

## Carbon Footprint Analysis



Understanding the UK's carbon footprint is the first step in reducing it.

### 1. Overall picture of UK's carbon footprint

#### 1.1 Carbon Trust = Consumption-based approach

The above table has been compiled by the Carbon Trust and includes both direct and indirect CO<sub>2</sub> emissions for people in the UK. From the above footprint diagram we can see that people in the UK emit most CO<sub>2</sub> emissions in the following areas:

- Recreation and Leisure = 116 MtCO<sub>2</sub> (million tonnes of CO<sub>2</sub>) = 18% of total
- Space heating = 88 MtCO<sub>2</sub> (million tonnes of CO<sub>2</sub>) = 14% of total
- Food & catering = 82 MtCO<sub>2</sub> (million tonnes of CO<sub>2</sub>) = 13% of total
- Household = 82 MtCO<sub>2</sub> (million tonnes of CO<sub>2</sub>) = 13% of total

"Recreation and Leisure, Space Heating and Food and Catering are the three consumer needs with the highest carbon emissions. Together, they account for almost half of the total UK carbon emissions." (*Carbon Trust – Reference 1*)

The above data is based on the Carbon Trust's consumption-based approach to analysing carbon emissions and differs from the approach used by DEFRA in analysing carbon emissions which is known as the production-based analysis. Most of the data in this report on the South West region and Gloucestershire and its districts has been taken from the DEFRA production-based analysis of CO<sub>2</sub> emissions and so the results are much more limiting than if DEFRA were able to use the consumption-based approach as the Carbon Trust do. As the Carbon Trust says:

"It is consumption activity and consumer behaviour that drives carbon emissions on a wider scale. In order to meet the long-term emission reduction targets it will be necessary to change cultural patterns of consumption and the way in which products and services are produced for the final consumer."

## 1.2 DEFRA UK CO2 STATISTICS: 1990 – 2006 = Production-based approach

(Reference 2)

“Carbon dioxide is the main man-made contributor to global warming. The UK contributes about 2% to global man-made emissions, which, according to the IPCC, were estimated to be 38 billion tonnes carbon dioxide in 2004. Carbon dioxide accounted for about 85% of the UK’s man-made greenhouse gas emissions in 2006.”

“In 2006, 40% of carbon dioxide emissions were from the energy supply sector, 22% from road transport, 17% from business and 15% from residential fossil fuel use. Since 1990, emissions from road transport have increased by 12%, while emissions from the energy supply industry have reduced by 9%\* and business emissions have reduced by 16%. Since 2005, emissions from the energy supply industry have risen by 1.5%\*\* whilst residential emissions have fallen by 4%.

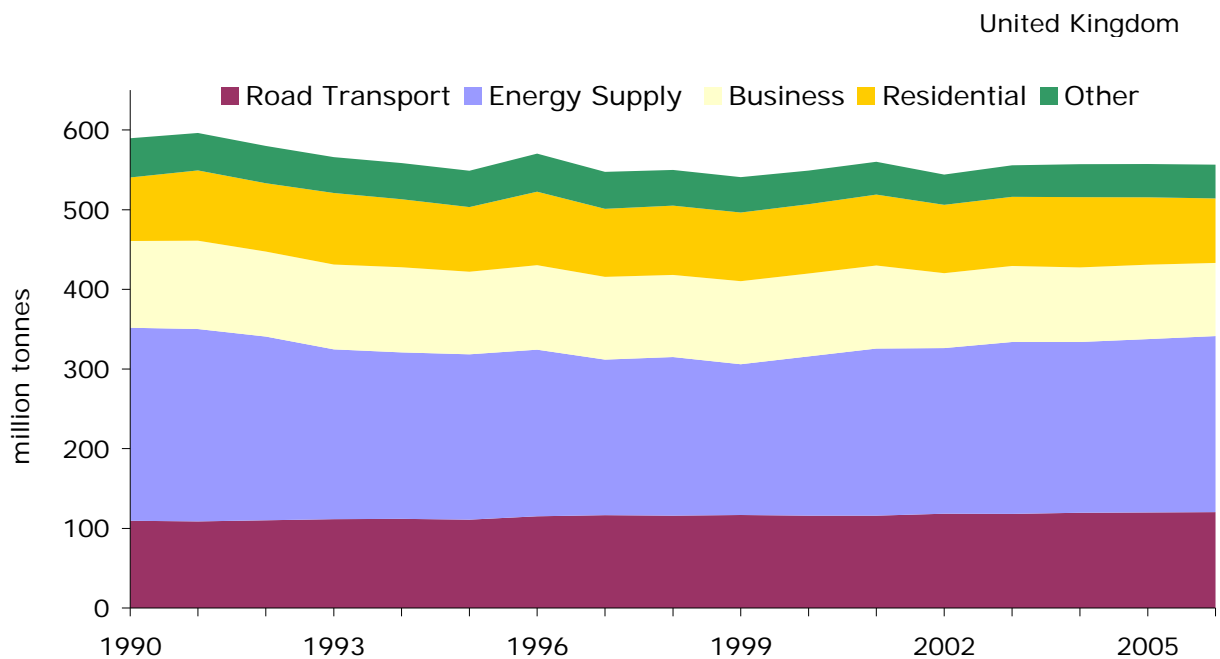
“In 2006 the percentage of total emissions accounted for by business was 35%, residential users was 27% and the transport sector was 28%. Between 1990 and 2006, total carbon dioxide emissions fell by 6.4%\*\*\*. Much of this decline has come from a reduction in emissions attributable to business which declined by 36%. Emissions caused by residential users have declined by 4% since 1990, but those attributable to transport have risen by 12%.” (DEFRA)

\* this 9% reduction is due to the ‘dash to gas’ following the closing of UK coal mines;

\*\* this 1.5% rise is because we are now importing coal not gas because it is cheaper;

\*\*\* according to a Report from the Tyndall Centre (March 2006) if emissions from aviation & shipping were included emissions would now be higher than 1990 levels.

**Figure 3 Carbon dioxide emissions by source: 1990-2006**



Source: AEA Energy & Environment

From DEFRA’s analysis of the UK’s carbon footprint since 1990 (above) we learn the following:

- In 2006 total emissions from business = 35%, residential users = 27%, transport sector = 28%;
- Emissions caused by residential users have declined since 1990 – by 4%;
- Emissions caused by transport have risen since 1990 – by 12%.

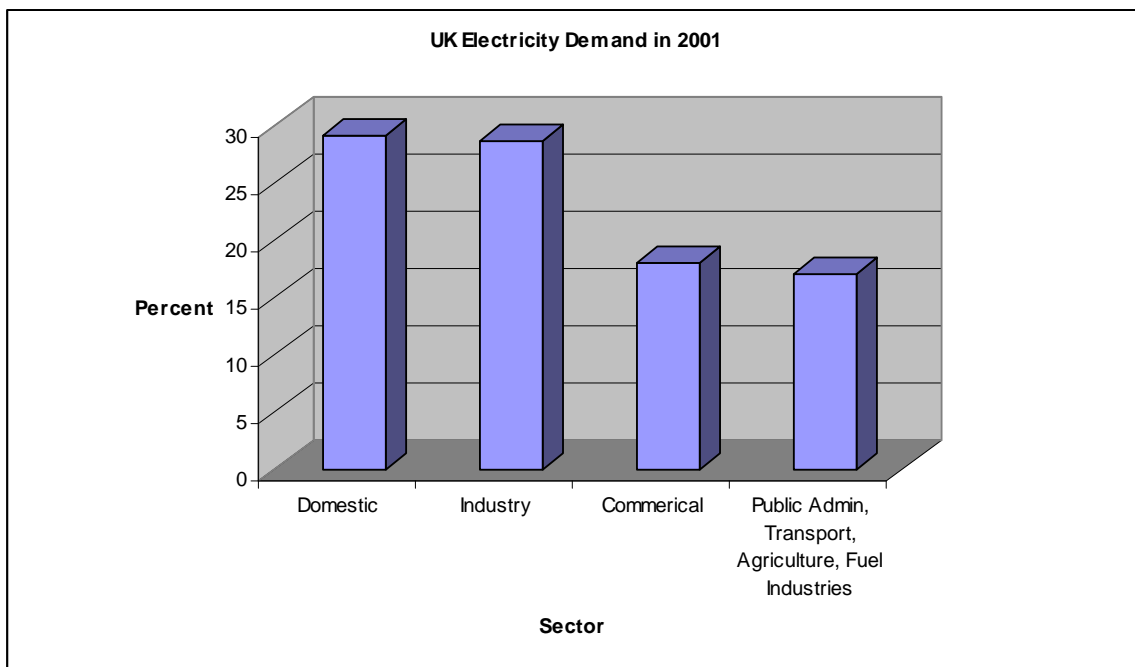
(It is estimated that emissions from road freight transport increased at a higher rate than emissions from road passenger transport)

### 1.3 Dept for Business Enterprise & Regulatory Reform (BERR) = Production-based (Reference 3)

A summary of the information provided by BERR: Energy Trends March 2008 includes the following:

“Emissions implied by the production of goods and services imported by the UK are not included, since under the UN-FCCC agreement, these emissions are counted by the country in which they occur.” If you include UK indirect emissions from goods imported from China then the global figure for CO2 would be 1.8%.

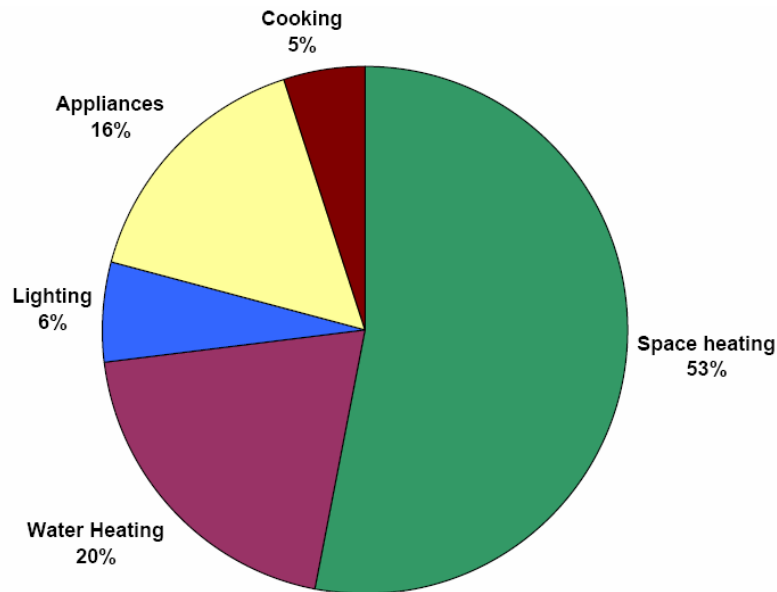
- Consumption of UK electricity increased between 1990 and 2007 by 24.5%;
- UK Domestic electricity consumption increased between 1990 and 2007 by 23%;
- The transport sector accounted for 24% of UK emissions in 2007 of which 92% was road transport.



The above bar chart shows UK Electricity demand in 2001:

UK Electricity demand in 2001 was divided into:

- 29% to the domestic sector;
- 28.5% to industry;
- 18% to the commercial sector
- 17% of demand shared by public administration, transport, agriculture and the fuel industries.



#### 1.4 DEFRA: Energy Efficiency of Dwellings (Nov. 2006) = Production-based

The above pie chart from DEFRA shows the split into areas of the use of energy in the domestic sector. Although UK electricity demand is the highest in the domestic sector this only usually accounts for lighting, appliances and some of the cooking and water heating from the above area split of domestic energy use. This is only a combined possible total of: 22% (appliances and lighting) and a proportion of a further 25% (cooking and water heating). The greatest use of energy in the domestic sector comes from space heating (53%) which usually comes from natural gas in the UK although a small proportion of homes are heated by electricity.

#### 1.5 WRAP (Waste & Resources Action Programme) and Waste *(Reference 4)*

The government funded WRAP (Waste Resources Action Programme) looks at the contribution that recycling makes to reducing CO<sub>2</sub>. WRAP estimates that current UK recycling saves 10-15 million tonnes of CO<sub>2</sub> equivalent greenhouse gases a year. This is equivalent to taking 3.5 million cars off the road. The WRAP study has reviewed and analysed Life Cycle Analysis studies from around the world, evaluating environmental impacts of recycling compared to incineration or landfill for seven of the most commonly recycled materials.

## 1.6 Conclusions

- From the table compiled by the Carbon Trust we can see that people in the UK emit most CO<sub>2</sub> emissions in the following areas:
  - Recreation and Leisure = 116 MtCO<sub>2</sub> = 18% of total;
  - Space heating = 88 MtCO<sub>2</sub> = 14% of total;
  - Household = 82 MtCO<sub>2</sub> = 13% of total;
  - Food & catering = 82 MtCO<sub>2</sub> = 13% of total.
  
- Altogether these four areas account for a total of 58% of the UK's total CO<sub>2</sub> emissions. They are also all lifestyle emissions and are a result of people wanting warmer houses, more exotic food choices available at the supermarket and restaurants, as well as people eating out more regularly and eating more ready meals which require more energy to process. There has also been an increase in more carbon-intensive leisure activities such as the Wii products, hot tubs, sunbeds etc. These choices all reflect the increase in individual wealth in the UK as it is well-known that the more money you earn the more carbon you emit through your lifestyle choices. According to the Resurgence web-site (*Reference 5*) they say that everyone's share of CO<sub>2</sub> emissions: "may be proportional to income, being roughly one tonne for every £5,000 of income per person in the home". Also many UK people's lifestyles are fuelled by credit - according to Credit Action: "the average household debt in the UK is: £8,985 (excluding mortgages). This figure increases to £20,895 if the average is based on the number of households who actually have some form of unsecured loan." (*Reference 6*)
  
- Another piece of evidence to support this is market research based on ACORN profiles (*Reference 7*) which profiles the group who have the largest carbon footprint and who will therefore have to alter their behaviour the most. They are known as type 3 in the ACORN classification and represent 2.7% of the UK's population. Neighbourhoods fitting this profile are found throughout the shire counties, especially in Gloucestershire. They are classed as "wealthy people living in rural villages..." Given the rural nature of these areas there is some agricultural employment but most residents are affluent, well educated professional people employed in senior managerial positions. There are also more of this type working from home. They tend to be older, aged 45+ with fewer children and more often retired. They tend to live in houses with four or more bedrooms, mostly detached and at the upper end of the property market. They have high car ownership with two or more cars per household being common, and high value cars being the norm. They also have high levels of ownership of stocks and shares, unit trusts and guaranteed income bonds. They use the internet to purchase financial products, cars, holidays and other products. Their leisure interests included walking, bird watching, the fine arts, antiques, classical music and the opera and membership of the National Trust is popular. They tend to read the Telegraph, the Times and the Financial Times.
  
- Overall UK consumption and domestic consumption of electricity increased by nearly 25% between 1990 and 2007. One conclusion that could be drawn from this is that industry may have reduced CO<sub>2</sub> emissions as highlighted above because of the conversion from coal to gas but that industry increased their use of energy in the form of electricity at the same time. This is in line with the corresponding economic growth which the UK has enjoyed in recent years. From a domestic point of view it would suggest that we are using an increasing amount of goods that require electricity and that merely having higher ratings of energy efficiency on those goods is falling far short of what is required.
  
- 92% of the UK's transport emissions are from the road. These have been rising since 1990. It is estimated that emissions from road freight transport increased at a higher rate than emissions from road passenger transport. Freight transport is responsible for just over 21% of all CO<sub>2</sub> emissions from the UK transport sector and roughly 6% of total CO<sub>2</sub> emissions in the UK – this statistic was published by the Department for Transport in 2005 (*Reference 8*).

## 2.0 Overall picture of the South West region's carbon footprint

### 2.1 Production-based approach - 2005 South West Region CO2 emissions

Total CO2 (tonnes) in the South West regions 2005

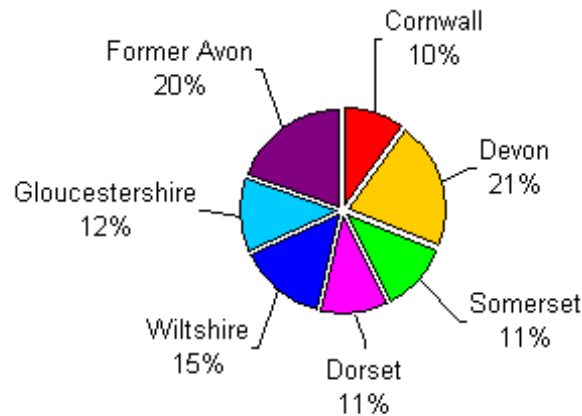


Table above taken from DEFRA statistics. For a pie chart detailing the CO2 emissions of the South West by sector please see: **Appendix 1** at the end of this report.

#### Per capita emissions

The per capita emissions for the South West were 8.8 tonnes in 2005, which was 5.4 percent below the UK per capita emissions of 9.3 tonnes. This figure of 9.3 tonnes was provided by DEFRA in 2005 but according to the Carbon Trust this figure has now risen to 11.3 tonnes of CO2 per year. All these figures include direct emissions and indirect or embedded emissions from the goods and services we buy.

#### Industrial emissions

Gloucestershire's industrial emissions account for 11% of the South West Region's emissions from Industry and Commerce, which makes Gloucestershire the fourth highest emitter in this sector out of seven regions in the South West.

#### Domestic emissions

South West domestic end user emissions was 2.6 tonnes of CO2 a year per capita. This represents 34% of their direct and indirect emissions and 59% of their direct emissions. This was slightly higher than the UK average of 2.5 tonnes a year per capita. Domestic CO2 emissions can be influenced by the type of fuel used, the insulation of the housing, average temperature, average household size, type of household, income and preferences of the occupiers.

## 2.2 Data from Government Office South West Regional Sustainable Development Indicators *(Reference 9)*

#### Carbon dioxide emissions by end user

Around 39% (England average 44%) of CO2 emissions in the South West were from industry and commerce, compared with approximately 30% (England average 28%) from domestic sources and 31% (England average 28%) from road transport. So in the South West region emissions are higher than average in the domestic and road transport sectors.

#### Waste

In 2004-5, around 18.1 million tonnes of waste (arising from construction and demolition, industry and commerce and the municipal sector which includes household waste) were produced in the South West; 10% of the UK total. 52% was produced by construction and demolition (48% England average) and 31% came from industry and commerce (36% England average) whilst the remaining 17% was municipal waste (16% England average). 45% of the waste was disposed of by landfill (42% England average) and 53% was recycled (average rate for England).

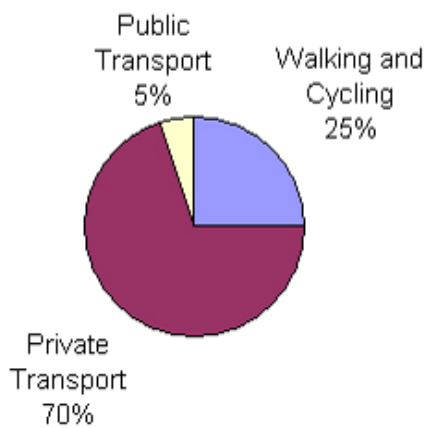
## Household waste

On average 526 kilograms of household waste were produced per person in the South West in 2006-7 (England average 511 kilograms); an increase of 7% compared with 1998-9 (England overall increase 6%). The South West had the second highest recycling rate of the regions, with 37% of household waste recycled (England average 31%).

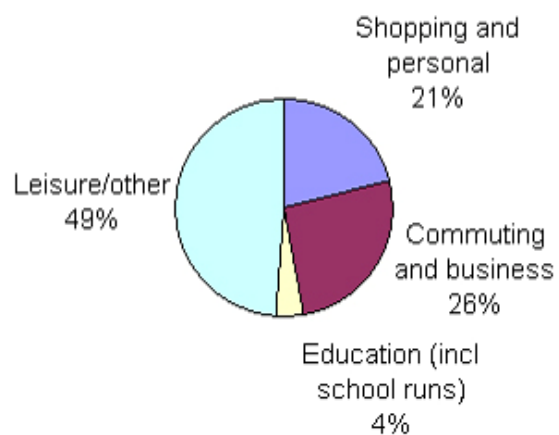
## Mobility

In 2005-6, walking and cycling accounted for 25% of all trips in the region, with private transport accounting for 70% of journeys and public transport 5%. The proportion of walking and cycling has fallen by 4 percentage points since 1995-7, the proportion of public transport has remained the same. 21% of the total mileage was on shopping and personal business, 26% on commuting and business, 4% on education (and escorting children to education), and the remaining 49% on leisure and other pursuits.

### Regional Mobility 2005-6



### Allocation of Car Mileage



## UK statistics on mobility

- 25 % of car journeys in the UK are less than 2 miles distance;
- 58 % of car journeys in the UK are less than 5 miles distance;
- Between 1996 and 2006 walking trips have fallen by 20%;
- Between 1992 and 2004 cycling reduced by 6%;
- Between 1992/94 and 2004 the proportion of primary-aged children walking to school fell from 61 to 50%, with an increase from 30 to 41% being driven. Between 1992/94 and 2004 the proportion of secondary school pupils walking remained at 44% whilst those being driven rose from 16 to 22%.

## Getting to school

In 2005-6, 44% (England average 48%) of pupils in the region walked or cycled to school, whilst 35% (England average 31%) used private motor vehicles and 21% (England average 20%) used public transport. Between 1995-7 and 2005-6 the proportion of pupils walking or cycling to school in the region decreased by 1.5 percent.

## 2.3 Conclusions

- The South West's carbon footprint is slightly below the UK average but this should not lead us to complacency as it is still double that of the average Chinese citizen and represents much more than our fair share of the earth's atmosphere.
- South West domestic and road transport emissions are slightly higher than other UK regions. The domestic emissions are probably as a result of the region's greater number of detached and larger residences. And the higher road transport emissions are as a result of the more rural make-up of the region.
- The household recycling rate in the South West was the second highest in the UK with 37% of household waste being recycled. This illustrates that household recycling is already well supported in the South West region by its residents. Although we understand that Vision 21 has shown the ability to raise the rate of domestic household recycling, given that domestic waste only accounts for 17% of total waste, domestic recycling should no longer be a priority for Vision 21 Glos. The logical next step in waste reduction would be to analyse waste from construction and demolition first and then from industry and commerce to ascertain how much is currently recycled and how Vision 21 could help to increase these recycling rates.
- Private road transport accounted for 70% of all domestic journeys in the South West region in 2005-6. This demonstrates that tackling personal car-use continues to be an important target for Vision 21's work.
- Only 4% of total South West transport emissions involved escorting children to education. Although the proportion of pupils walking or cycling to school decreased during 1995-2006 by 1.5% there were still 44% of pupils in the region walking or cycling to school in 2005. This shows us that putting resources into 'Walk to School' campaigns is not a priority in terms of reducing CO2 emissions in the South West.



### 3.0 Overall picture of Gloucestershire’s carbon footprint

#### 3.1 DEFRA 2005 statistics = production-based approach

According to DEFRA in 2005 Gloucestershire emitted a total of 5,142 kt of CO2 of which:

- **35%** came from industry & commerce (this includes: agriculture & public sector fuel combustion; electricity use; industrial process emissions management of airports & ports - support vehicles, stationary heating & power; industrial & agricultural off-road machinery industry auto-generation of electricity; electricity use and stationary combustion in the rail sector; diesel rail transport; waste incineration; emissions from agricultural soils; deforestation);
- **29%** came from domestic sources including fuel combustion, electricity use & house and garden machinery. (For a breakdown of sources of energy use - see *appendix 4*)
- **35%** came from road transport fuel use and burning of lubricants – we have not been able to find the split for domestic and commercial from this percentage figure.
- **1%** came from land use change, natural CO2 emissions from soils and peat extraction.

The ratio split of emissions in Gloucestershire is virtually identical to that of the South West region. Also the above statistics are only based on direct CO2 emissions and not direct and indirect CO2 emissions combined. As stated earlier, DEFRA’s data is based on a production-based analysis of carbon footprints and not the more comprehensive consumption-based analysis used by the Carbon Trust. Unfortunately the Carbon Trust don’t break down their national data into regions or Local Authorities.

Emissions unallocated outside Local Authority boundary emissions:

Domestic aviation, offshore gas and offshore oil, shipping (including coastal shipping and fishing).

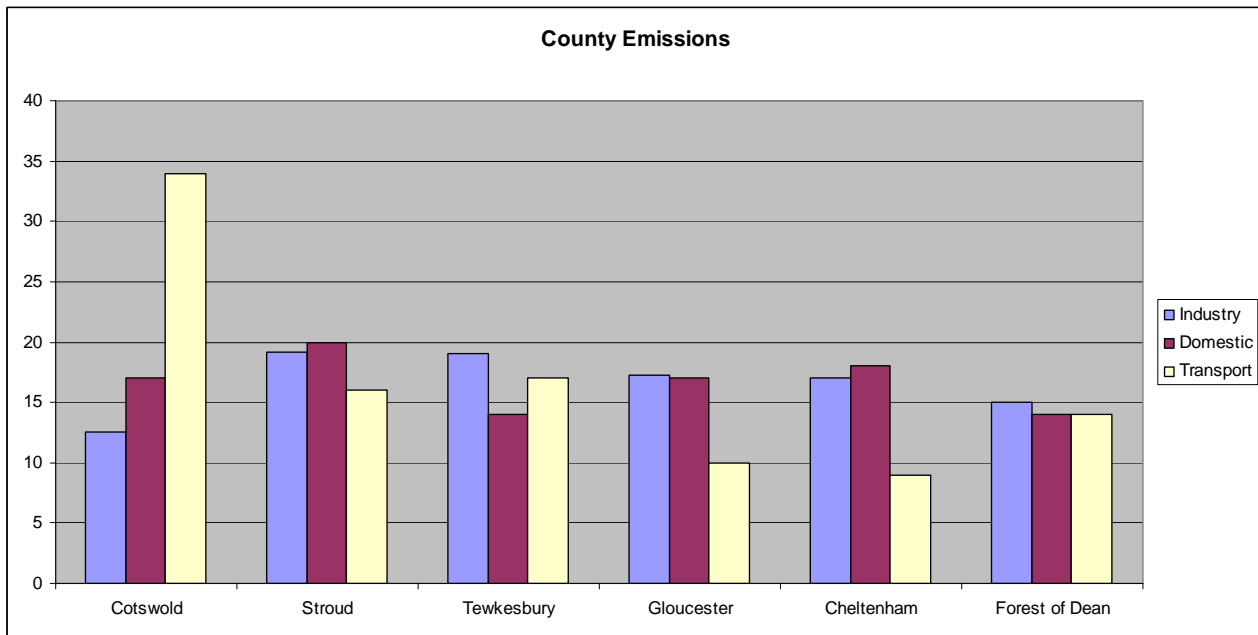
**Local and Regional Estimates Carbon Emissions by End User Summary 2005 source: DEFRA**

Local Authority and Government Office Region South West	Industry and Commercial (not inc ETS installations or diesel railways)	Domestic	Road Transport (not including motorways)	Total emission for indicator	Population Thousands <sup>(1)</sup>	Per capita Total CO2 (tonnes)
Cheltenham	304	265	103	672	110	6.1
Cotswold	225	260	387	872	80	10.8
Forest of Dean	277	211	156	644	80	8.0
Gloucester	313	252	118	683	110	6.2
Stroud	346	292	179	817	108	7.6
Tewkesbury	335	207	200	742	76	9.7

If you break down the above direct emissions across all sectors into the districts comprising Gloucestershire:

- **20%** came from Cotswold;
- **18%** came from Stroud;
- **17%** came from Tewkesbury;
- **15.4%** came from Gloucester;
- **15.1%** came from Cheltenham;
- **14.5%** came from the Forest of Dean.

See bar chart on next page for details of percentages analysed from the above DEFRA table:



### Analysis of Road Transport sector

Cotswold is the highest area for road transport emissions – over double the sector emissions than Stroud, Forest of Dean and Tewkesbury and over three times more sector emissions than Cheltenham and Gloucester. Tewkesbury and Stroud have roughly the same sector share of emissions with Forest of Dean a close fourth but Cheltenham and Gloucester’s road transport emissions are the two lowest in the county. Without further research it is reasonable to assume that the high road transport emissions for the Cotswold district are due to its rural aspect as rural areas are poorly served by public transport, and since the Cotswold Industry sector emissions are lower than other districts this backs up the fact that these high emissions come from domestic / private road transport activities. The Gloucestershire Energy strategy states that Gloucestershire has a 25% higher than average number of households with two or more cars which backs up these statistics. These statistics therefore show us that private road transport in the Cotswold district is a key area to tackle in terms of CO2 reduction for the county.

### Analysis of Industry sector

Stroud and Tewkesbury together have the highest industry sector share of emissions with Gloucester and Cheltenham following together as a joint close second. Forest of Dean also has high industry sector emissions – it is only the Cotswold area whose industry sector emissions are much lower than that of the other districts. With the possible exception of the Cotswold district, this shows us that tackling industry and commercial emissions across the county should be an equal priority in all the districts.

### Analysis of Domestic sector

Stroud has the highest share of domestic sector emissions, with Cheltenham coming second highest and the Cotswold and Gloucester districts joint third. Tewkesbury and the Forest of Dean are joint fourth. The scale of Stroud, Cheltenham, Cotswold and Gloucester’s emissions may be to do with the fact that there could be a high proportion of older housing stock, which are classed as ‘hard to treat’. These properties have no cavity walls and are therefore less likely to be insulated. This would be especially true in the Cotswolds area where many buildings are older. Furthermore, Gloucestershire may have a higher than average number of listed buildings which makes modification to windows and doors etc. more difficult and as is mentioned below in the Gloucestershire Energy Strategy, Gloucestershire has a higher than average proportion of detached houses which can take more energy to heat. This is an area that requires further research but it’s clear that most of the districts of Gloucestershire would benefit from savings in this field. Although we realise that SWEA (Severn Wye Energy Agency) and their offshoot, the Gloucestershire Energy Efficiency Advice Centre (EEAC) both work in this area predominately and it is their speciality it is such an important sector for CO2 reduction that it would benefit from further research to see if there is a place for Vision 21 Gloucestershire to work within it. For example, SWEA do less to promote ‘hard to treat’ homes and these homes are not included in the DEFRA national indicator 187.

## 3.2 Gloucestershire Energy Strategy Executive Summary (Reference 11)

The population of the County is predicted to increase by about 3.5% from 2001 to 2011 with this upward trend likely to continue. Also the County has 50% higher than average the number of detached houses and these often require more energy to heat, especially if not properly insulated.

According to the Gloucestershire Energy Strategy the energy use for transport in Gloucestershire is predicted to rise by 27% by 2020. Also gas consumption (domestic use) is predicted to rise by 18% by 2020. The strategy also states that Gloucestershire has a 25% higher than average number of households with two or more cars.

### Current energy demand and supply in Gloucestershire:

Sector	Electricity	Gas	Petrol / Diesel	Total
Domestic	9%	25%	25%	59%
Commercial	9%	16%	15%	41%
Total	19%	41%	40%	100%

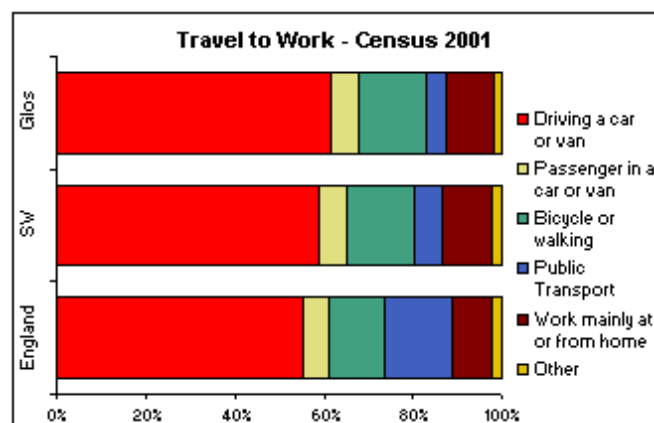
**NOTE:** The following Glos. Energy Strategy aims coincide with Vision 21 Gloucestershire's findings:

- **Create a common gateway for advice and support** with EST and others: target = by June 2008 to set up a web-site;
- **Develop programme to address 'hard to treat' homes** with Utility companies / housing associations / district authorities: target = 2008 – 2017 = pilot 'hard to treat' in 2008/9 – High priority;
- **Promote awareness of the benefits of Renewable Energy and energy conservation in the context of sustainable communities** with SWEA & Sustainable SW = 2007-2010 – High priority;
- **Promote greater engagement with the Tourism Industry** – 2008-2012 = promote greater use of CHP in hospitality sector – target = 10 major hotels have CHP by 2009 – High priority;
- **Ensure LAs lobby Govt for / or set up commercial waste plans & targets** with GCC / LAs = plans and targets in place by 2008 = High priority;
- **Promote the procurement of 'green energy'** – aim for all public sector organisations to aim to procure 100% green energy by 2010 if the resources are available = High priority.

Vision 21 are members of the Gloucestershire First 'Sustainable Energy Group' and are included in the following action:

- **Reduce car journeys through use of ICT and green travel plans** – target = all public sector organisations to commit to reduce travel mileage by 20% by 2008.

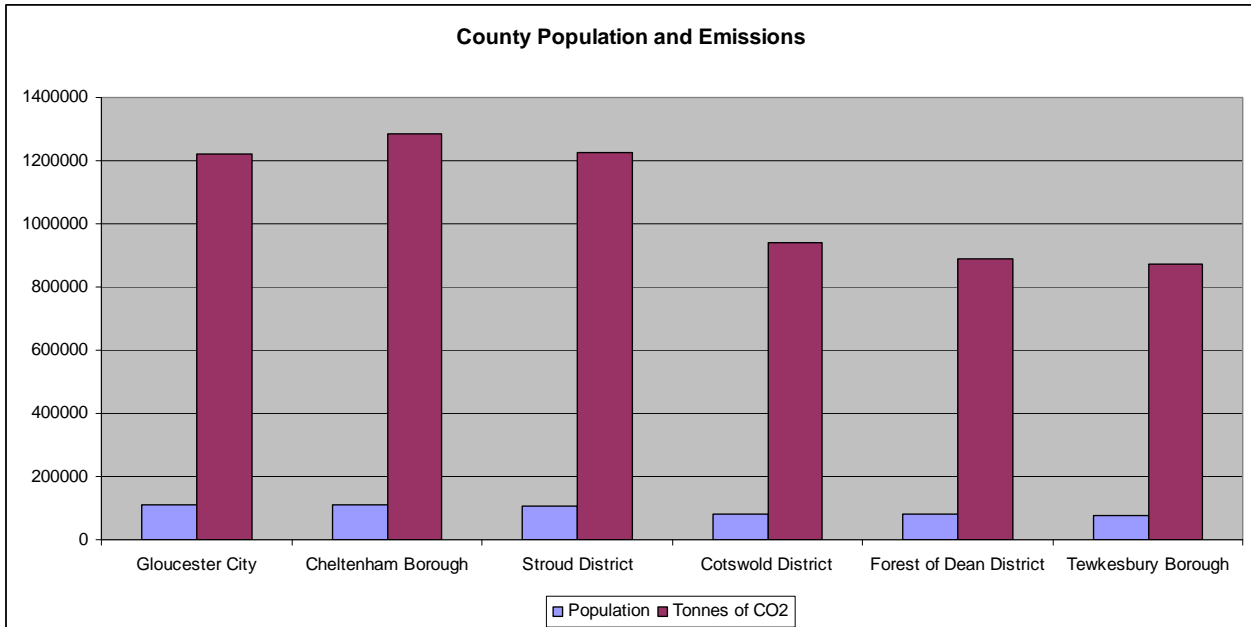
## 3.3 Census 2001 Travel to Work statistics



The 2001 Census measured travel to work patterns. Results for Gloucestershire show less people travel to work using public transport than in the South West and England as a whole so this is an area of private transport that Vision 21 could tackle.

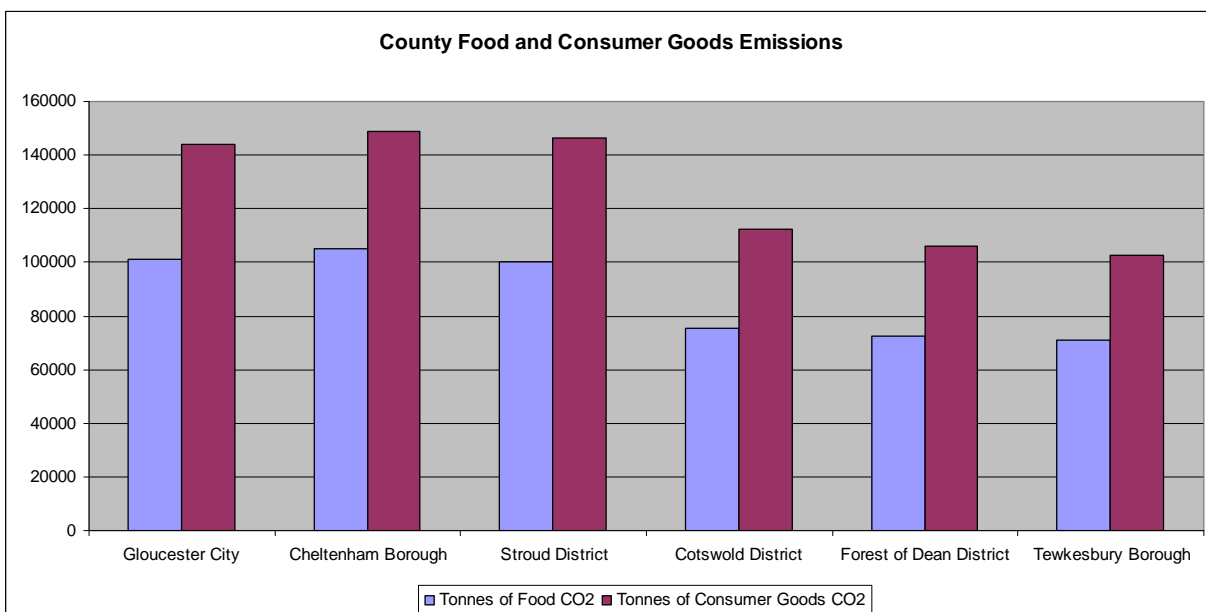
### 3.4 Stockholm Environment Institute stats = Consumption-based approach (Ref. 13)

The Stockholm Environment Institute (SEI) is based at the University of York and produces a much more detailed breakdown of the sources of CO2 emissions based on local authority regions. The total CO2 emissions for the county are: 6,433,963 tonnes. It is interesting to note that the size of the population for each district does not necessarily equate to size of CO2 emissions. For example, Cheltenham's population is less than Gloucester City Council's but its emissions are more than theirs. This would suggest Cheltenham is a more affluent town but we would have to pay a market research company in order to gain confirmation of this fact. According to SEI's data Gloucestershire's population and CO2 statistics are:



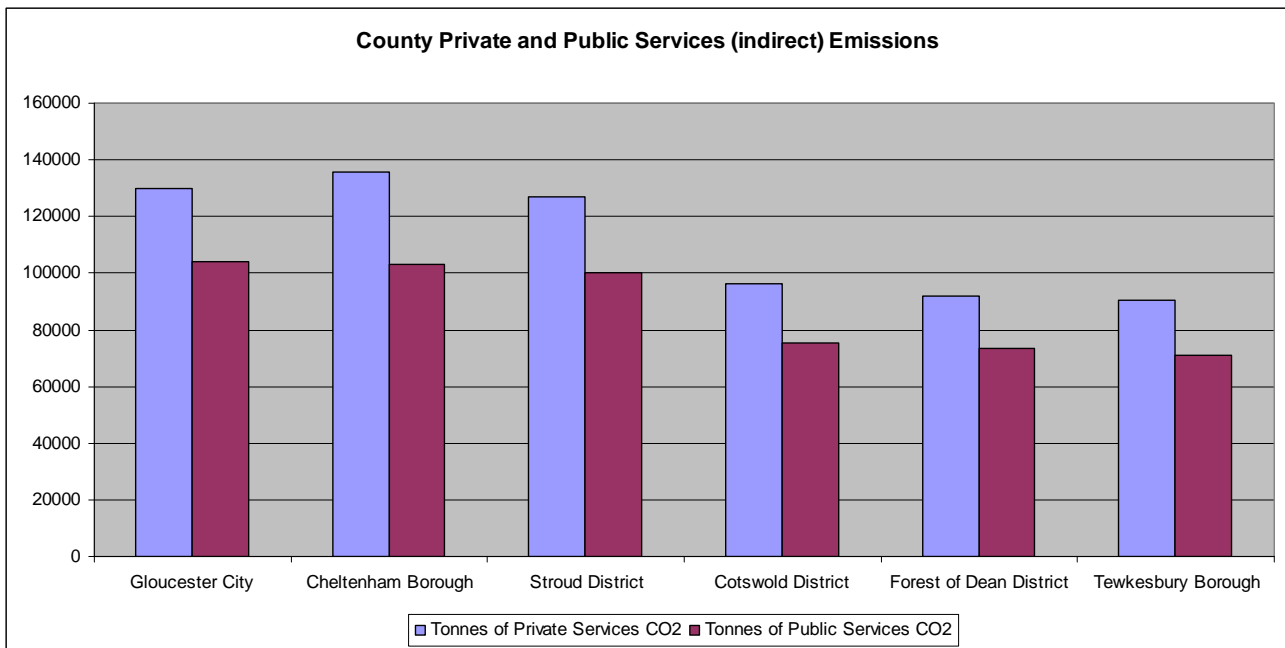
- Gloucester City Council = 111,726 population - 1,221,308 total tonnes of CO2 (10.93 *per capita*)
- Cheltenham Borough Cl = 110,884 population - 1,287,230 total tonnes of CO2 (11.61 *per capita*)
- Stroud District Council = 107,426 population - 1,224,615 total tonnes of CO2 (11.40 *per capita*)
- Cotswold District Council = 81,135 population - 941,680 total tonnes of CO2 (11.61 *per capita*)
- Forest of Dean District Cl = 78,895 population - 888,784 total tonnes of CO2 (11.27 *per capita*)
- Tewkesbury Borough Cl = 76,101 population - 870,346 total tonnes of CO2 (11.44 *per capita*)

The data below gives CO2 emissions for food (all organic & non-organic food consumed by household & restaurants & takeaways) and for consumer items (all products bought by households from newspapers to appliances). From this data it is interesting to note that for most Councils the proportion of CO2 emissions from consumer goods rises proportionately to the CO2 emissions emitted from food but in the case of Stroud their emissions from consumer goods is significantly higher than that of the other Councils.



- Cheltenham Borough Council = 105,094 tonnes of food CO2; 148,837 tonnes of consumer goods CO2
- Gloucester City Council = 101,377 tonnes of food CO2; 144,001 tonnes of consumer goods CO2
- Stroud District Council = 100,115 tonnes of food CO2; 146,222 tonnes of consumer goods CO2
- Cotswold District Council = 75,559 tonnes of food CO2; 112,182 tonnes of consumer goods CO2
- Forest of Dean District Council = 72,367 tonnes of food CO2; 105,797 tonnes of consumer goods CO2
- Tewkesbury Borough Council = 71,126 tonnes of food CO2; 102,593 tonnes of consumer goods CO2

The data below gives CO2 emissions for private (services ranging from entertainment to financial services) and public services (education, sewage, healthcare, capital investment & impact of overseas tourists). This data is interesting because Gloucester City Council emits more tonnes of CO2 on public services than all the other districts. However Gloucester City Council emits less CO2 overall than Cheltenham Borough Council which emits more tonnes of CO2 on private services than all the other districts. This data would suggest that Vision 21 should be working more closely with Cheltenham, Gloucester and Stroud Councils to reduce their private and public services emissions but on closer analysis of the population of each district it is clear that these three district's emissions are higher in proportion to their higher population.



- Cheltenham Borough Council = 135,562 tonnes of private; 103,343 tonnes of public services CO2
- Gloucester City Council = 129,728 tonnes of private; 104,128 tonnes of public services CO2
- Stroud District Council = 126,800 tonnes of private; 100,120 tonnes of public services CO2
- Cotswold District Council = 96,396 tonnes of private; 75,617 tonnes of public services CO2
- Forest of Dean District Cl = 91,934 tonnes of private; 73,529 tonnes of public services CO2
- Tewkesbury Borough Council = 90,616 tonnes of private; 70,925 tonnes of public services CO2

### 3.5 Consumption-based Analysis

- The data in these three tables is based on an analysis of the consumption of Gloucestershire's population and so provides a more complete picture of CO2 emissions patterns, including some of the indirect emissions from the goods and services we buy in the county.
- The data from the above two tables illustrates that Cheltenham Borough Council scores highest of all the districts in Gloucestershire in emitting indirect CO2 emissions – so this is an area that Vision 21 Gloucestershire could definitely tackle in Cheltenham.
- From this data we can see that Cheltenham is the biggest consumer of food and consumer goods CO2 in the county as well as the biggest consumer of private services. We can also see that Gloucester is the biggest consumer of public services CO2 in the county. However, it is interesting to note that Stroud is proportionately higher in their consumer goods CO2 than all the other districts in the county.
- These conclusions would lead Vision 21 to concentrate on projects to reduce the indirect emissions in Cheltenham and Stroud, particularly those related to food, consumer goods and private services.

## 3.6 Conclusions

### UK conclusions

- 58% of UK CO2 emissions come from: Recreation and Leisure, Food & Catering, Space Heating and Household. These are all mainly lifestyle-related emissions.
- Since 1990 emissions caused by road transport have risen by 12%. The transport sector accounted for 24% of UK CO2 emissions in 2007, of which 92% was from road transport. It is estimated that emissions from road freight transport increased at a higher rate than emissions from road passenger transport.
- Overall UK consumption and domestic consumption of electricity increased by nearly 25% between 1990 and 2007. UK Domestic electricity consumption increased between 1990 and 2007 by 23%.

### South West Region conclusions

- South West domestic and road transport emissions are slightly higher than other UK regions. The domestic emissions are probably as a result of the region's greater number of detached and larger residences and the higher road transport emissions are as a result of the more rural make-up of the region.
- Private transport accounted for 70% of all journeys in the South West region in 2005-6 and the 2001 Census shows that out of all the South West regions, Gloucestershire has less people using public transport to travel to work. This demonstrates that tackling personal car-use remains an important area.
- Only 4% of total South West transport emissions involved escorting children to education. Although the proportion of pupils walking or cycling to school decreased during 1995-2006 by 1.5% there were still 44% of pupils in the region walking or cycling to school in 2005. This shows that putting energy and resources into 'Walk to School' campaigns is not a priority in terms of reducing CO2 emissions in the South West.

### Gloucestershire conclusions based on 2005 figures

The ratio split of emissions in Gloucestershire is virtually identical to that of the South West region. Also the above statistics are only based on direct CO2 emissions and not direct and indirect CO2 emissions combined. As stated earlier, DEFRA's data is based on a production-based analysis of carbon footprints and not the more comprehensive consumption-based analysis used by the Carbon Trust. Unfortunately the Carbon Trust don't break down their national data into regions or Local Authorities.

#### Analysis of Road Transport sector:

- Cotswold is the highest emitter of road transport emissions. The Gloucestershire Energy strategy states that Gloucestershire has a 25% higher than average number of households with two or more cars which backs up this statistic. Without further research it is reasonable to assume that the high road transport emissions for the Cotswold district are due to its rural aspect as rural areas are poorly served by public transport, and since the Cotswold Industry sector emissions are lower than other districts this backs up the fact that these high emissions come from domestic/private road transport activities. These statistics therefore show us that private road transport in the Cotswold district is a key area to tackle in terms of CO2 reduction for the county.

#### Analysis of Industry sector:

- Stroud and Tewkesbury together have the highest industry sector share of emissions with Gloucester and Cheltenham following together as a joint close second. Forest of Dean also has high industry sector emissions – it is only the Cotswold area whose industry sector emissions are much lower than that of the other districts. This shows us that tackling industry and commercial emissions across the county should be an equal priority in all the districts.

#### Analysis of Domestic sector:

- Stroud has the highest share of domestic sector emissions, with Cheltenham coming second highest and the Cotswold and Gloucester districts joint third. Tewkesbury and the Forest of Dean are joint fourth. The scale of Stroud, Cheltenham, Cotswold and Gloucester's emissions may be to do with the fact that there could be a high proportion of older housing stock, which are classed as 'hard to treat'. These properties have no cavity walls and are therefore less likely to be insulated. This would be especially true in the Cotswolds area where many buildings are older. Furthermore, Gloucestershire may have a higher than average number of listed buildings which makes modification to windows and doors more difficult.

## Analysis of Stockholm Institute data (consumption-based approach)

- Cheltenham Borough Council scores highest of all the districts in Gloucestershire in emitting indirect CO<sub>2</sub> emissions, so this is an area that Vision 21 Gloucestershire could definitely tackle in Cheltenham. Cheltenham is the biggest consumer of food and consumer goods CO<sub>2</sub> in the county as well as the biggest consumer of private services. We can also see that Gloucester is the biggest consumer of public services CO<sub>2</sub> in the county. However, it is interesting to note that Stroud is proportionately higher in their consumer goods CO<sub>2</sub> than all the other districts in the county.
- These conclusions would lead Vision 21 to concentrate on projects to reduce the indirect emissions in Cheltenham and Stroud, particularly those related to food, consumer goods and private services and public services emissions in Gloucester.

## ANALYSIS + STRATEGY

### Introduction

Regarding priorities for reducing CO<sub>2</sub> emissions in Gloucestershire, there is an almost equal split between industry, transport and the domestic sectors. So in order for Vision 21 to be able to set aims and objectives there needs to be further analysis within each sector in order to understand them and see where the quickest fixes are. This is such a complex subject with so many ways of representing the data and within each segment there are many influencing factors that have ultimate control over emissions reduction. Vision 21 needs to understand that any projects we carry out may not have as much effect on reducing emissions as we would like because we lack any regulatory power and therefore we may have to decide that providing information is the best way to influence behavioural change. A vital thread that must go through all our work is promotion of the philosophy of a personal carbon allowance as this would naturally reduce everyone's emissions within every sector.

It is interesting to note that the conclusions reached following this carbon footprint research of Gloucestershire county overlap with seven of the aims from the Gloucestershire First's Energy Strategy (2007) (*Reference 11*). This is not surprising as the research was based on the same statistics.

### How to tackle the Domestic sector

We look at what SWEA are doing and what isn't being done in the Domestic sector and see if there is a niche for us to enter into the market especially on insulation. Gloucestershire has a higher than average proportion of detached houses which can take more energy to heat. This is an area that requires further research but it's clear that most of the districts of Gloucestershire would benefit from savings in this field. Although we realise that SWEA (Severn Wye Energy Agency) and their offshoot, the Gloucestershire Energy Efficiency Advice Centre (EEAC) both work in this area predominately and it is their speciality, it is such an important sector for CO<sub>2</sub> reduction that it would benefit from further research to see if there is a place for Vision 21 Gloucestershire to work within it as well. For example, SWEA do less to promote 'hard to heat' homes and these homes are not included in the DEFRA national indicator 187.

### How to tackle the Increase in Electricity Consumption

We work with EST to promote energy efficiency ratings on electrical goods and promote OWL electricity monitors. We push green tariffs and work with Ecotricity and Good Energy.

### How to tackle Private Transport for Leisure & Recreation

Private road transport in Cotswold / Stroud / Tewkesbury districts / Leisure transport = high emitter:

- Lobby Councils for improvements in availability of public transport.
- Set up a car club in Tewkesbury and Cotswold main towns.
- Promote car club in Stroud.
- Congestion charging information on web-site.
- Transport information factsheets on web-site.
- Sustainable transport links to cycle paths and bus timetables.
- Encourage people to use public transport, walking and cycling for their work commute although research from the 2001 Census shows that targeting private transport use for commuting in Gloucestershire should not be a priority as it is less than UK average.
- Sell the idea of more local days out and more local holidays and to encourage local people to take advantage of local tourism and local festivals / events.
- Influence the Cheltenham Festivals to get them to target local audiences not national audiences.

## How to tackle the Local food issue

- Promoting local food – local, seasonal recipe page on web-site.
- Use local celebrity chefs (Raymond Blanc?) to promote cooking with local ingredients.
- Community Farm idea.
- Waste ground from Council for communal allotments.
- Encourage schools to get allotments.
- Promote growing food in your gardens + vegesboxes etc.

## How to tackle Over Consumption

- Stop Shopping campaigns – need to use cleverly using adbusters etc. Appeal to different social classes in different ways. e.g. Fashion show of charity shop clothes etc.
- Promote freecycle and other ways to reduce overall consumption.
- Campaign to get Gloucester City Council to reduce its emissions from public services.
- Campaign to get Stroud general public to stop buying so many consumer goods.
- Campaign to get Cheltenham people to stop eating out so much, buying so many consumer goods and using so many private services.

## How to tackle the Industry and Commerce sector

We need to do some more market research to find out how we can tackle this sector – possibly in partnership with other local organisations already working in this area.

## Waste and recycling

The household recycling rate in the South West was the second highest in the UK with 37% of household waste being recycled. This illustrates that household recycling is already well supported in the South West region by its residents. Although we understand that Vision 21 has shown the ability to raise the rate of domestic household recycling, but given that domestic waste only accounts for 17% of total waste, domestic recycling should no longer be a priority for Vision 21 Gloucestershire. The logical next step in waste reduction would be to analyse the waste from construction and demolition first and then from industry and commerce to ascertain how much is currently being recycled and how Vision 21 could help to increase these recycling rates.

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## Appendix 1 - Source: DEFRA

