] https://www.gov.uk/guidance/harnessing-hydroelectric-power#uk-use-of-hydroelectricity

Appendix F Heat Networks Policy Draft

Version 1: Draft prepared by BHCC and included within the ITT (October 2017)

DRAFT CPP2 POLICY PROFORMA

TOPIC: ENERGY

Policy Title: District and communal heating and cooling

Policy Text in bold

To ensure communal heating systems and heat networks are specified to good standards of efficiency, facilitate future connection to wider networks, and provide reliable, affordable, quality service standards:

Major developments are required under City Plan Part One policy CP8 para 4.85, to submit an assessment of the energy demand and carbon dioxide emissions. In addition, proposals should demonstrate that heating and cooling systems have been selected in accordance with the heating and cooling hierarchy CIBSE Heat Network Code of Practice[73]; also,

All proposals that include combined heat and power (CHP) should achieve good practice by meeting CHP Quality Assurance standards (CHPQA)[74];

All proposals that include communal heating systems must demonstrate they offer heat service customer protection by adopting a nationally recognised customer protection scheme as part of their service; and

All development incorporating communal heating which is proposed within or adjacent to a development area or a heat priority area[75] will be expected to meet good practice standards as specified in the CIBSE Heat Network Code of Practice or other nationally recognised good practice standard and demonstrate:

a. **heat network connectivity;**
b. **pipe routes; and**
c. **indicative space requirements.**

Reasoned Justification

Heat is responsible for a third of national greenhouse gas emissions. Government sets out in *The Future of Heating: Meeting the challenge*[76] their strong policy support for alternatives to fossil fuel for the supply of heat. Decarbonising heat will play a vital role in the shift to a thriving low carbon economy, and achieving the 80% reduction target for greenhouse gas emissions by 2050. This will involve changing the way we produce and consume heat.

An increasing number of heat networks and communal heating systems are being integrated into development schemes across Brighton & Hove and in neighbouring authority areas. Heat and cooling networks along with decentralised energy schemes are expected to extend across the city and region in future years and decades. This policy expands on existing policy CP8 providing additional criteria that should be addressed when such schemes come forward.

To ensure consistency, quality and connectivity of decentralised energy systems and protections for heat customers, this policy sets out technical guidelines for communal heating and cooling systems, district heating and cooling systems and networks. This policy follows on from City Plan Part One policy CP8 Sustainable Buildings 2 (a), (b), (c), (d), and (n).

Heating and cooling hierarchy

City Plan Part One Policy CP8 at para 4.85 sets out that an assessment of the energy demand and carbon dioxide emissions will be expected from all proposed major developments. This should show how carbon emissions have been reduced, energy efficiency integrated, renewable energy installed, and connections facilitated or made to heat networks where they exist. In addition to the criteria set out in paragraph 4.85, proposals should demonstrate that the heating and cooling systems have been selected in accordance with the heating and cooling hierarchy. This will ensure development in the city contributes to the Strategic Objective 7 of CPP1, to contribute to a reduction in the ecological footprint of Brighton & Hove.

[73] CIBSE Heat Networks Code of Practice CP1 'Heat Networks: Code of Practice for the UK' www.cibse.org/knowledge/knowledge-items/detail?id=a0q200000090MYHAA2

[74] CHP Quality Assurance programme (CHPQA) is a government initiative www.gov.uk/guidance/combined-heat-power-quality-assurance-programme

[75] Fourteen heat priority areas where identified in the B&H Renewable & Sustainable Energy Study and allocated in CPP1. These identify areas in the city with enhanced opportunity for the successful delivery of heat networks. Further heat priority areas may be identified when this study is updated.

[76] The Future of Heating: Meeting the challenge (2013) www.gov.uk/government/publications/the-future-of-heating-meeting-the-challenge

Heating and Cooling Hierarchy (CIBSE Heat Networks Code of Practice)

1) Connection to existing Combined Cooling Heat and Power - (C) CHP - distribution networks
2) Site wide renewable (C) CHP
3) Site wide gas-fired (C) CHP
4) Site wide renewable heating/cooling
5) Site wide gas-fired heating/cooling
6) Individual building renewable heating
7) Individual building heating

All (C) CHP must be of a scale and operated to maximise the potential for carbon reduction.

Feasibility assessments should be in line with Section 2 of the CIBSE Heat Networks Code of Practice, providing rationale for the preferred option and incorporating a high level assessment of the potential to phase the growth of the network beyond the development area in future. Centralised communal wet heating systems are encouraged rather than individual gas boilers or electric heating.

Proposals for major developments should demonstrate and quantify how the development will comply with the heating and cooling hierarchy.

Combined heat and power quality assurance (CHPQA)

The CHP Quality Assurance programme (CHPQA) is a government initiative providing a practical, determinate method for assessing all types and sizes of CHP scheme throughout the UK. CHP, the simultaneous generation of heat & power in a single process, provides one of the most cost-effective approaches for making carbon savings and plays a crucial role in the UK Climate Change programme.

CHPQA aims to monitor, assess and improve the quality of UK Combined Heat and Power. The government is committed to increasing the UK's CHP capacity because of the considerable environmental, economic and social benefits it can bring together with its contribution to security of supply. Successful CHPQA certification grants eligibility to a range of benefits[77]. CHPQA, by assessing CHP schemes on the basis of their energy efficiency and environmental performance, ensures that the associated fiscal benefits are in line with environmental performance

Customer protection for communal heat service users

The heating sector, unlike gas and electricity, is an unregulated market. This means heat customers can be vulnerable to variable pricing and service standards from their heat provider. To ensure customers receive fair and quality services, proposals for communal heat systems are expected to adopt a nationally recognised customer protection scheme in the delivery and management of their service. An example of a national scheme is the Heat Trust Customer Protection Scheme[78].

Heat Network Good Practice standards

a) Technical specifications for connection

Within CPP1 Policy CP8, the Development Area policies and some of the Strategic Areas, policies set out local priorities that proposed energy systems in heat priority areas should be 'connection ready' or to connect where network is planned or exists. Where there is requirement for heat network connection or to be 'connection ready' (to have capacity for future connection) buildings connecting to an existing heat network should adhere to the relevant guidelines set in the CIBSE Heat Networks Code of Practice for the UK Chapter 3 'Design'.

The following Code of Practice objectives should be implemented when connecting to an existing heat network. These provide good practice technical specifications for connection to an existing network, planned network or network under construction

[77] CHPQA current benefits at April 2017 include Renewable Heat Incentive, Carbon Price Floor (heat) relief, Climate Change Levy exemption (in respect of electricity directly supplied), Enhanced Capital Allowances and preferential Business Rates.

[78] Heat Trust Protection Scheme www.heattrust.org. Heat customers that are served by heat networks registered with Heat Trust will benefit from the standards set out within the Scheme. These standards are designed to be comparable to the service standard required by gas and electricity companies and include: support for vulnerable consumers, responding to faults and emergencies, guaranteed service payments for interruptions in supply, metering and billing and complaints handling. Customers will also be able to access the Energy Ombudsman if they remain unhappy with how their heat supplier has managed their complaint.

CIBSE Heat Networks Code of Practice CP1

- Objective 3.3: To select suitable building interfaces, direct or indirect connection
- Objective 3.4: To design or modify suitable space heating and domestic hot water services systems
- Objective 3.9: To achieve an efficient heat distribution system within a multi-residential building and to reduce risk of over-heating.

b) Indicative space requirements

Buildings should allow adequate plant room space to allow for connection at a later date (indicative requirements are shown in the table below).

Indicative space requirements for heat exchange substation equipment within building plant rooms[79]

Heating Capacity, kW (space heating + ventilation)	Approximate building size, m3	Space required by the heating equipment, m2
30	1,000-1,500	2
200	10,000-15,000	4
400	20,000-30,000	5
800	40,000-60,000	6

c) Pipe routes

The developer should identify, with the support of the planning authority or their representatives, and safeguard a pipe route to allow connection between the building and the highway or identified network route where available. The developer should not compromise or prevent the potential connection of the building to a planned network.

Core Documents

Renewable and Sustainable Energy Study (BHCC, AECOM 2013)

Heat Networks Code of Practice for the UK (CIBSE)

The Future of Heating: Meeting the challenge (BEIS 2013)

East Sussex, South Downs and Brighton & Hove Waste & Minerals Plan (2017)

CPP1 link (policy/ spatial objective)

DA1 – Brighton Centre and Churchill Square Area

DA2 – Brighton Marina, Gas Works and Black Rock Area

DA3 – Lewes Road Area

DA4 – New England Quarter and London Road

DA5 – Eastern Road and Edward Street Area

DA6 – Hove Station Area

DA7 – Toads Hole Valley

DA8 – Shoreham Harbour

SA1 – The Seafront

SA2 – Central Brighton

SA3 – Valley Gardens

SA4 – Urban Fringe

SA6 – Sustainable Neighbourhoods

CP8 - Sustainable Buildings and the DAs and SAs

CP18 – Healthy City

BHLP policy/ies that will be superseded (or to be deleted as result of the CPP2 policy)

N/A

[79] Greater London Authority. (2014). London Heat Network Manual. Pg.41. www.londonheatmap.org.uk/Content/uploaded/documents/LHNM_Manual2014Low.pdf

Implementation and Monitoring Target

Consider whether implementation and monitoring target is required; check back with CPP1 Annexe 1 and discuss with AM if data is available/easily monitored. Also consider Inspector's criticism of our submitted Annexe1.

CPP2 Policy		**Strategic Objectives: SO6, SO9, SO10, SO11, SO12, SO15**		
Implementation / Issue	**Delivery Mechanism / Partners**	**Indicator Reference / Indicator**	**Target / Timescale**	**Trigger and Actions to be taken if target not being achieved**
Sustainable building standards assessment	*BHCC; Sustainability Officers; Planning Conditions; S106 agreements; BEIS Heat Networks Delivery Unit; BEIS funding.*	*LOI % of new developments that meet minimum building standard requirements for B&H: a) Residential new build;*	*To be monitored annually throughout plan period; Targets as set out in policy CP8. (Source: Planning)*	*Trigger: Annual % of developments that meet targets fall below 70% Action: Review Development Management procedures;*
Reducing carbon emissions	*Sustainability Checklist; BHCC; Developers; landowners; BEIS*	*LOI Percentage of applications approved for new dwellings that meet minimum standards for energy and water To be monitored annually throughout the plan period Targets for new dwellings (to be met by 2017):*	*To be monitored annually throughout plan period; Targets as set out in policy CP8. (Source: Planning)*	*Review Development Management procedures;*
Reduce City carbon emissions	*Sustainability Checklist; BHCC; Developers; landowners; BEIS*	*Based on city wide data. Showing 4% reduction annually, or progress towards 80% reduction by 2050*	*To be monitored annually throughout plan period; Targets as set out in policy CP8. (Source: Planning)*	*Review Development Management procedures;*

Changes to Policies Map Required

The majority of the policy is generic/citywide,

However, there may be specific recommendations around strengthening policy for connection of heat networks where firm proposals plans are coming forwards in the city. A heat network study for Hove Station will be published imminently (May 2017). The council may develop a heat network in the area of Hove Station in which case strengthened DA policy is recommended.

How preferred policy addresses consultation responses

Consultees responding to Question P19 strongly supported production of additional guidance/policy to support district heating. This was supported for either or both planning policy or supplementary guidance. All those suggesting further policy should be adopted in CPP2 also recommended production of supplementary planning guidance. References were made to the following issues that should be addressed: Combined Heat and Power Quality Assurance (CHPQA); and CIBSE Code of Practice for 'CP1': Heat Networks Code of Practice for the UK; heat customer protection (e.g. Heat Trust Scheme). Additional supplementary guidance was also considered appropriate due to the technical complexity, and the extensive implications for the city and development schemes. The Shoreham Harbour Heat Network Study (2016) recommended text to be incorporated into CPP2. This has influenced some of the text proposed for this part of CPP2. A Heat Network Study has also been produced for Hove Station area and Eastern Road Areas, which when published may are likely to influence the DA policies. One internal consultee recommended that stronger policy should be adopted in all Development Areas to support heat networks.

Version 2: Edited version proposed by AECOM

TOPIC: ENERGY – HEAT NETWORKS

Policy Title: Heating and cooling network infrastructure

Policy Text in bold

To ensure heat network infrastructure (including communal heating systems) is incorporated into new development (where appropriate) to support wider heat development within Brighton & Hove and to ensure that this is constructed to a high quality to provide a reliable, affordable, quality and low carbon source of heat to end users.

Major developments are required under City Plan Part One policy CP8 para 4.85, to submit an assessment of the energy demand and carbon dioxide emissions. In addition, proposals should demonstrate that heating and cooling systems have been selected in accordance with the heating and cooling hierarchy and CIBSE Heat Network Code of Practice[80]; also,

All proposals that include combined heat and power (CHP) should achieve good practice by meeting CHP Quality Assurance standards (CHPQA)[81];

All proposals that include heat networks must demonstrate they offer heat service customer protection by adopting a customer protection scheme (such as Heat Trust[82] or equivalent); and

All development incorporating heat network infrastructure which is proposed within or adjacent to a heat priority area[83] [suggest inserting map here] will be expected to meet the minimum standards specified in the CIBSE Heat Network Code of Practice and demonstrate the consideration of the future connection to a wider heat network, including;

- **d. control systems and temperatures of operation;**
- **e. routing of pipework and location of the energy centre;**
- **f. safeguarded access for external pipework into the energy centre;**
- **g. space within the energy centre for a future heat substation.**

Reasoned Justification

Heat is responsible for a third of national greenhouse gas emissions. Government sets out in *The Future of Heating: Meeting the challenge*[84] their strong policy support for alternatives to fossil fuel for the supply of heat. Decarbonising heat will play a vital role in the shift to a thriving low carbon economy, and achieving the 80% reduction target for greenhouse gas emissions by 2050. This will involve changing the way we produce and consume heat.

An increasing number of heat networks and communal heating systems are being integrated into development schemes across Brighton & Hove and in neighbouring authority areas. Heat and cooling networks along with decentralised energy schemes are expected to extend across the city and region in future years and decades. This policy expands on existing policy CP8 providing additional criteria that should be addressed when such schemes come forward.

To ensure consistency, quality and connectivity of decentralised energy systems and protections for heat customers, this policy sets out technical guidelines for communal heating and cooling systems, district heating and cooling systems and networks.

This policy follows on from City Plan Part One policy CP8 Sustainable Buildings 2 (a), (b), (c), (d), and (n).

Heating and cooling hierarchy

City Plan Part One Policy CP8 at para 4.85 sets out that an assessment of the energy demand and carbon dioxide emissions will be expected from all proposed major developments. This should show how carbon emissions have been reduced, energy efficiency integrated, renewable energy installed, and connections facilitated or made to heat networks where they exist.

In addition to the criteria set out in paragraph 4.85, proposals should demonstrate that the heating and cooling systems have been selected in accordance with the heating and cooling hierarchy. This will ensure development in the city contributes to the Strategic Objective 7 of CPP1, to contribute to a reduction in the ecological footprint of Brighton & Hove.

[80] CIBSE Heat Networks Code of Practice CP1 'Heat Networks: Code of Practice for the UK' www.cibse.org/knowledge/knowledge-items/detail?id=a0q200000090MYHAA2

[81] CHP Quality Assurance programme (CHPQA) is a government initiative www.gov.uk/guidance/combined-heat-power-quality-assurance-programme

[82] http://heattrust.org/

[83] Fourteen heat priority areas where identified in the B&H Renewable & Sustainable Energy Study and allocated in CPP1. These identify areas in the city with enhanced opportunity for the successful delivery of heat networks. Further heat priority areas may be identified when this study is updated.

[84] The Future of Heating: Meeting the challenge (2013) www.gov.uk/government/publications/the-future-of-heating-meeting-the-challenge

Heating and Cooling Hierarchy

System

1. Connection to existing heat/cooling networks
2. Site wide heat/cooling network
3. Building heat/cooling network
4. Individual heating/cooling systems

Technology

1. Systems using renewable/waste energy sources e.g. biomass, heat pumps (favouring those using secondary, waste, ground and water heat sources)
2. Low carbon technologies e.g. gas-CHP
3. Conventional systems e.g. gas or direct electric

Feasibility assessments should meet the minimum requirements of Section 2 of the CIBSE Heat Networks Code of Practice, providing rationale for the preferred option and incorporating a high level assessment of the potential to extend the network beyond the development area in future. Centralised communal wet heating systems are encouraged rather than individual gas boilers or electric heating, particularly in locations within or near to the identified heat network priority areas.
Proposals for major developments should demonstrate and quantify how the development will comply with the heating and cooling hierarchy.

Combined heat and power quality assurance (CHPQA)

The CHP Quality Assurance programme (CHPQA) is a government initiative providing a practical, determinate method for assessing all types and sizes of CHP scheme throughout the UK. CHP, the simultaneous generation of heat & power in a single process, provides one of the most cost-effective approaches for making carbon savings and plays a crucial role in the UK Climate Change programme.
CHPQA aims to monitor, assess and improve the quality of UK Combined Heat and Power. The government is committed to increasing the UK's CHP capacity because of the considerable environmental, economic and social benefits it can bring together with its contribution to security of supply. Successful CHPQA certification grants eligibility to a range of benefits[85].
CHPQA, by assessing CHP schemes on the basis of their energy efficiency and environmental performance, ensures that the associated fiscal benefits are in line with environmental performance

Customer protection for communal heat service users

The heating sector, unlike gas and electricity, is an unregulated market. This means heat customers can be vulnerable to variable pricing and service standards from their heat provider. To ensure customers receive fair and quality services, proposals for communal heat systems are expected to adopt a nationally recognised customer protection scheme in the delivery and management of their service. An example of a national scheme is the Heat Trust Customer Protection Scheme[86].

Heat Network Good Practice standards

a) Technical specifications for connection

Within CPP1 Policy CP8, the Development Area policies and some of the Strategic Areas, policies set out local priorities that proposed energy systems in heat priority areas should be 'connection ready' or to connect where network is planned or exists. Where there is requirement for heat network connection or to be 'connection ready' (to have capacity for future connection) buildings connecting to an existing heat network should adhere to the relevant guidelines set in the CIBSE Heat Networks Code of Practice for the UK Chapter 3 'Design'.

b) Indicative space requirements

[85] CHPQA current benefits at April 2017 include Renewable Heat Incentive, Carbon Price Floor (heat) relief, Climate Change Levy exemption (in respect of electricity directly supplied), Enhanced Capital Allowances and preferential Business Rates.
[86] Heat Trust Protection Scheme www.heattrust.org. Heat customers that are served by heat networks registered with Heat Trust will benefit from the standards set out within the Scheme. These standards are designed to be comparable to the service standard required by gas and electricity companies and include: support for vulnerable consumers, responding to faults and emergencies, guaranteed service payments for interruptions in supply, metering and billing and complaints handling. Customers will also be able to access the Energy Ombudsman if they remain unhappy with how their heat supplier has managed their complaint.

Buildings should allow adequate plant room space to allow for connection at a later date (indicative requirements are shown in the table below).

Indicative space requirements for heat exchange substation equipment within building plant rooms[87]

Heating Capacity, kW (space heating + ventilation)	Approximate building size, m3	Space required by the heating equipment, m2
30	1,000-1,500	2
200	10,000-15,000	4
400	20,000-30,000	5
800	40,000-60,000	6

c) Pipe routes

The developer should identify, with the support of the planning authority or their representatives, and safeguard a pipe route to allow connection between the building and the highway or identified network route where available. The developer should not compromise or prevent the potential connection of the building to a planned network.

Core Documents

Renewable and Sustainable Energy Study (BHCC, AECOM 2013)

Heat Networks Code of Practice for the UK (CIBSE)

The Future of Heating: Meeting the challenge (BEIS 2013)

East Sussex, South Downs and Brighton & Hove Waste & Minerals Plan (2017)

[AECOM Comment: Suggest referencing HNDU studies here too]

CPP1 link (policy/ spatial objective)

DA1 – Brighton Centre and Churchill Square Area

DA2 – Brighton Marina, Gas Works and Black Rock Area

DA3 – Lewes Road Area

DA4 – New England Quarter and London Road

DA5 – Eastern Road and Edward Street Area

DA6 – Hove Station Area

DA7 – Toads Hole Valley

DA8 – Shoreham Harbour

SA1 – The Seafront

SA2 – Central Brighton

SA3 – Valley Gardens

SA4 – Urban Fringe

SA6 – Sustainable Neighbourhoods

CP8 - Sustainable Buildings and the DAs and SAs

CP18 – Healthy City

BHLP policy/ies that will be superseded (or to be deleted as result of the CPP2 policy)

N/A

Implementation and Monitoring Target

Consider whether implementation and monitoring target is required; check back with CPP1 Annexe 1 and discuss with AM if data is available/easily monitored. Also consider Inspector's criticism of our submitted Annexe1.

[87] Greater London Authority. (2014). London Heat Network Manual. Pg.41. www.londonheatmap.org.uk/Content/uploaded/documents/LHNM_Manual2014Low.pdf

CPP2 Policy		Strategic Objectives: SO6, SO9, SO10, SO11, SO12, SO15		
Implementation / Issue	**Delivery Mechanism / Partners**	**Indicator Reference / Indicator**	**Target / Timescale**	**Trigger and Actions to be taken if target not being achieved**
Sustainable building standards assessment	*BHCC; Sustainability Officers; Planning Conditions; S106 agreements; BEIS Heat Networks Delivery Unit; BEIS funding.*	*LOI % of new developments that meet minimum building standard requirements for B&H: a) Residential new build;*	*To be monitored annually throughout plan period; Targets as set out in policy CP8. (Source: Planning)*	*Trigger: Annual % of developments that meet targets fall below 70% Action: Review Development Management procedures;*
Reducing carbon emissions	*Sustainability Checklist; BHCC; Developers; landowners; BEIS*	*LOI Percentage of applications approved for new dwellings that meet minimum standards for energy and water To be monitored annually throughout the plan period Targets for new dwellings (to be met by 2017):*	*To be monitored annually throughout plan period; Targets as set out in policy CP8. (Source: Planning)*	*Review Development Management procedures;*
Reduce City carbon emissions	*Sustainability Checklist; BHCC; Developers; landowners; BEIS*	*Based on city wide data. Showing 4% reduction annually, or progress towards 80% reduction by 2050*	*To be monitored annually throughout plan period; Targets as set out in policy CP8. (Source: Planning)*	*Review Development Management procedures;*

Changes to Policies Map Required

The majority of the policy is generic/citywide,

However, there may be specific recommendations around strengthening policy for connection of heat networks where firm proposals plans are coming forwards in the city. A heat network study for Hove Station will be published imminently (May 2017). The council may develop a heat network in the area of Hove Station in which case strengthened DA policy is recommended.

How preferred policy addresses consultation responses

Consultees responding to Question P19 strongly supported production of additional guidance/policy to support district heating. This was supported for either or both planning policy or supplementary guidance. All those suggesting further policy should be adopted in CPP2 also recommended production of supplementary planning guidance. References were made to the following issues that should be addressed: Combined Heat and Power Quality Assurance (CHPQA); and CIBSE Code of Practice for 'CP1': Heat Networks Code of Practice for the UK; heat customer protection (e.g. Heat Trust Scheme). Additional supplementary guidance was also considered appropriate due to the technical complexity, and the extensive implications for the city and development schemes. The Shoreham Harbour Heat Network Study (2016) recommended text to be incorporated into CPP2. This has influenced some of the text proposed for this part of CPP2. A Heat Network Study has also been produced for Hove Station area and Eastern Road Areas, which when published may are likely to influence the DA policies. One internal consultee recommended that stronger policy should be adopted in all Development Areas to support heat networks.

Appendix G Community Energy Policy Draft

Version 1: Draft prepared by BHCC and included within the ITT (October 2017)

TOPIC: ENERGY

Policy Title: Community Energy

Policy Text

Developers of medium and major development schemes are encouraged to actively seek community energy partners to deliver low carbon energy[88] solutions which are 'led by'; or 'meet the needs' of; and provide a positive local benefit to communities.

On medium scale and major developments where viability issues restrict the applicants' ability to install renewable energy as part of their scheme, community energy solutions should be explored which are 'led by' or 'meet the needs' of communities and provide a way to install technologies at reduced or potentially no upfront cost. In such instances, this approach will particularly be encouraged.

The definition 'led by' or 'meet the needs' of local communities is defined as full community ownership and control of a low carbon energy solution or project. This model provides the greatest scope for long term accessible and inclusive benefits for the local community and will therefore receive the greatest level of support. Other models exist such as split ownership, joint venture, equity shares, and post-construction community buy out.

Reasoned Justification

Full community ownership is defined as where the community, through an appropriately constituted community energy enterprise, has ownership and control of the revenue, surplus income and energy generated by the development (which could include being used to provide cheaper energy within the community through locally discounted tariffs).

Medium scale and major developments are defined as:

- non-residential retail developments over 151sqm;
- other non-residential development over 236sqm;and
- residential development over 3 units.

The City Plan recognises the importance of enabling communities and residents to take a greater share in the benefits of our transition to a low carbon energy system. This policy follows on from City Plan Part One policy CP8 Sustainable Buildings 2 (a), (b), (c), and (d).

Developers of medium and major development schemes are encouraged to actively seek community energy partners to deliver low carbon energy solutions which are 'led by' or 'meet the needs' of communities**.**

The government's Community Energy Strategy (2014[89]) supports the role communities can play in helping to meet the UK's energy and climate change challenges, and asks all authorities to show leadership to help deliver community energy projects.

The National Planning Policy Framework (2012), states that local planning authorities should recognise the responsibility on all communities to contribute to energy generation from renewable and low carbon sources, and support community-led initiatives for renewable and low carbon energy sources where there is clear evidence of local community involvement and leadership. Protection of landscapes, heritage and local amenity should also be given proper consideration.

The local energy economy in Brighton & Hove can deliver significant long term benefits to the community, including reduced energy bills, increased energy sustainability and security, and a shift of ownership to local people.

Core Documents

Renewable and Sustainable Energy Study 2013

East Sussex, South Downs and Brighton & Hove Waste & Minerals Plan 2013

CPP1 link (policy/ spatial objective)

- SS1 - Presumption in Favour of Sustainable Development
- CP2 Sustainable Economic Development
- CP3 Employment Land
- CP7 Infrastructure and developer contributions

[88] Renewable and low carbon energy: Includes energy for heating and cooling as well as generating electricity. Renewable energy covers those energy flows that occur naturally and repeatedly in the environment – from the wind, the fall of water, the movement of the oceans, from the sun and also from biomass and deep geothermal heat. Low carbon technologies are those that can help reduce emissions (compared to conventional use of fossil fuels). (Definition from NPPF)

[89] DECC Community Energy Strategy 2014: https://www.gov.uk/government/publications/community-energy-strategy

- CP8 Sustainable Buildings
- CP9 Sustainable Transport
- CP12 Urban Design
- CP13 Public Streets and Spaces
- CP18 Healthy City
- SA6 Sustainable Neighbourhoods
- SO1, SO4, SO7, SO8, SO9, SO13, SO19, SO20, SO22

BHLP policy/ies that will be superseded (or to be deleted as result of the CPP2 policy)

N/A

Implementation and Monitoring Target

CPP2 Policy		**Strategic Objectives: SO1, SO4, SO7, SO8, SO9, SO13, SO19, SO20, SO22**		
Implementation / Issue	**Delivery Mechanism / Partners**	**Indicator Reference / Indicator**	**Target / Timescale**	**Trigger and Actions to be taken if target not being achieved**
Reduce City carbon emissions	*Sustainability Checklist; BHCC; Developers; landowners; BEIS*	*City wide carbon emissions data. Showing 4% reduction annually, or progress towards 80% reduction by 2050*	*To be monitored annually throughout plan period; Targets as set out in policy CP8. (Source: Planning)*	*Review Development Management procedures;*

Changes to Policies Map Required

N/A

How preferred policy addresses consultation responses

There was strong support for further development of policy on low and zero carbon energy. An area that was particularly well supported across the consultation was Community Energy. This policy introduces generic policy in support of Community Energy.

Version 2: Edited version proposed by AECOM

TOPIC: ENERGY

Policy Title: Community Energy

Policy Text

Developers of medium and major development schemes are encouraged to actively seek community energy partners to deliver low carbon energy[90] solutions which are 'led by'; or 'meet the needs' of community partners and thereby provide a positive local benefit to communities.

On medium scale and major developments where financial viability issues restrict the applicants' ability to maximise the potential for delivering low or zero carbon energy technologies as part of their scheme, the Council will expect development to explore the potential for engaging community groups to deliver solutions that are 'led by' or 'meet the needs' of communities to provide a way of installing technologies at reduced or potentially no upfront cost.

The definition 'led by' or 'meet the needs' of local communities is defined as full community ownership and control of a low carbon energy solution or project. This model provides the greatest scope for long term accessible and inclusive benefits for the local community and will therefore receive the greatest level of support. Other models exist such as split ownership, joint venture, equity shares, and post-construction community buy out.

Reasoned Justification

Full community ownership is defined as where the community, through an appropriately constituted community energy enterprise, has ownership and control of the revenue, surplus income and energy generated by the development (which could include being used to provide cheaper energy within the community through locally discounted tariffs).

Medium scale and major developments are defined as:

- non-residential retail developments over 151sqm;
- other non-residential development over 236sqm;and
- residential development over 3 units.

The City Plan recognises the importance of enabling communities and residents to take a greater share in the benefits of our transition to a low carbon energy system. This policy follows on from City Plan Part One policy CP8 Sustainable Buildings 2 (a), (b), (c), and (d).

Developers of medium and major development schemes are encouraged to actively seek community energy partners to deliver low carbon energy solutions which are 'led by' or 'meet the needs' of communities**.** [Consider adding another sentence here to make reference to the recommendation in our study that there are sites in the city with the potential to deliver higher levels of LZCs (beyond the minimum 19% target)]

The government's Community Energy Strategy (2014[91]) supports the role communities can play in helping to meet the UK's energy and climate change challenges, and asks all authorities to show leadership to help deliver community energy projects.

The National Planning Policy Framework (2012), states that local planning authorities should recognise the responsibility on all communities to contribute to energy generation from renewable and low carbon sources, and support community-led initiatives for renewable and low carbon energy sources where there is clear evidence of local community involvement and leadership. Protection of landscapes, heritage and local amenity should also be given proper consideration.

The local energy economy in Brighton & Hove can deliver significant long term benefits to the community, including reduced energy bills, increased energy sustainability and security, and a shift of ownership to local people.

Core Documents

Renewable and Sustainable Energy Study 2013

East Sussex, South Downs and Brighton & Hove Waste & Minerals Plan 2013

CPP1 link (policy/ spatial objective)

- SS1 - Presumption in Favour of Sustainable Development
- CP2 Sustainable Economic Development
- CP3 Employment Land
- CP7 Infrastructure and developer contributions
- CP8 Sustainable Buildings

[90] Renewable and low carbon energy: Includes energy for heating and cooling as well as generating electricity. Renewable energy covers those energy flows that occur naturally and repeatedly in the environment – from the wind, the fall of water, the movement of the oceans, from the sun and also from biomass and deep geothermal heat. Low carbon technologies are those that can help reduce emissions (compared to conventional use of fossil fuels). (Definition from NPPF)

[91] DECC Community Energy Strategy 2014: https://www.gov.uk/government/publications/community-energy-strategy

- CP9 Sustainable Transport
- CP12 Urban Design
- CP13 Public Streets and Spaces
- CP18 Healthy City
- SA6 Sustainable Neighbourhoods
- SO1, SO4, SO7, SO8, SO9, SO13, SO19, SO20, SO22

BHLP policy/ies that will be superseded (or to be deleted as result of the CPP2 policy)

N/A

Implementation and Monitoring Target

CPP2 Policy		**Strategic Objectives: SO1, SO4, SO7, SO8, SO9, SO13, SO19, SO20, SO22**		
Implementation / Issue	**Delivery Mechanism / Partners**	**Indicator Reference / Indicator**	**Target / Timescale**	**Trigger and Actions to be taken if target not being achieved**
Reduce City carbon emissions	*Sustainability Checklist; BHCC; Developers; landowners; BEIS*	*City wide carbon emissions data. Showing 4% reduction annually, or progress towards 80% reduction by 2050*	*To be monitored annually throughout plan period; Targets as set out in policy CP8. (Source: Planning)*	*Review Development Management procedures;*

Changes to Policies Map Required

N/A

How preferred policy addresses consultation responses

There was strong support for further development of policy on low and zero carbon energy. An area that was particularly well supported across the consultation was Community Energy. This policy introduces generic policy in support of Community Energy.