

Carbon Literacy for Communities

References and further reading

This note has been prepared by Keep Scotland Beautiful to accompany Carbon Literacy for Communities.

Climate science

Climate Change the Facts has video resources from Keep Scotland Beautiful that help you to understand the basics of climate change.

<https://www.keepsotlandbeautiful.org/sustainability-climate-change/climate-challenge-fund/climate-change-engagement/climate-change-resources/>

Intergovernmental Panel on Climate Change (IPCC), the leading international body for the assessment of climate change, website hosts the most up-to-date reports and information

<http://www.ipcc.ch/>

Good sources of information from the Met Office around what climate is and what influences it, how and why our climate is changing.

<http://www.metoffice.gov.uk/climate-guide>

<http://www.youtube.com/watch?v=lrPS2HiYVp8>

<http://www.metoffice.gov.uk/climate-guide/climate-change>

The United States Environmental Protection Agency (EPA) have clear information and good videos to help you understand the science

<http://www.epa.gov/climatechange/science/causes.html#>

Royal Geographic Society have a 'summary of the science' PDF

http://royalsociety.org/uploadedFiles/Royal_Society_Content/policy/publications/2010/4294972962.pdf

Ahead of COP21 in Paris, the BBC News created this resource explaining what we know and don't know about the Earth's changing climate.

<http://www.bbc.co.uk/news/science-environment-24021772>

In 2016, global carbon dioxide levels were set to pass 400ppm milestone

<http://www.theguardian.com/environment/2016/may/11/worlds-carbon-dioxide-concentration-teetering-on-the-point-of-no-return>

NASA collected quotes from climate scientists on their reaction to this news

<http://climate.nasa.gov/400ppmquotes/>

Al Gore: What comes after An Inconvenient Truth?

http://www.ted.com/talks/al_gore_warns_on_latest_climate_trends.html

This webpage from 'Carbon Brief' shows where carbon dioxide emissions have come from since 1750 – useful for considering the historical contributions of different countries.

<https://www.carbonbrief.org/interactive-map-historical-emissions-around-the-world>

Engaging People with climate change

We've collected some interesting web resources that might be useful for engaging your community on climate change.

This infographic demonstrates the 'spiralling' of global temperatures since 1850

<http://www.climate-lab-book.ac.uk/2016/spiralling-global-temperatures/>

This interactive webpage from the Royal Geographic Society demonstrates flood risk from rising sea levels around the world.

<http://www.rgs.org/webcasts/activities/sealevelriserisk.html>

This infographic from Bloomberg gives a really clear picture of the factors causing warming

<http://www.bloomberg.com/graphics/2015-whats-warming-the-world/>

Thin Ice: the inside story of climate science (link to trailer)

<http://www.youtube.com/watch?v=2UxViE9YP6U>

This video uses the story of the Titanic as an analogy for our inaction on climate change.

https://www.youtube.com/watch?v=YYqJLJmxvnM&feature=iv&src_vid=7e9njdYLOOY&annotation_id=annotation_4133292447

These videos from the UN, narrated by Morgan Freeman, look at the possibilities for solutions if we act together.

<https://vimeo.com/107500922>

<https://www.youtube.com/watch?v=-vaajVtgRul>

This palindromic poem is quite popular and inspiring

https://www.youtube.com/watch?v=aRG4ySdi_aE

Prince Ea's poem is another popular choice for social media posts to get people talking

<https://www.youtube.com/watch?v=eRLJscAlk1M>

This is the inspiring story of the 'Boy Who Harnessed the Wind'

<https://www.youtube.com/watch?v=eRLJscAlk1M>

Carbon footprinting and calculators

Recommended conversation factors from Keep Scotland Beautiful

Food, Transport, Energy <https://www.keepsotlandbeautiful.org/media/1557003/2016-conversion-factors-spreadsheet-energy-transport-food.xlsx>

Waste <https://www.keepsotlandbeautiful.org/media/1557001/2016-conversion-factors-spreadsheet-waste.xlsx>

Zero Waste Scotland's 'Benefits of Re-Use' spreadsheet

<http://www.wrap.org.uk/content/benefits-product-re-use-tool>

DEFRA repository of CO₂e conversion factors

<http://www.ukconversionfactorscarbonsmart.co.uk/>

Carbon Conversations have a calculator for monitoring your footprint

<http://www.carbonconversations.org/participants/carbon-footprint-calculator>

The DEFRA Act On CO₂ foot-printing website

<http://carboncalculator.direct.gov.uk/index.html>

The WWF ecological (and CO₂) foot-printing site

<http://footprint.wwf.org.uk/>

Climate actions

'Scotland's Response to Climate Change' webpage from Keep Scotland Beautiful is a summary of what's being done in Scotland to tackle climate change

<https://www.keepsotlandbeautiful.org/climate-change/take-action-on-climate-change/>

Low Carbon Behaviours Framework from the Scottish Government highlights how adoption of certain everyday behaviours could reduce carbon emissions significantly

<http://www.gov.scot/Resource/0043/00435368.pdf>

The Greener Scotland website is the Scottish Government's public engagement website for climate change and details how the public can take action on climate change

<http://www.greenerscotland.org/>

The Scottish Government's Draft Climate Change Plan is a very detailed look at policies and proposals to meet its carbon reduction targets

<http://www.gov.scot/Resource/0051/00513102.pdf>

Walk the Walk activity from Climate Outreach is an interactive activity to demonstrate how many small actions can reduce your footprint

<http://climateoutreach.org/resources/walking-the-walk/>

Scotland's Climate Action Story

<https://www.youtube.com/watch?v=xiWIEHINzck>

DEFRA climate change awareness video for the carbon footprint calculator at direct.gov.uk. It focuses on how much energy we use, and why we should act now to use less energy in our fight against global warming.

<http://climate2050.co.uk/defra-climate-change-video/>

Climate Ready Scotland: Scottish Climate Change Adaptation Programme

<http://www.scotland.gov.uk/Resource/0042/00426516.pdf>

Information from Adaptation Scotland on adaptation stories from around Scotland.

<http://www.adaptationscotland.org.uk/2/126/0/Scotlands-climate-story.aspx>

Carbon Conversations - six friendly, practical meetings to help you halve your carbon footprint.

<http://carbonconversations.org/>

Behaviour change

The Scottish Government's 'Shifting Normal: 4 Questions, Four Zones' is a tool to help community-led organisations design and implement more effective behaviour change projects.

The summary Guide gives an overview of the tool

www.gov.scot/Resource/0048/00481574.pdf

The Full Guide goes into more detail and the theoretical background

<http://www.gov.scot/Resource/0048/00481836.pdf>

The Workshop Plan gives an outline of how to run two workshops that help to identify and design projects
<http://www.gov.scot/Resource/0048/00481819.pdf>

The Scottish Government's 'Climate Change Behaviours Research Programme' (CCBRP) features a range of research projects, both in-house and commissioned work, to better understand: the behaviour areas that are central to addressing climate change and the most effective mechanisms for stimulating, facilitating and supporting new and more sustainable ways of living.

<http://www.scotland.gov.uk/Topics/Research/by-topic/environment/social-research/Behaviour-Change-Research>

Low Carbon Scotland Behaviour change framework presents the 10 Key Behaviours identified as a priority for Scotland meeting its climate change targets

<http://www.scotland.gov.uk/Resource/0041/00415744.pdf>

The Scottish Government's Segmentation Tool for Climate Change Behaviours – dividing Scotland's households into 9 segments and analysing their propensity to adopt low carbon behaviours.

<http://www.scotland.gov.uk/Topics/Environment/climatechange/resource-materials/segmentationtool/segmentationmodel>

Scottish Government's Influencing behaviours evidence library – one stop access point to key publications on changing behaviours, with overviews of the reports.

<http://www.scotland.gov.uk/Topics/Research/by-topic/environment/social-research/Behaviour-Change-Research/LibraryRecommendations>

Full report of the Scottish Environmental Attitudes and Behaviours Survey 2008

<http://www.scotland.gov.uk/Resource/Doc/263223/0078735.pdf>

Communicating climate change

'Scotland 2030' is an interactive web resource from the Scottish Government designed to help the public think about life in a low carbon Scotland

<http://www.scotland2030.org/>

Our 'Climate Change Resources' webpage hosts a range of activities you can use to help you communicate climate change

<https://www.keepsotlandbeautiful.org/sustainability-climate-change/climate-challenge-fund/climate-change-engagement/>

Climate Outreach research communicating climate change to different audiences and have a lot of useful reports and short guides for practitioners.

www.climateoutreach.org

Carbon Visuals is a website created by Climate Outreach and is an evidence based resource of images of climate change impacts and solutions that people respond positively to

<http://carbonvisuals.com/>

The psychology of climate change communication

http://www.csc.noaa.gov/digitalcoast/_pdf/CRED_Psychology_Climate_Change_Communication.pdf

Interesting TED talk on the psychology of climate change, with practical advice on how to be more effective:

https://ted.com/talks/per_espen_stoknes_how_to_transform_apocalypse_fatigue_into_action_on_global_warming?utm_source=tedcomshare&utm_medium=email&utm_campaign=tedsread--a

Futerra's 'Selling the Sizzle' draws insights from the world of marketing

<http://www.futerra.co.uk/downloads/Sellthesizzle.pdf>

Common values and climate change

<http://valuesandframes.org/>

WWF Weathercocks & Signposts report; the environment movement at a crossroads

http://www.wwf.org.uk/wwf_articles.cfm?unewsid=2224

WWF Simple & Painless? the limitations of spillover in environmental campaigning

http://www.wwf.org.uk/wwf_articles.cfm?unewsid=2728

Myths busting and dealing with denial

Our guide 'Responses to Climate Myths and Denials' is an information sheet with information you can use to counter common climate myths and argument used to deny climate change is a problem

<http://www.KeepScotlandBeautiful.org/media/430749/ccf-climate-workshop-responses-to-climate-myths-and-denial.pdf>

Myths Snap is a game based on the above resource

<http://www.KeepScotlandBeautiful.org/media/846175/myths-snap.pdf>

Communicating Climate Change Scenarios is a role playing activity to practice countering common climate myths

<http://www.KeepScotlandBeautiful.org/media/846179/communicating-climate-change-scenarios.pdf>

How to talk to a climate change denier. Communications expert George Marshall tells us to have that important conversation with Uncle Bob, six strategies to use that may actually change his mind....

<http://www.youtube.com/watch?v=Qp-nJKBwQR4>

Climate Change Denial is George Marshall's blog on the topic of psychology climate change denial

<http://climatedenial.org>

Policy

The 'Paris Agreement' was the new global climate change agreement that came out of COP 21 in Paris.

http://unfccc.int/paris_agreement/items/9485.php

This Summary Report details the findings from Conversations About COP21, Keep Scotland Beautiful's public consultation on the UN climate change negotiations 21st Convention of Parties in Paris (COP21)

<http://www.KeepScotlandBeautiful.org/media/845617/conversations-about-cop21-summary-report.pdf>

'The Paris Agreement: Meeting the People of Scotland's Expectations?' is an analysis comparing 'Conversations About COP21' to the outcomes of the Paris Agreement to demonstrate where the new agreement delivers on the priorities of people in Scotland and where it doesn't.

<http://www.KeepScotlandBeautiful.org/parisagreement>

The Scottish Government published the report Low Carbon Scotland: Meeting our Emissions Reduction Targets 2013-2027: The Second Report on Proposals and Policies (RPP2) sets out specific measures for reducing greenhouse gas emissions to meet Scotland's ambitious statutory targets.

<http://www.scotland.gov.uk/Topics/Environment/climatechange/scotlands-action/lowcarbon/meetingthetargets>

This is the most recent report from the Committee on Climate Change on Scotland's progress towards meeting emission reduction targets, as requested by Scottish Ministers under the Climate Change (Scotland) Act 2009.

<https://www.theccc.org.uk/publication/reducing-emissions-in-scotland-2015-progress-report/>

This report from the Committee on Climate Change sets out recommended annual emissions targets for 2028-2032.

<https://www.theccc.org.uk/publication/scottish-emissions-targets-2028-2032-the-high-ambition-pathway-towards-a-low-carbon-economy/>

Report from Audit Scotland report on Scotland's progress on cutting emissions and the costs of meeting ambitious targets.

http://www.audit-scotland.gov.uk/docs/central/2011/nr_111208_greenhouse_gases.pdf

Stories from around the world

http://news.bbc.co.uk/1/hi/in_depth/629/629/6528979.stm

Melting glaciers in the Himalayas could lead to water shortages for hundreds of millions of people, the conservation group WWF has claimed

<http://news.bbc.co.uk/1/hi/sci/tech/4346211.stm>

Climate change hitting Africa – climate change is already affecting people across Africa and will wipe out efforts to tackle poverty there unless urgent action is taken.

<http://news.bbc.co.uk/1/hi/world/africa/6092564.stm>

Pakistan floods - In summer 2010, unusually heavy monsoon rains triggered devastating floods along Pakistan's populous Indus River Valley. By September, the flooding had affected an estimated 21 million people

<http://www.oxfamamerica.org/files/pakistan-floods-factsheet.pdf>

Latin America and the Caribbean face a greater risk of more natural disasters because of environmental degradation and climate change, campaigners warn.

<http://news.bbc.co.uk/1/hi/sci/tech/5290818.stm>

To visit the Maldives is to witness the slow death of a nation.

http://news.bbc.co.uk/1/hi/world/south_asia/3930765.stm

America's first climate refugees - Newtok, Alaska is losing ground to the sea at a dangerous rate and for its residents, exile is inevitable.

<http://www.theguardian.com/environment/interactive/2013/may/13/newtok-alaska-climate-change-refugees>

Droughts could hit food production in England in 2020s, report warns - Without action, farmers will face shortfalls of 50% of the water they currently use to grow crops, threatening most fertile areas
<http://www.theguardian.com/environment/2013/jul/10/droughts-hot-dry-summers-england>

The Atlas of climate change

<http://www.routledge.com/books/series/ECTEAS/>

This important UNICEF report bears out the reality that young people around the world understand that the damage that is being done to the Earth by man-fuelled climate change is damage that their generation will have to suffer, pay for, and attempt to rectify. The quotes of children from Madagascar to the Philippines and from India to the UK, demonstrate powerfully how articulately they express their fears for the future. And the action they need us all to take now.

<http://www.unicef.org.uk/Documents/Publication-pdfs/unicef-climate-change-report-2013.pdf>

Least developed countries agree to cut greenhouse gas emissions. LDC group's move can quicken pace of UN climate change talks, but richer countries will need to make firm commitments

<http://www.theguardian.com/environment/2013/apr/03/climate-change-greenhouse-gas-emissions#start-of-comments>

Recent massive forest fires in Indonesia have been linked to climate change. This interactive guide explores 2015's worst environmental disaster

<http://www.theguardian.com/environment/ng-interactive/2015/dec/01/indonesia-forest-fires-how-the-years-worst-environmental-disaster-unfolded-interactive>

The next pages provide additional information for some of the slides & graphs in the workshop which participants might find useful.

This is the source data for the graph on the slide titled 'Global CO₂ emissions per capita – 2009'

Source <http://data.worldbank.org/indicator/EN.ATM.CO2E.PC>

Country	CO ₂ t per capita 2009
Burundi	0
Chad	0
Congo, Dem. Rep.	0
Mali	0
Burkina Faso	0.1
Central African Republic	0.1
Eritrea	0.1
Ethiopia	0.1
Guinea	0.1
Liberia	0.1
Madagascar	0.1
Malawi	0.1
Mozambique	0.1
Nepal	0.1

Country	CO ₂ t per capita 2009
Niger	0.1
Rwanda	0.1
Somalia	0.1
Uganda	0.1
Afghanistan	0.2
Comoros	0.2
Guinea-Bissau	0.2
Haiti	0.2
Myanmar	0.2
Tanzania	0.2
Timor-Leste	0.2
Togo	0.2
Zambia	0.2
Bangladesh	0.3
Cambodia	0.3

Country	CO ₂ t per capita 2009
Cameroon	0.3
Gambia, The	0.3
Ghana	0.3
Kenya	0.3
Lao PDR	0.3
Sierra Leone	0.3
Sudan	0.3
Cote d'Ivoire	0.4
Senegal	0.4
Solomon Islands	0.4
Tajikistan	0.4
Benin	0.5
Congo, Rep.	0.5
Kiribati	0.5
Nigeria	0.5
Papua New Guinea	0.5
Vanuatu	0.5
Bhutan	0.6
Cape Verde	0.6
Djibouti	0.6
Mauritania	0.6
Micronesia, Fed. Sts.	0.6
Sri Lanka	0.6
West Bank and Gaza	0.6
Paraguay	0.7
Philippines	0.7
Sao Tome and Principe	0.7
Zimbabwe	0.7
Nicaragua	0.8
Pakistan	0.9
Samoa	0.9
Swaziland	0.9
Albania	1
El Salvador	1
Fiji	1
Honduras	1
Gabon	1.1
Guatemala	1.1
Yemen, Rep.	1.1
Kyrgyz Republic	1.2
Georgia	1.3
Moldova	1.3

Country	CO ₂ t per capita 2009
Angola	1.4
Belize	1.4
Bolivia	1.4
Armenia	1.5
Colombia	1.6
Morocco	1.6
Peru	1.6
India	1.7
Namibia	1.7
Tonga	1.7
Vietnam	1.7
Costa Rica	1.8
Dominica	1.8
St. Vincent and the Grenadines	1.8
Brazil	1.9
Indonesia	1.9
Ecuador	2
Guyana	2
Marshall Islands	2
Dominican Republic	2.1
Panama	2.2
St. Lucia	2.2
Botswana	2.3
Uruguay	2.3
Grenada	2.4
Tunisia	2.4
Cuba	2.8
Egypt, Arab Rep.	2.8
Macao SAR, China	2.8
Latvia	3
Mauritius	3
Korea, Dem. Rep.	3.1
Syrian Arab Republic	3.1
Jamaica	3.2
Maldives	3.2
Algeria	3.3
French Polynesia	3.4
Iraq	3.6
Romania	3.7
Jordan	3.8
Lithuania	3.8
Mexico	3.8

Country	CO ₂ t per capita 2009
Chile	3.9
Turkey	3.9
Thailand	4.1
Uzbekistan	4.2
Argentina	4.4
Sweden	4.7
Suriname	4.8
Croatia	4.9
Hungary	4.9
Lebanon	4.9
Montenegro	4.9
St. Kitts and Nevis	5
Hong Kong SAR, China	5.3
Turks and Caicos Islands	5.3
Antigua and Barbuda	5.4
Macedonia, FYR	5.4
Mongolia	5.4
Portugal	5.4
Switzerland	5.4
Azerbaijan	5.5
Barbados	5.6
Bulgaria	5.6
France	5.6
China	5.8
Ukraine	5.9
Malta	6
Belarus	6.3
Serbia	6.3
Slovak Republic	6.3
Spain	6.3
Iceland	6.4
Singapore	6.4
Venezuela, RB	6.5
Andorra	6.6
Italy	6.7
Bermuda	7.1
Equatorial Guinea	7.1
Malaysia	7.1
Bahamas, The	7.3
Austria	7.4
New Zealand	7.4
Cyprus	7.5

Country	CO ₂ t per capita 2009
Slovenia	7.5
United Kingdom	7.7
Bosnia and Herzegovina	7.8
Poland	7.8
Iran, Islamic Rep.	8.2
Denmark	8.3
Greece	8.4
Seychelles	8.4
Japan	8.6
Germany	9
Israel	9
Ireland	9.3
Cayman Islands	9.5
Belgium	9.6
Norway	9.7
Turkmenistan	9.7
Finland	10
South Africa	10.1
Greenland	10.2
Czech Republic	10.3
Netherlands	10.3
Palau	10.3
Korea, Rep.	10.4
Libya	10.5
Russian Federation	11.1
Estonia	11.9
New Caledonia	12.1
Kazakhstan	14
Faeroe Islands	14.3
Canada	15.2
Oman	15.4
Saudi Arabia	16.2
United States	17.3
Australia	18.4
Bahrain	20.3
United Arab Emirates	20.3
Luxembourg	20.4
Aruba	22.6
Brunei Darussalam	23.5
Kuwait	28.1
Trinidad and Tobago*	36.1
Qatar	45

***Why is Trinidad & Tobago 2nd highest?**

[http://www.trinidadexpress.com/business/T T 2nd highest producer of greenhouse emissions-189462871.html](http://www.trinidadexpress.com/business/T_T_2nd_highest_producer_of_greenhouse_emissions-189462871.html)

“In a presentation Wednesday at the final day of the Energy Conference at the Hyatt Regency hotel, Port of Spain, UTT Process Engineering lecturer Dr Donnie Boodlal said the country was in a unique position, where the pattern of greenhouse gas emissions was significantly different from other countries.

The data, from a 2010 study by the University, said Trinidad and Tobago produces 53 million tonnes of greenhouse emissions annually, with 80 per cent coming from the petrochemical and power generation.”

Further notes to accompany the slide ‘**Sankey diagram showing By Source and End User GHG emission transfers for Scotland in 2011.**’

Source - http://uk-air.defra.gov.uk/reports/cat07/1306070907_DA_GHGI_report_2011_Issue1.pdf

Scotland can be found on pages 35 to 60 of this report, and the Sankey diagram is on page 39

Energy supply – 34.7% of our emissions

- Made up of gas, liquid and solid fuel production, the offshore industry and the production of electricity. Nearly 72% (71.8%) comes from the production of electricity at power stations – gas, coal, oil, nuclear, renewables and hydro.
- This has reduced by 24% from 1990, mainly the reduction in use of coal.
- 52% goes to business; 40% goes to residential

Agriculture – 16% of emissions.

- NOT mainly CO₂ from combustion of fossil fuels, but the emissions of methane and nitrous oxide from livestock and agricultural soils (complicated – depend on the type of soil, what is added, how it is worked etc.) also some fuel combustion in agricultural machinery.
- Largest emitted of methane (which is x25 of CO₂). Cattle emissions are 71% of total agricultural methane, sheep are 25% (rest pigs, poultry, horses, goats, deer)
- Have fallen 20% since base year – mainly down to reduced livestock numbers and reduced fertilisation of grassland/pasture.

Transport – 21.5% of emissions

- Made up of road (88.5% [49.5% cars, 39% commercial]), rail (2%), national navigation & costal shipping (3%), domestic aviation (4%) and military aviation and shipping (2%)
- Not change much since base year – small reduction of 2%. However, more people are traveling more, so less emissions per passenger miles. Scots travelled on average 7,010 miles per year within the UK in 2009/10. Rise from 4,652 in 1985/86. (stats from Transport Scotland – High Level Summary of Statistical Trends, March 2012).

Business – 18% of source, but 33% of end user emissions.

- Made up of the industrial combustion of fuels (87%), refrigeration and air conditioning (10%), fire-fighting solvents and electronics (2%), combustion emissions in the iron and steel industry (1%).
- What we are emitting at our work, as well as the consumption of goods and services within the UK.

Industrial Process – less than .5%

- These are the emissions from non-combustion industrial processes and are counted separately.
- Three main sources –
 - the decarbonisation of limestone in cement production (76%),
 - the glass industry (11%) and
 - primary aluminium production (11%)

Public – this 1.5% by source and 3% by end user

- Made of mainly of fossil fuel combustion in public sector buildings.
- Reduced by 39% since base year – more energy efficient public buildings and more use of gas as heating source.

Residential – 13.5 % - by source . 25% by end user.

- This made up of residential direct combustion of fossil fuels - gas, oil, coal for heating & cooking - 95%. Other 5% is domestic aerosols, asthma inhalers, accidental fires.
- Reduced by 20% since base year.

Waste Management – 4.5% of emissions, and the 2nd largest source of methane emissions.

- Methane from landfill makes up 90% of these emissions, rest is from treatment of waste water and small amount from waste incineration. Reduced by 68% from base year, mainly through better management of landfill sites.
- No energy consumption included in reporting from this sector – will be reported under public or business.

Land Use & Land Use Change (LULUC) - - 11%

- Scotland is a net sink of GHG - removing emissions through forestry and land management though also emitting them when trees are harvested, or land ploughed.
- This has net sink has increased significantly since base year. It could now absorb around half of our transport emissions.

Notes on Production & Consumption

The Scottish Government targets are based on the GHG emissions that are **produced** in this country – these are the emissions that can be directly affected or influenced by government policies and actions.

“Achievement of Scotland's targets will be measured against the level of the Net Scottish Emissions Account (NSEA). This accounts for the greenhouse gas emissions from sources in Scotland, Scotland's share of emissions from international aviation and international shipping, the effect of any relevant emissions sequestration (e.g. "carbon sinks" such as woodland) and the effect of the sale and purchase of relevant emissions allowances.”

From Low Carbon Scotland: Meeting our Emissions Reduction Targets 2013-2027 - The Draft Second Report on Proposals and Policies¹

However, that is not the whole story. We **consume** a lot more than what is produced in this country. Much of the food and consumer products that we buy come from outside Scotland. These goods and services emit GHGs in their production and transport that are not counted in the Production Footprint. The Scottish Government recognises this ...

*2.13.1 Consumption-based emissions are all emissions attributable to the goods and services we consume in Scotland (as opposed to the domestic emissions on which our targets are based). The Act requires that Scottish Ministers report, in so far as is reasonably practicable, the emissions of greenhouse gases (whether in Scotland or elsewhere) which are produced by or otherwise associated with the **consumption of goods and services** in Scotland. These reports must be laid before the Scottish Parliament in respect of each year in the period 2010-2050. The reports^[34] can be accessed on the Scottish Government's website.*

2.13.2 Consumption-based emissions reporting is a complex and evolving field and we are working to determine the most suitable methodology on which to base our reports. In October 2009 we made available a time series (1992-2006) of the Scottish greenhouse gas footprint, including consumption estimates, which

¹ <http://www.scotland.gov.uk/Publications/2013/01/3958/4>

reflect this developing work.^[35] Subsequently, in May 2012 we published experimental data on Scotland's greenhouse gas footprint for 2009^[36].

From *Low Carbon Scotland: Meeting our Emissions Reduction Targets 2013-2027 - The Draft Second Report on Proposals and Policies*²

It is obvious when you think about it – we grow and make things in Scotland that we export world-wide, but we import a lot more of the things we eat and drink and wear and use. While we want to cut our own GHG footprint, out-sourcing it to other countries is not the answer.

Implications for CCF projects – If projects are dealing mainly with energy efficiency and/or travel, they will be impacting mainly on the Production Footprint - these are the emissions that are produced, measured and the targeted by government policies in Scotland. If projects are focussing on food and waste – looking at the consumer goods that we eat, drink, use and wear - they will be impacting on the Consumption Footprint, our larger footprint that is the measurement of the global emissions of meeting our needs.

Source data for the graph illustrating “How we are doing”

How Scotland's CO₂e emissions have reduced since base year 1990

Source - http://uk-air.defra.gov.uk/reports/cat07/1306070907_DA_GHGI_report_2011_Issue1.pdf

Summary of Table ES1.2

	1990	1995	2000	2005	2010	2011
Total	70.42	68.52	66.67	57.76	54.51	48.79
Energy Supply	22.41	26.48	26.04	20.4	20.74	16.93
Transport	10.5	10.51	10.83	11.37	10.7	10.47
Business	11.69	8.89	9.84	10.06	8.76	8.79
Agriculture	9.92	9.76	9.43	8.73	7.96	7.93
Residential	8.18	8.14	8.28	7.98	8.37	6.58
Waste management	6.71	5.79	4.12	2.61	2.24	2.17
Public	1.23	1.07	1.03	1.07	0.87	0.75
Industrial Process	1.83	0.56	0.58	0.54	0.38	0.44
Land Use Change	-2.05	-2.68	-3.48	-5	-5.51	-5.27

² <http://www.scotland.gov.uk/Publications/2013/01/3958/4>

What do we mean by 'Low Carbon Food'?

Further information for the slide titled "The Footprint of Food"

Source - "How Low Can We Go" 2010 WWF / Food Climate Research Network / Ecometrica

http://www.wwf.org.uk/wwf_articles.cfm?unewsid=3678

category	Commodity	UK	Rest of Europe	Rest of World	average
fruit	Apricots		0.43		0.43
fruit	Figs		0.43		0.43
fruit	Citrus Fruit (misc)		0.51		0.51
fruit	lemons & limes		0.51		0.51
fruit	Oranges		0.51		0.51
fruit	tangerines, mandarins etc.		0.51		0.51
fruit	Apples	0.32	0.43	0.88	0.54
fruit	Cherries	0.32	0.43	0.88	0.54
fruit	Pears & quinces	0.32	0.43	0.88	0.54
fruit	Plums & sloes	0.32	0.43	0.88	0.54
fruit	Grapes		0.42	0.75	0.59
fruit	Dates	0.32		0.88	0.60
fruit	Grapefruit		0.51	0.70	0.61
fruit	Misc fruit		0.43	0.88	0.66
fruit	Kiwi fruit		0.43	0.88	0.66
fruit	Currents & gooseberries	0.84			0.84
fruit	Papaya			0.88	0.88
fruit	peaches & nectarines			0.88	0.88
fruit	Raspberries & other berries	0.84	0.95	1.41	1.07
fruit	Strawberries	0.84	1.06	1.39	1.10
fruit	Bananas			1.33	1.33
fruit	Watermelon		1.33	1.33	1.33
fruit	Cranberries & blueberries			1.39	1.39
fruit	Melons		1.55	1.74	1.65
fruit	Guavas & mangos			1.78	1.78
fruit	Pineapples			1.78	1.78
grains/leg	Oats	0.38	0.12		0.25
grains/leg	Misc cereals	0.37	0.49		0.43
grains/leg	Rye	0.38	0.49		0.44
grains/leg	Maize/corn		0.45		0.45
grains/leg	Millet			0.47	0.47
grains/leg	Wheat	0.52	0.63	0.66	0.60
grains/leg	Beans (dry)		0.61		0.61
grains/leg	Chickpeas		0.77	0.80	0.79
grains/leg	Lentils			1.06	1.06
grains/leg	leguminous veg - misc	1.55			1.55
grains/leg	Barley	3.24	3.35		3.30

category	Commodity	UK	Rest of Europe	Rest of World	average
grains/leg	Rice (paddy)			3.50	3.50
meat/dairy	Milk, whole, fresh	1.19			1.19
meat/dairy	Chicken	2.84	2.95	2.60	2.80
meat/dairy	Eggs	2.94	3.04		2.99
meat/dairy	Turkey meat	3.76	3.87		3.82
meat/dairy	Pig meat	4.45	4.56		4.51
meat/dairy	Fish	5.36			5.36
meat/dairy	sheep/goat meat	14.61		12.00	13.31
meat/dairy	Beef	12.14	12.26	32.00	18.80
nuts	Chestnuts		0.43		0.43
nuts	Peanuts			0.65	0.65
nuts	Hazelnuts		0.43	0.88	0.66
nuts	Almonds			0.88	0.88
nuts	Nuts misc			0.88	0.88
nuts	Pistachios			0.88	0.88
nuts	Walnuts			0.88	0.88
nuts	Sesame seed		1.05		1.05
nuts	Cashew nuts			1.06	1.06
nuts	Coconuts			1.78	1.78
nuts	sunflower seed		2.20		2.20
Spices including cinnamon, nutmeg, mace, cardamom, pepper.				0.87	0.87
spices	Ginger			0.88	0.88
veg	Peas, green	0.29	0.40		0.35
veg	Potatoes	0.26	0.51		0.39
veg	Carrot & turnips	0.35	0.46		0.41
veg	Onions	0.37	0.48		0.43
veg	Peas, dry	0.51	0.62	0.15	0.43
veg	Cabbages & other brassica	0.22	0.48	0.64	0.45
veg	Artichokes		0.48		0.48
veg	Garlic	0.57	0.68		0.63
veg	Avocados		0.43	0.88	0.66
veg	Yams			0.88	0.88
veg	Mushrooms & truffles	1.00	1.11		1.06
veg	Aubergines		1.30		1.30
veg	Plantains			1.33	1.33
veg	Anise, fennel			1.41	1.41
veg	Asparagus	1.94	2.22	2.39	2.18
veg	Cauliflowers & broccoli	1.94	2.22	2.39	2.18
veg	Pumpkins, squash & gourds		2.22		2.22
veg	Spinach		2.22		2.22
veg	Cucumbers & gherkins	3.79	1.30		2.55
veg	Tomatoes	3.79	1.30		2.55

category	Commodity	UK	Rest of Europe	Rest of World	average
veg	Olives		3.66		3.66
veg	lettuce & chicory	1.15	1.00	10.00	4.05
veg	Chillies & peppers (fresh)	5.88	3.12		4.50
veg	Green Beans	1.55		10.70	6.13
	sugar cane & other sugar crops			0.09	0.09
	sugar beet	0.10			0.10
	sorghum (mainly animal feed)			0.47	0.47
	Cocoa beans			0.74	0.74
	soy oil		0.77	0.80	0.79
	Grapes as wine		0.65	1.08	0.87
	Tea			0.87	0.87
	Natural honey	1.00	1.00	1.00	1.00
	Rapeseed & mustard seed	2.09			2.09
	oilseeds misc		2.20		2.20
	palm nuts/oil			2.23	2.23
	Coffee (green)			8.10	8.10