

6. Global emissions – who are the culprits?

Trying to determine who is responsible for global greenhouse gas (GHG) emissions is not as straightforward as it first appears as there is more than one way to do the counting. Some countries started early, some started late and some have hardly started.

Production Emissions. China clearly produces more CO₂ emissions than any other country, followed by the USA, India, Russia, Japan, Germany, South Korea, Iran, Saudi Arabia and Indonesia. This is not surprising when China and India have 18.5% and 17.7% respectively of the world's population.

CO₂ emissions are measured on what is produced in a particular country or territory and are known as production emissions or territorial emissions. These are used when individual countries report their emissions and establish national and international emissions targets.

Per capita emissions, or the contribution of the average citizen of each country, is determined by dividing its total emissions by its population. These show a quite different picture (table below) with China's emissions (6.92t) being slightly higher than the UK (5.81t) but less than New Zealand.

India's emissions (1.84t) are less than a third of the UK's and Indonesia's (2.21t) less than a half. Saudi Arabia (19.93t) and other gulf states top the list of high per capita emitters followed by Australia (16.96t), USA (16.21t) Canada (15.55t), South Korea (12.54t) and Russia (11.32t).

The average Ugandan, Tanzanian, Ethiopian and Somalian produce 100th of the emissions of a North American or Australian and it is they who will be hit hardest by climate change. The British, French and Italians produce 3 times the average Indian, 5 times the average Pakistani over ten times the average Bangladeshi and over 100 times that of the average Somali.

Per capita CO ₂ Emissions in tonnes (t) (2017)					
Qatar	39.77	Netherlands	9.66	Brazil	2.23
Trinidad and Tobago	31.37	Germany	9.65	Indonesia	2.21
Kuwait	24.07	Japan	9.32	India	1.84
Bahrain	21.30	Poland	8.87	Philippines	1.25
UAE	21.09	Iran	8.50	Pakistan	1.02
Saudia Arabia	19.13	Norway	8.25	Cambodia	0.63
Australia	16.96	Ireland	8.15	Congo	0.62
United States	16.21	South Africa	8.12	Bangladesh	0,49
Kazakstan	15.67	New Zealand	7.66	Kenya	0.36
Canada	15.55	China	6.92	Afghanistan	0.25
Estonia	14.14	United Kingdom	5.81	Tanzania	0.22
South Korea	12.54	France	5.34	Ethiopia	0.14
Taiwan	11.60	Portugal	5.31	Uganda	0.14
Russia	11.32	Venezuela	5.23	Somalia	0.05
Iceland	10.82	Mexico	3.95	Democratic Republic of Congo	0.02

The share of global missions per global citizen is 4.79t. In a more equitable world, each country's share of emissions would be related to its population size. This clearly is not the case since the Gulf States with their relatively small populations are the highest producers and Bangladesh with a population of 165M is one of

the lowest. In general, high-income countries emit more than their population share and all low-income countries emit less than their population share. The USA, Canada, Australia emit three times their population share and almost 3 times the emissions of the UK and France. The UK and France are about 20% above their population share and China about 40% above.

Consumption based emissions take account of emissions produced by countries manufacturing goods on behalf of others. When the goods are exported the emissions count is exported as well. Transferring the emissions count from the manufacturing territory to the consuming territory will result in the emissions for the manufacturing country going down and those of the consuming country going up.

In 2016 **China's** consumption based emissions were 14% lower than its production based emissions decreasing its per capita emissions from 6.9t to 6.2t.

In 2017, the UK consumption emissions were an estimated 784 million tonnes of CO₂ **equivalents** more than one-and-a-half times the 468 million tonnes from territorial emissions alone. When the UK's consumption emissions are re-calculated as per capita emissions they **give** 8.43t. On this basis the UK's per capita emissions are significantly above those of China.

Overall UK production and consumption emissions have fallen over the past 10 years, the former primarily due to the phasing out of coal fired power stations, the increasing introduction of solar and wind energy production and the continuing contraction of carbon intensive industries. For example steel production reduced by **40%** between 2008 and 2020. The national trends for the emission of the other GHGs reflect those of CO₂ but are skewed by the relocation of GHG emitting, manufacture or processing to 'developing' countries. Much of the world's **adipic acid** - a precursor of nylon manufacture - is now produced at 11 Chinese sites which are consequently responsible for a significant proportion of global N₂O emissions.

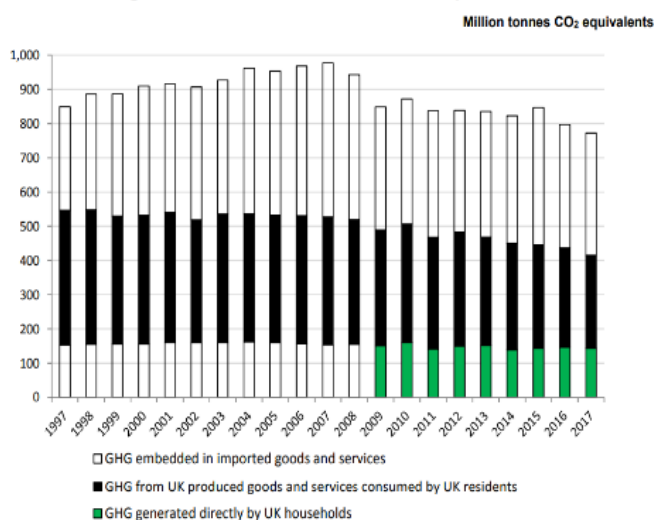
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Unattributed Emissions. The emissions from international shipping and international **aviation** in 2017 totalled **1.23Gt** and, if a country, would have been the 6th highest emitter after Japan. International transport emissions are not included within individual countries' contributions but assessed separately. If they were allocated to individual countries then since aircraft are built, owned and operated between high emitting nations - which is also where 90% of their passengers are drawn - allocation would be mainly to the already high emitters. Similarly, international **shipping** is predominantly committed to transporting raw materials and goods between high emitting countries, and passengers from cruise liners are also almost exclusively from developed countries.

Historic emissions. Once CO₂ has been released from fossil fuels it remains in circulation for **100s** of years. Since 1751 the world has **emitted** over 1.5 trillion tonnes of CO₂. During 30 years of Climate negotiations the argument persists that the countries which have added most to atmospheric CO₂ should take on the greatest responsibility in tackling it.

Figure 1 Greenhouse gas emissions associated with UK consumption 1997 to 2017



Historical emissions data shows that the USA has emitted more CO₂ than any other country to date: at around 400 billion tonnes since 1751 and is responsible for 25% of historical emissions. This is twice as much as China, the second largest national contributor. Until 1950 more than half of historical CO₂ emissions had been produced by Europe with the majority produced by the UK. The 28 countries of the European Union (EU-28) are responsible for 22% of historical emissions. It is only in the last 50 years that growth in South America and Asia has increased contributions from these regions.

The 'take home message' is that whoever we try to blame for the 1650Gt of CO₂ emissions released into the atmosphere since 1750 or the current annual emissions of about 36Gt there are many countries in the world whose impact has been and remains minimal. Many of these same countries are destined to see the worst impacts of climate change with desertification, heat-waves, droughts and flooding, and for some the loss of their coastal or island communities.

The result will be movement of displaced communities, seeking water, a place to grow food and a safe, stable environment to bring up their families. The refugee camps we see today across the world due to civil war, and the camps of refugees we see in Sangatte will be insignificant to what we will see in the future unless we act now.