Can-do Cities

# Carbon Accounts and the Scope for Low Carbon Development

# Bournemouth

## Introduction

Here we present information on past, present and future carbon emissions for your area. The information relates to real (measured) emissions and future (forecast/modelled) emissions.

It includes data on what are known as production-based (or territorial) emissions and consumption-based (or extra-territorial) emissions. Production-based emissions relate to all of the fuels that are consumed (e.g. gas, coal, oil) and emissions that are generated (e.g. from waste) as well as the emissions that come from all of the electricity that is consumed within the area. These emissions are also known as scope 1 and 2 emissions.

It also includes data on consumption-based emissions include all of the emissions associated with the goods and services that are consumed by a region, with allowance made for goods and services produced in the area and exported for consumption in other areas. These emissions therefore include (but are not equal to; see the readme download) scope 3 emissions.

## Production-based emissions

The production-based baseline in Figure 1 takes into account projected economic and population growth in your area, as well as the impacts of a continuation of national trends in the carbon intensity of electricity generation and trends in energy consumption and energy efficiency. The forecast assumes that, over the next two decades, the decarbonisation of domestic, commercial, industrial and transport sectors in the area will follow national trends. In reality, future emissions pathways are highly uncertain and depend upon many factors, many of which are out of local administrative control, e.g. the carbon intensity of the electricity supplied through the national grid.

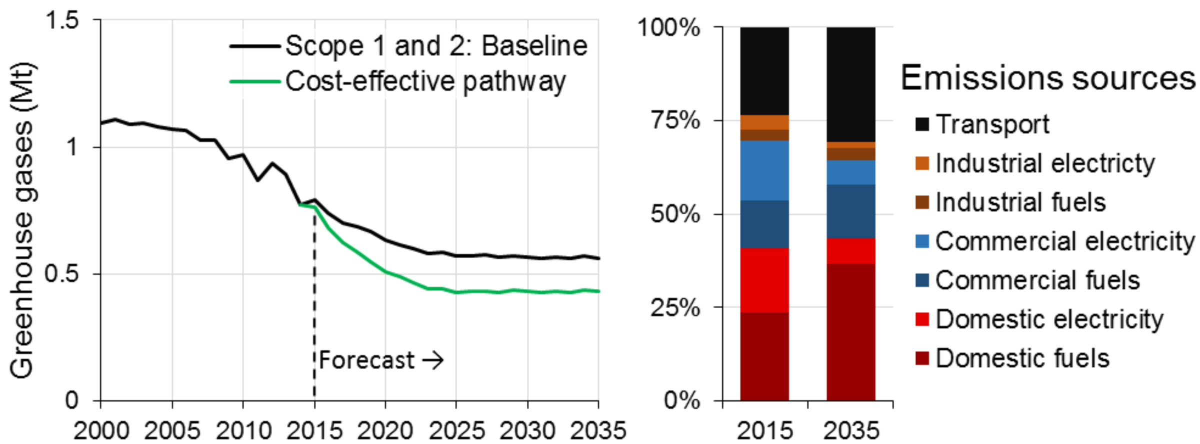


*Figure 1: production-based emissions trajectories for the area in megatons of carbon emissions equivalent (left) and the percentage split of these emissions in 2015 and 2035 (right).*


E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL
Centre for Climate Change Economics and Policy
An ESRC Research Centre
UNIVERSITY OF LEEDS

The ‘cost-effective’ pathway in Figure 1 considers the carbon savings that could be achieved if all of the energy efficient and low carbon options that at least covered their costs (including purchase, installation, maintenance) over their life time were adopted in the area. Available options have been considered for the domestic (housing), commercial (public and private sector non-residential buildings), industrial and in-area transport (excluding public transport) sectors. Far more significant savings could be made if investment was also made in other low carbon options that are not attractive from this direct, narrow, economic perspective. This analysis can be provided on request.

## Consumption-based emissions

Consumption-based emissions, which are all the emissions associated with the goods and services that are consumed by a region, are more difficult to calculate than production-based emissions. For example, when an electronic device is purchased by a person, an estimate must be made of the emissions involved in mining the raw materials, manufacturing the device, and transporting it to the UK retailer, and these emissions must then be assigned to the area’s consumption-based emissions account. Rather than calculating this for every item, economic data is used that tracks all the transactions between different sectors of the economy and different countries. This leads to aggregate estimates of an area’s consumption-based carbon impact, as shown in Figure 2.

In this figure, the differences between consumption- and production-based emissions can be seen. In industrialised, or post-industrialising countries such as the UK (as opposed to industrialising, or pre-industrial, countries), consumption-based emissions are often two to three times larger than production-based emissions. Note also that Figure 2 should be viewed as illustrative: This calculated breakdown of emissions uses a number of national-level datasets that are not yet available at a more refined local-level, and the forecast assumes a continuation of recent trends in the global carbon intensity of production and of recent (national and local) trends in spending and consumption.

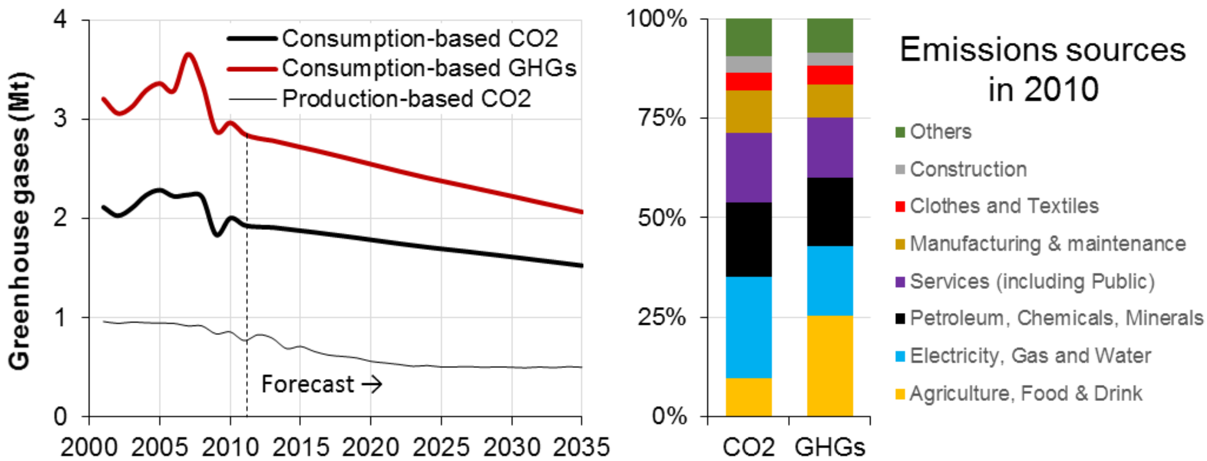


*Figure 2: consumption-based emissions trajectories for the area’s total GHGs and for $CO_2$ only (left) and the percentage split of these GHG and $CO_2$ emissions (right).*

## The Most Cost and Carbon Effective Options

Below are tables of the potentially most carbon effective (Table 1) and cost-effective (Table 2) options available for reducing production-based emissions. These are grouped into various high-level categories such as 'domestic insulation', which includes an aggregate estimate of savings for various types of cost-effective insulation over the full area. Note also that these tables can be used to guide low carbon development planning, but they should *not* be used to develop specific business cases or to guide specific investments. More refined data can also be developed and supplied on request.

### Table 1: The Most Carbon Effective Options

*Note: when calculating total area savings cash flows are discounted at 3%. Please see the readme document for more details*

| Carbon Effectiveness | Total area carbon savings | Measure | Sector |
|---|---|---|---|
| Highly effective | *500 kt to 1 Mt $CO_2$* | Insulation (cost-effective insulation: cavity, loft and floor) | Domestic |
| | | Heating (boilers, heat pumps, controls) | Domestic |
| | | Cooling in retail buildings | Commercial |
| | | Insulation (cost-effective fabric improvements) | Commercial |
| Very effective | *101 to 500 kt $CO_2$* | Demand reduction (minor; heating, lighting and appliances) | Domestic |
| | | Appliances (refrigeration, cookers, TVs, washing machines) | Domestic |
| | | Lighting (low energy) | Domestic |
| Effective | *13 to 50 kt $CO_2$* | Electric vehicles (cars, goods vehicles and buses) | Transport |
| | | Heating (boilers, heat pumps, controls) | Commercial |
| | | Boilers and Steam Piping (cost-effective measures) | Industrial |

### Table 2: The Most Cost Effective Options

*Note: when calculating total area savings cash flows are discounted at 3%. Please see the readme document for more detail.*

| Cost Effectiveness | Total area cost savings | Measure | Sector |
|---|---|---|---|
| Highly effective | *£100 to £200 million* | Cooling in retail buildings | Commercial |
| | | Hybrid cars (diesel and petrol) | Transport |
| | | Insulation (cost-effective insulation: cavity, loft and floor) | Domestic |
| Very effective | *£10 to £100 million* | Appliances (refrigeration, cookers, TVs, washing machines) | Domestic |
| | | Demand reduction (minor; heating, lighting and appliances) | Domestic |
| | | Heating (boilers, heat pumps, controls) | Domestic |
| | | Lighting (low energy) | Domestic |
| Effective | *£1 to £10 million* | Heating (boilers, heat pumps, controls) | Commercial |
| | | Insulation (cost-effective fabric improvements) | Commercial |
| | | Pumps (cost-effective measures) | Industrial |

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

Centre for Climate Change Economics and Policy
An ESRC Research Centre

UNIVERSITY OF LEEDS

## Notes of Caution

All modelling and forecasting depends on the quality of the input data and on a series of assumptions, and all results include an element of uncertainty. These results are therefore presented for indicative purposes only. Further information on these issues is included in the 'Readme' document that accompanies this document and is available via the candocities.org web-site. None of the organisations involved in the funding, development or promotion of this research can accept any responsibility for decisions taken on the basis of the information provided here.

## Further Information

For further information or data please contact info@candocities.org

Fuller datasets and reports on the economic case for low carbon development or on the costs and benefits of achieving different low carbon targets in a local authority, local enterprise partnership or city/region etc. can be provided. Depending on the amount of information or analysis required a fee may be charged.