

ACT Transport Baseline

This document explores possible sources for a baseline for measuring carbon reduction in Teignbridge based on available government statistics.

CO₂ equivalence

A generally accepted measure of carbon emissions is mass of CO₂ equivalent. Each greenhouse gas **GHG** has a Global Warming Potential (**GWP**), which is weighting that is used to convert the mass of gas emitted to its CO₂ equivalent. The CO₂ equivalent of an emission of gas is the mass of gas multiplied by its GWP.

CO₂ has a GWP of 1, other common GWP values are methane (CH₄) 25, nitrous oxide (N₂O) 298, and so on for other GHGs. It is assumed this is the measure we are targeting.

The GWPs currently used in government GHG reporting can be found here: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/79286/1_20100121130353_e_listgreenhousegases.xls

These values correspond with the 4th assessment report from 2007. More detail on GWP values can be found here: https://www.ghgprotocol.org/sites/default/files/ghgp/Global-Warming-Potential-Values%20%28Feb%2016%202016%29_1.pdf

Available government statistics on GHG all report in CO₂ equivalent units.

Emissions of carbon dioxide for Local Authority areas

This dataset is produced to provide baselines to measure progress at a local authority level.

<https://data.gov.uk/dataset/723c243d-2f1a-4d27-8b61-cdb93e5b10ff/emissions-of-carbon-dioxide-for-local-authority-areas>

Data at local authority level is published in June for the period ending 2 years earlier.

The most recent dataset from this source is up to 2017:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/812142/2005-17_UK_local_and_regional_CO2_emissions_tables.xlsx

Emissions in these tables are expressed in kilotonnes of CO₂ equivalent. (**kt CO₂e**).

Two datasets are provided:

- Full dataset – all emissions within the local authority area.
- Subset dataset – all emissions within the local authority's control (excludes large industrial sites, motorways, railways and land use).

As we are dealing with transport, and a shift to rail may well be part of the solution the full dataset seems more relevant. We need a transport based total derived from the full dataset.

For each year figures are given for:

A – Industry and Commercial Electricity

B – Industry and Commercial Gas

C – Large Industrial Installations

D – Industrial and Commercial other fuels
E – Agriculture
F – Domestic Electricity
G – Domestic Gas
H – Domestic Other Fuels
I – Road Transport A Roads
J – Road Transport Motorways
K – Road Transport Minor Roads
L – Diesel Railways
M – Transport Other
N – LULUCF (Land Use) Net Emissions
Population

From a transport point of view we are probably interested in categories I,J,K,L,M and possibly A,F if EV charging shows up here. We need more information about how the statistics are derived to answer this.

How the GHG statistics are derived

The methodology for compiling UK GHG statistics is given here:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/349618/IntroToTheGHGI_2014_Final.pdf

The FAQs found here probably give more concise explanations:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/371493/uk_emissions_statistics_faq.pdf

GHG statistics are estimates based on available data such as [DUKES](#) , as well as bottom up estimates based on distances travelled and vehicle fuel consumption. Appropriate GHG conversion factors are applied.

There is no statement in these documents to indicate how consumption by EVs is handled, it might be treated as domestic or industrial electricity – equally it might be included in road transport. We do not know.

Use a consistent dataset

Details of the methodology are evolving, in order to make the figures consistent the complete dataset for each year from 2005 is republished with corrections applied. This means that if we pick a baseline year (say 2017), we need to compare the figures for the current year with the figures for 2017 in the current year's dataset, rather than the original figure for 2017 when the 2017 statistics were published. To illustrate this point the 2010 Total emissions are shown as 991.45 in the dataset 2005-2010, but they are shown as 905.2 in the 2005-2017 figures.

How actions in Teignbridge will be reflected in the statistics

Likely actions in the transport sector will have to involve:

- Reducing the distance travelled by emitting vehicles.
- Increasing the proportion of EVs in Teignbridge.
- Reducing emission rate from other vehicles.
- Banning motor vehicles other than EVs in town centres.
- Lower speed limits and/or enforcement of speed limits.

We need to determine how these measures would show up in the statistics.

For example:

- If there was higher than average take-up of EVs in Teignbridge would this be reflected in the local statistics, or would the national or regional average vehicle mix be used?
- Are local vehicle speeds accounted for?

Per Capita versus overall

The population of Teignbridge is increasing. Transport energy use has also increased, but not quite as fast as the population, so per capita energy use has dropped slightly. From a climate change perspective what needs to reduce is overall emissions, rather than per capita emissions.

Exporting emissions and imported embedded energy

It is recognised that it is possible to reduce emissions by carrying out activities that cause emissions outside the district. The GHG statistics probably don't take this into account, so some measure of this needs to be developed.

Since the objective of zero emissions by 2025 is extremely demanding and monitoring imports and exports from the district is not done by local GHG statistics, we may have to ignore this component. We should, however, try to spot blatant examples of shifting the problem.

Digest of UK Energy Statistics (DUKES)

These give a number of breakdowns of annual energy consumption, for which GHG statistics are derived.

<https://www.gov.uk/government/statistical-data-sets/total-final-energy-consumption-at-regional-and-local-authority-level>

These give energy consumption figures for each completed year up to 2016, by fuel type and sector by local authority. Units are gigawatt hours (**GWh**) or kilotonnes of oil equivalent (**Ktoe**). Factors will need to be applied to these numbers to convert to CO₂ equivalents. Energy use by rail is clearly separated out.

This datasource has some disadvantages:

- Figures are only published about 2.5 years after the end of the year in question.
- Road transport is not split in any way, either by road type or by vehicle type.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/812411/Road_Transport_fuel_consumption_tables_2005-2017.xlsx

These are still energy consumption figures, but give a breakdown for each local authority by vehicle type and road type:

Vehicle types:

- Buses
- Diesel Cars
- Petrol Cars
- Motorcycles
- HGVs
- Diesel LGVs
- Petrol LGVs

Road types:

- Motorways
- A roads
- Minor roads

Conversion factors will still need to be applied to get CO₂ equivalents.

Year by year comparison of road fuel consumption from this source shows that transport fuel consumption has increased between 2005 and 2017 (118045 and 124285 tonnes of oil equivalent respectively), but that per capita consumption is slightly down(0.956 versus 0.946).

These figures may be useful as a dataset for to direct action, but are inferior as a means of measuring overall progress.

Extract Spreadsheet

The spreadsheet [ACT TransportBaseline.xlsx](#) contains extract tables for Teignbridge from the GHG dataset and Road transport fuel consumption dataset.

I have also expressed the GHG emissions table as % of total emissions. This shows that transport in 2017 represented about 54% of total Teignbridge emissions.