Section 1 Local Contribution to Global Climate Change

A. Present Situation

Bristol City has a population of 428,000 residents living in 195,000 households. It is part of a wider sub-region of 1.1 million residents. In the last 10 years Bristol City’s population has grown by 10% and the value of its economy has grown by 40%.

In 2003 the UK Government set a target to reduce the UK’s emissions by 60% by 2050 from the 1990 baseline. This formed the context for carbon management in the UK. In 2008 the UK Government set statutory targets to reduce national emissions by 80% by 2050 and has subsequently set a target to reduce by 34% from 1990 to 2020.

There is no duty on municipalities in the UK to manage or reduce CO₂ emissions.

Despite the absence of statutory responsibility, Bristol City Council (BCC) and partners have been working to reduce the city’s contribution to climate change since 2000 and it has developed and delivered a series of strategies and action plans. These are summarised in Table 1.

In 2000 Bristol was the UK pilot of the Local Governments for Sustainability (ICLEI)’s Cities for Climate Protection programme. The City developed the Bristol Climate Protection and Sustainable Energy Strategy that set a target to reduce emissions by 60% by 2050 from a 1990 baseline. Bristol was one of the first UK municipalities to adopt such a strategy.

In 2009 Bristol joined the Covenant of Mayors and set more ambitious CO₂ reduction targets than the EU and UK, to reduce emissions by 40% by 2020 and 80% by 2050 from a 2005 baseline. To meet these commitments BCC created the current strategy and action plan – The Climate Change and Energy Security Framework.

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Table 1: Summary of BCC’s Adopted Climate Change Strategies
Present Situation

Bristol has the lowest per capita CO2 emissions of any major city in the UK (Ref1) – 4.7t in 2010, compared to a major city average of 5.6t, and a national average of 6.6t.\(^2\)

Bristol’s emissions were derived from the following fuels:
- Electricity – 2.22t
- Non-Transport Fossil Fuels – 1.55t
- Transport – 0.97t

Emission data at municipality level is available for the years 2005-10 and Bristol has successfully reduced per capita emissions by 19%. This compares to national UK reductions of 12% over the same period.

<table>
<thead>
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<th>Per Capita Emissions 2010</th>
<th>Reduction in Total Emissions 2005-2010</th>
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<tbody>
<tr>
<td>Electricity</td>
<td>2.22</td>
<td>17%</td>
</tr>
<tr>
<td>Non-Transport Fossil Fuels</td>
<td>1.55</td>
<td>23%</td>
</tr>
<tr>
<td>Transport</td>
<td>0.97</td>
<td>14%</td>
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Table 2: Per Capita CO\(_2\) emissions Bristol

Figure 1: CO\(_2\) emissions by energy source for Major English Cities
Figure 2: CO₂ emission by end user in the 8 Major English Cities outside London

Bristol’s CO₂ inventory

The UK Government produces a National Emissions Inventory, in line with international standards. It then extracts data from this for all UK municipalities and this data is used in this submission.

The data includes end user CO₂ emissions from the consumption of electricity, gas, and oil and from road transport within the city boundaries. It excludes road transport on the national motorway network, diesel railways, major industrial processes covered by the European Emissions Trading Scheme and Land Use Change and Forestry as these are deemed to be outside of the influence of local authority influence. Full details of the UK Government methodology are available³.

If those additional data are included Bristol has emissions of 5.0t/capita and remains the lowest major city.⁴

In the UK emission factors are calculated on a national basis and this information is presented in Table 3.

<table>
<thead>
<tr>
<th>Year</th>
<th>Gas</th>
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<tr>
<td>2005</td>
<td>0.187</td>
<td>0.521</td>
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<tr>
<td>2006</td>
<td>0.184</td>
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<tr>
<td>2008</td>
<td>0.190</td>
<td>0.553</td>
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<tr>
<td>2009</td>
<td>0.184</td>
<td>0.500</td>
</tr>
<tr>
<td>2010</td>
<td>0.206</td>
<td>0.511</td>
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Table 3: National emission factors (kg CO₂ per kWh)
Scientific basis for claimed reductions

Bristol’s reported CO₂ reductions are based on actual reductions in energy use in the city and reductions in the kilometres driven by vehicles on the city’s roads. Changes in the UK electricity grid CO₂ factor account for less than 0.5% reduction in emissions. Energy data used to produce the emissions inventory is produced by the UK Government and shows that Bristol homes, businesses and transport reduced their energy use from 7,948 GWh in 2005 to 6,747 Gwh in 2010.

Reductions in CO₂ emissions

Bristol’s first CO₂ target, 2004, was to reduce emissions by 60% by 2050 from an estimated 1990 baseline. New targets were adopted in 2010 to reduce emissions by 40% by 2020 and 80% by 2050.

Since the 2004 strategy Bristol has successfully reduced its CO₂ emissions by 15% overall between 2005-09. This performance has exceeded the targets, as shown in Figure 3 and Table 4.

Figure 3: Bristol CO₂ targets versus emission reductions to date
B. Measures implemented

Bristol has implemented the plans shown in Table 1 and some of the key measures are described below.

Bristol City Council Operations

As part of its community leadership BCC has reduced its CO₂ emissions by 28% between 2003/04 and 2011/12, by investing over £30m in:

- A dedicated Energy Management Unit and a robust system accredited to the Eco-Management and Audit Scheme.
- Improving 185 non-domestic buildings saving 4,500 tCO₂/pa
- Automatic Meter Reading of energy meters providing accurate, real time data to improve energy management.
- Street-lighting modernisation. A 4 year retrofit programme has so far replaced 10,500 lamps and fitted all illuminated bollards with LED lamps.
- Eco-Schools Programme. Working with community organisations to improve energy performance and climate awareness in schools.
- A school solar PV and energy efficiency programme, with 32 schools and an installed capacity of 568kWp.
- Reducing council travel CO₂ emissions by 32% through improved staff awareness and driver training, business travel planning, more efficient vehicles.
- Developing a 6MW wind energy project on BCC owned land at the industrial port area. Construction work has commenced and will be the first UK Council to own wind turbines.
- Developing 15 Biomass Boilers, mainly feed by wood waste from parks and street trees.

Local Road Transport

Bristol has reduced CO₂ emissions from transport by 12%/capita (2005-2010), through a £100m programme:

- Reducing transport demand; through integrated planning, increasing density and creating sustainable communities in accessible locations.
- Promoting sustainable transport; through:
  - Improved walking and cycling networks – Bristol became UK’s official demonstration Cycling City and invested £20m (2009-11) in new infrastructure and communication to encourage cycling.
  - Car parking control and promoting car clubs, e.g. residents parking areas
  - Improving bus infrastructure and services , e.g. improving a network of 10 new cross city bus routes with bus priority, real time information and new vehicles.
Industry and Commercial

The Bristol Green Capital Partnership is a network of over 250 businesses (not necessarily low carbon businesses) and organisations who have pledged to help make Bristol a low carbon city with a high quality of life. Many have joined a City Region Carbon Challenge – to cut their own emissions by 10% in three years. Results for 2010-2011 include:

- Environment Agency – 38% reduction, through new offices and working practices
- Bristol’s Fire and Rescue Service - 16% reduction, through improved energy management and heating systems.
- Latchams Direct Marketing and Media – 13% reduction through improved lighting
- BAM Construction - 12% reduction through automatic monitoring and better control

Overall, Bristol’s economy is growing but emissions have been reduced by 23% 2005-10, and CO₂ intensity has been reduced by 40%, as shown in Figure 4 below:

![GVA (£m) / Commercial & Industrial CO2 Emissions](image)

*Figure 4: Gross Value Added and CO₂ emissions from commercial and industrial sources*

Housing / Residential

Bristol has successfully reduced CO₂ emissions from homes by 16% per capita 2005-10, by:

- An energy efficiency programme that has improved over 20,000 homes since 2004 through insulation and new energy systems. This has increased the energy efficiency of homes in the city by 15%.
- Providing bespoke energy efficiency advice to over 100,000 residents through phone advice lines and a range of other communication channels.
- Communications programmes to raise awareness - 80% of residents are taking action about climate change by improving the energy efficiency of their homes.
Land-Use Planning and Building Control

BCC has adopted and updated policy to reduce the impact of new development. In 2011 BCC adopted a new city plan which:

- Requires all development to have an energy strategy
- Requires major developments to assess energy performance using independent methodologies (UK BREEAM and/or UK Code for Sustainable Homes)
- Requires all development to provide energy from onsite renewable sources, resulting in a 20% reduction in CO₂ emissions above UK building regulations
- Encourages the use of district heating and has identified priority areas for the city where developers will be expected to connect to future networks.
- Encourages major renewable energy installations, although capacity for this is limited.

Several new developments have been completed or are now underway which exemplify this plan:

- The headquarters of the UK Environment Agency – which was the most energy efficient office building in the UK in 2009.

- A major new acute hospital – which will be the most energy efficient major hospital in the UK – completion 2014

![Figure 5: Artist's impression new Southmead Hospital for Bristol](image)

Partnership Working, Awareness Raising and Education

Bristol’s citizens are concerned about climate change (70%) (BCC 2012) and many community groups are helping to make Bristol a low carbon city, including:

- Transition Neighbourhoods - raising awareness of energy security issues and helping to create resilient communities
- Community energy groups - developing practical projects, e.g. collectively draught-proofing and insulating homes in their communities
- Community energy co-operatives developing community owned energy systems, e.g. solar PV on community buildings
- Social enterprise Bristol Green Doors, whose “open door” events showcase ordinary citizens homes that have had energy efficiency refurbishment. Supported by BCC it began in 2010 with 50 homes and 2,700 visitors of whom 70% were "more likely to install related solutions" after visiting the homes. It now holds regular events.

*Figure 6: Bristol Green Doors*

BCC invested over £1m since 2001 supporting community action through small grants funding; and a revolving loan fund for community energy projects.
C. Future Plans

Bristol City Council has set targets to reduce CO₂ emissions from the city by 40% by 2020 and 80% by 2050, from a 2005 baseline.

Bristol City Council has adopted a Climate Change and Energy Security Framework (shown below) to achieve these targets. This is the city’s Sustainable Energy Action Plan under its Covenant of Mayors commitment.

Bristol’s Climate Framework is cross-cutting, embedding the targets and actions to tackle emissions across all sectors including buildings, transport, sustainable energy supply, economy, digital connectivity, planning, waste, communities and culture. It is built on an evidence base of research. It includes over £700m of investment in new transport and energy infrastructure and efficiency improvements as well as training initiatives, city policy changes, technology pilots and public engagement activities.

The CO₂ savings of each project are being assessed as they are developed so that the overall progress towards the targets can be predicted and additional actions planned.

Figure 6: Bristol’s Climate Framework Citizen Communication material
BCC Operations

Leadership by the municipality is important and Bristol is using its own operations to demonstrate low carbon business. As part of the Climate Framework it is investing over £35m to achieve BCC’s goal of 40% carbon reduction. Delivery has begun and actions include:

- Renewable energy programme - biomass, wind and solar £14m – delivery commenced
- Solar Phase 2 - £8m
- Street lighting moderisation citywide - £4m – delivery commenced
- Energy efficiency in public buildings - £8.7m

Local Road Transport

Reducing CO₂ emissions is a priority of the city’s mobility plan to 2026. The City’s Director of Transport is responsible for delivering a comprehensive 3 year delivery plan 2012-26 with £420m of investment in:

- Reducing the demand for travel, through superfast broadband (£30m)
- Reducing traffic in the city and city centre through parking restrictions, road space reallocation and 20mph speed restrictions city wide.
- Improving public transport by creating a rapid transit network in the city, linking suburbs to the city centre and complementing the recently enhanced bus network (£195m) (Figure 6)
- Improving rail services and opening new stations (£100m).
- An integrated package to promote walking and cycling (£24m)
- Intelligent traffic management systems
- Electric car charging points and electronic management system.
- New powers from UK Government to manage transport and secure long term investment in low carbon travel
Figure 6: Planned Bristol City Region Public Transport Network
Industry and Commerce

The City’s Director of Economic Futures is responsible for coordinating a £31m action plan that will contribute significant savings directly and many more indirectly. Delivery has begun and actions include:

- Supporting businesses with low carbon advice services
- Supporting the development of the sustainable energy installation industries, through training and skills development programme
- District heating projects in 5 key locations
- Development of a low carbon enterprise zone, creating thousands of jobs
- A UK demonstration pilot smart grid project to allow the integration of PV onto the grid

Housing / Residential

The City’s Directors of Finance and of Housing Strategy are responsible for delivering an action plan that incorporates a revolving fund that will contribute significant CO₂ savings. Key actions are:

- Continued advice and support for residents to undertake simple insulation measures.
- External wall insulation to 46 apartment blocks (£52m).
- Upgrading boiler systems and installing solar thermal systems in municipal homes (£10m)
- Installing Solar Photovoltaic systems on municipal homes – detailed feasibility work is underway to define the scale of the project following changes to UK Feed in Tariffs.

Planning and Building Control

Bristol City Council will ensure new Bristol development is built in a sustainable and low-carbon way by implementing new local statutory planning policy that all new development must adhere to:

- Requires all development to have an energy strategy
- Requires major developments to submit an assessment of its energy performance using independent methodologies (BREEAM and/or Code for Sustainable Homes)
- Requires all development to provide energy from onsite renewable sources, resulting in a 20% reduction in CO₂ emissions above those required nationally where viable
- Encourages the use of district heating and has identified priority areas for the city
- Encourages major renewable energy installations.

Monitoring progress

The CO₂ reduction target will be met via a combination of action from Bristol City Council, other Bristol public sector bodies, residents and the private sector. BCC actions within the Climate Framework are estimated to deliver CO₂ savings of
120kt/yr, representing a 5% reduction from Bristol’s 2005 emissions by 2020. Further savings will be made indirectly and from those actions that are unquantifiable.

The Climate Framework actions and Bristol’s emissions are being monitored and publicly reported annually.
D. References

1. The major English Cities are called the Core Cities and are: Birmingham, Bristol, Leeds, Liverpool, Manchester, Newcastle, Nottingham and Sheffield. [http://www.corecities.com/](http://www.corecities.com/)


8. BCC has developed its Climate Framework from a robust evidence base outlined

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<tr>
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<th>Description</th>
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<td>Building a Positive Future After Peak Oil</td>
<td>An analysis of the implications and possible city responses to Peak Oil (UK first)</td>
<td>(2009)</td>
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<tr>
<td>Carbon Futures for the Bristol Region 2050</td>
<td>Research project with local Universities and partners to develop scenarios</td>
<td>(2009-12)</td>
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<td>Bristol Citywide Sustainable Energy Study</td>
<td>Identified and mapped heat demand and sustainable energy opportunities</td>
<td>(2009)</td>
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<td>Low Carbon Refurbishment Investment Programme for Bristol’s Housing</td>
<td>Housing stock assessment identifying sustainable energy opportunities</td>
<td>(2010)</td>
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<td>Saving energy in Bristol’s Public Buildings</td>
<td>Public Buildings stock assessment</td>
<td>(2010)</td>
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<td>Assessment of Bristol’s Opportunities for District Heating</td>
<td>Identified priority locations for district heat development via heat mapping</td>
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<td>Assessment of Solar Potential</td>
<td>PV potential of every roof in the city identified using advanced mapping techniques</td>
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<td>Local Transport Plan</td>
<td>Included carbon emissions assessment</td>
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<td>Carbon Costing Toolkit</td>
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