



Dumfries & Galloway's Low-Carbon Journey

1 Introduction

What is a low-carbon journey, how is Dumfries & Galloway doing in this regard and how does it compare to other parts of Scotland and the rest of the UK? Above all, what does it mean for the local economy and businesses in the area? These are all valid and relevant questions.

Low-carbon in this article is taken to represent the goal of minimising anthropogenic or man-made emissions of carbon dioxide (CO₂), which is the main greenhouse gas (GHG) - leaving aside water vapour, and accounting for about 82% of the UK's total GHG emissions in 2014 (1). Among the many human activities that produce greenhouse gases the energy sector represents by far the largest source, particularly of CO₂ emissions, due to the oxidation of carbon in fuels during combustion.

2 Background

The concern for CO₂ emissions from the burning of fossil-fuels arise from the 'greenhouse effect' which is a phenomenon whereby certain gases, CO₂ being one of them, in the Earth's atmosphere are more transparent to the short wave radiation from the sun than to the long wave radiation from the Earth's surface. Consequently the atmosphere traps solar radiation in a similar manner to a greenhouse and without this greenhouse effect the Earth's average surface temperature would be closer to -18°C rather than +15 °C (2).

Thus while the greenhouse effect is a natural process by which global warming occurs and thereby renders the Earth habitable for life as we know it, concern lies with anthropogenic emissions that have increased since the pre-industrial era, driven largely by economic and population growth leading to unprecedented values of CO₂ and other GHGs (3). Climate scientists are now clear in their view that human influence on the climate is increasingly becoming more evident; observing that CO₂ concentrations in the atmosphere have increased

from about 280 parts per million (or ppm) to 397 ppm by 2014 with an average growth of 2 ppm/year in the last ten years (4).

In the UK this concern for the climate is enshrined in legislation: in the form of the Climate Change Act (2008), which places a legal requirement on government to reduce emissions by at least 80% below 1990 levels by 2050 and by at least 34% by 2022 through a series of carbon budgets. The Scottish Government meanwhile, through the Climate Change (Scotland) Act 2009, has set more ambitious targets which it aims to achieve by reducing energy demand, improving energy efficiency and replacing fossil-fuels with renewable sources (5).

3 Discussion

Against this background it is interesting to note that by 2013 UK territorial CO₂ emissions, (emissions arising from the production of goods and services within national or territorial boundaries), which account for 1.4% of global CO₂ emissions, had reduced by 18.1% since 1990. By contrast, China, the largest polluter at 28.0%, increased emissions by 307% over the same period (6). This growth in emissions from China and other developing economies in relation to reductions by developed economies is linked to the concept of 'de-materialisation' in which the former argue they are satisfying the consumption requirements of the latter. Hence, emissions that historically occurred in developed countries of the western world now occur in developing nations in order to satisfy western needs for manufactured goods (7).

In the UK, DECC have compiled a database of CO₂ territorial emissions for all 406 Local Authorities based on estimated data that takes account of Standard Industry Classification (SIC) Codes for the composition and type of businesses within each area, the type and scale of fuel use, national traffic statistics and road networks, population, employment and much more. The purpose of the data is to assist Local Authorities in tracking progress on decarbonisation with time series datasets going back to 2005 (8). These data are broken down into the five main categories of industrial and commerce, agriculture, domestic, transport and land use, land use change and forestry (LULUCF).

While the four former categories are self-evident in terms of being sources of carbon and other GHG emissions, LULUCF on the other hand can be both source and sink in so far as the predominant emission, carbon dioxide, can also be removed from the atmosphere (9).

Sources are expressed as positive CO₂ values while sinks, i.e., removals, are given negative values. Table 1 shows the CO₂ emissions data for the UK and Scotland broken down into the main categories based on estimated data available in 2012 (10).

Category	UK (kteCO₂)	Scotland (kteCO₂)	Percentage (%)
Industrial & Commerce	192,571	16,915	8.8
Agriculture	4,225	749	17.7
Domestic	141,999	13,192	9.3
Transport	123,028	10,264	8.3
LULUCF	-7,722	-5,445	70.5
Total	454,102	36,675	8.1

Source: DECC (2014)

The values in Table 1 illustrate, for Scotland relative to the UK, a) the larger percentage contribution of CO₂ arising from agriculture, b) factors such as the greater use of oil for domestic heating as well as lower ambient temperatures and poorer housing stock which combine to give rise to larger percentage emissions, and c) the significance of land use, land use change and forestry, and particularly forestry, in removing CO₂ from the atmosphere.

Looking deeper at the background dataset on a per capita basis (per head of population), in order to draw comparisons while allowing for the different size of regions, the UK emissions overall represent 8.7teCO₂ per capita while Scotland is marginally lower at 8.2teCO₂. Dumfries & Galloway meanwhile had the lowest emissions per capita of any of the 406 Local Authorities in the UK. Indeed, the figure is so low, at 0.3teCO₂, that the region may almost be regarded as being carbon neutral. The primary reason being that 1565.5teCO₂ is estimated as being removed from the atmosphere by LULUCF, and this is aided by the absence of a large energy consuming industrial base together with a falling electricity demand (11).

The latest figures from DECC (12) based on 2013 data, in which there has been some underlying changes to the methodology, shows that Northumberland has beaten Dumfries & Galloway into second place by becoming carbon negative following the repurposing of an on-site power plant after the closure of a large industrial site (Alcan Smelter). Dumfries & Galloway, however, remains the lowest CO₂ polluter/capita of any of the 32 Local Authorities in Scotland and had the methodology relating to LULUCF not been revised this year the region could have claimed to be truly carbon neutral.

4 The importance of low-carbon to Dumfries & Galloway

So, why should businesses in Dumfries & Galloway be interested in these 'green' credentials? The answer lies in the fact that Dumfries & Galloway is a predominantly rural area (13) with a greater propensity for micro and small businesses dominated by declining primary industries, especially farming (14). Furthermore, the fundamental indicators of economic well-being are weak, with the area classified as one of the 'less-developed' within the European Union (15), with a gross value added (GVA) growth rate predicted to increasingly lag behind Scotland and the rest of the UK (16). Additionally, business birth rates for the region lag behind comparator regions and business closures in 2012 exceeded the birth rate by a large margin while for Scotland as a whole the reverse holds true (17).

To add to matters, in the past, inward migration – bringing a fresh source of entrepreneurs into the region – exceeded outward migration but a reversal occurred in 2011 and in the three years to 2013 the loss of young people leaving the region looking for jobs and seeking education exceeded the gain from older people moving to the region (18); a trend projected to continue over the coming decades culminating in a 6.1% population fall against an increase of 8.8% for Scotland overall by 2037 (19). Estimates suggest there are about 5500 people currently out of work and seeking employment, or 8% of the economically active population; a figure that has doubled since 2008 and higher than Scotland and other comparator regions. Of those out of work, Dumfries & Galloway Council is one of the worst Local Authority areas for unemployed young people (20). More recent statistically generated model data, however, indicates the number of unemployed in the region may have fallen to 3800 (21).

On the other hand, the region is rich in natural resources as well as historic and cultural assets; the sort of qualities that make the area so attractive for people to visit but which needs protection from adverse development. These qualities offer growth opportunities for increasing GVA (22) and associated employment from a growing tourism sector which, in 2009, contributed £270m or 11% to the economy (23) compared to just 8.5% for Scotland's tourism sector overall in 2013 (24). Tourism is therefore an increasingly important component of Dumfries & Galloway's rural economy, both in terms of jobs and wealth creation, with income in 2015 rising for the first-time beyond £300m and attracting more than 2,000,000 visitors (25).

Dumfries & Galloway is consequently well placed to capitalise on its 'green' credentials by attracting increasing visitor numbers to the region from the multi-billion pound wave of eco-tourism sweeping the world. Given that a recent poll of 60,000 visitors ranked Scotland as the top European eco-destination and ninth in the world (26), if Dumfries & Galloway can nurture and protect its natural assets, market the inherent low-carbon environment and integrate this with the Green Tourism Business Scheme (27) it has the potential to become the eco-destination of choice in both Scotland and Europe. This would provide an exciting future for the region!

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