Farnham U3A Sustainable Energy

June 2022

Overview of Session

- What can we do as individuals?
  - Intro (SE)
  - Transport (SE)
  - Home (PO)
  - Food (PO)
  - Other (SE)
- BREAK
- Action through other groups …….including Extinction Rebellion
- Planning 2022/23

What can we do as Individuals?

- Firstly the data – what Greenhouse Gas(GHG) do we generate as individuals?
  - Enormously dependent on country
- In UK
  - Total UK country emissions 455 Mtonnes Co2 equiv.
  - BUT this excludes International shipping / aviation 45MTCo2equiv
  - AND total UK GHG footprint should include GHG embedded in imported goods
  - UK DEFRA statistics give TOTAL UK GHG footprint as.. 700 MTCo2 equiv
- *(Note – scale of imported GHG emissions is considerable)*

UK population (2019) 67.5 M

700MT = 10.4 MT Co2 equiv per head

What can we do as Individuals?

- Mike Berners-Lee book – How Bad are Bananas?
  - Addresses this issue head on
  - Unfortunately uses 12.7 Tonnes per head (850MT total)…….

  - But to have a consistent basis we are running mostly with his estimates.
    - *(Consider data used in talk as reasonable estimates rather than strictly accurate)*

- Estimates include, for an individual activity
  - Direct energy used (eg fuel in car,)
  - Energy used indirectly (eg to build, maintain car)
    - Whether sourced in UK or imported

UK Per Head emissions by individual

- Berners-Lee Analysis opposite ➔
- These are AVERAGES
  - Eg a Euro flight every year, but 50% never fly
  - Richer will tend to be higher
- Berners-Lee challenge is to reduce from

12.7 MT pp/ yr to 5 MT pp/yr

		% total		Mt per yr
FOOD		25		
	shops		23	2.9
	restaurants		2	0.3
HOME& ACCOMMODATION		25		
	Staying away		3	0.4
	Housing		6	0.8
	Household fuel		11	1.4
	Household electricity		5	0.6
TRAVEL		27		
	Vehicle fuel		11	1.4
	Car manufacture		3	0.4
	Trains buses other		2	0.3
	Flights		9	1.1
	Ferries and cruises		2	0.3
OTHER		23		
	Non food shopping		7	0.9
	Leisure recreation		1	0.1
	Other services		3	0.4
	Water, waste		2	0.3
	Health, education, public services		10	1.3
TOTAL		100		12.7

TRANSPORT - FLYING

- Flying generates 9% of total ……. 1/3 of all transport
  - 1.1 MT per person/yr
- One individual transatlantic economy return flight (6500 miles) is approximately the same GHG footprint as that from 1 Year's average mileage (7600 miles) for a small car ……(*and car will be used for more than 1 person*)
  - Creating 2.5MT GHG equiv

- Message – consider whether you have to go so far!
  - (For Europe, consider coach or train instead …….)

TRANSPORT CARS

- Average car doing average UK mileage (7600 miles) uses 4.0 MT
  - Average car has 1.6 people in it so this is 2.5 MT per person in car
  - People with cars are each using 20% of UK average person's GHG
- Reduce footprint by
  - Use smaller car ……. And NOT large SUV (which can be 3 times worse than small)
  - More people in car (4 people in car can compete with train Co2)
  - Drive gently in urban conditions (Up to 20% less)
  - Drive more slowly (15% less at 60mph instead of 70mph)
  - Use electric car ……BUT
    - manufacturing is 30% of life-total Co2 for 200Kkm petrol car
    - So make ANY car last as long as possible unless it is very inefficient
  - Use diesel not petrol !! (but pollution problem…….)
  - Share cars (taxis, car share, Zip car type hire)
- DO NOT BUY NEW NON-ELECTRIC CAR?

USAGE / MANUFACTURING & DISPOSAL

- Volvo data shows the significance of manufacturing / disposal as percentage of lifetime use.

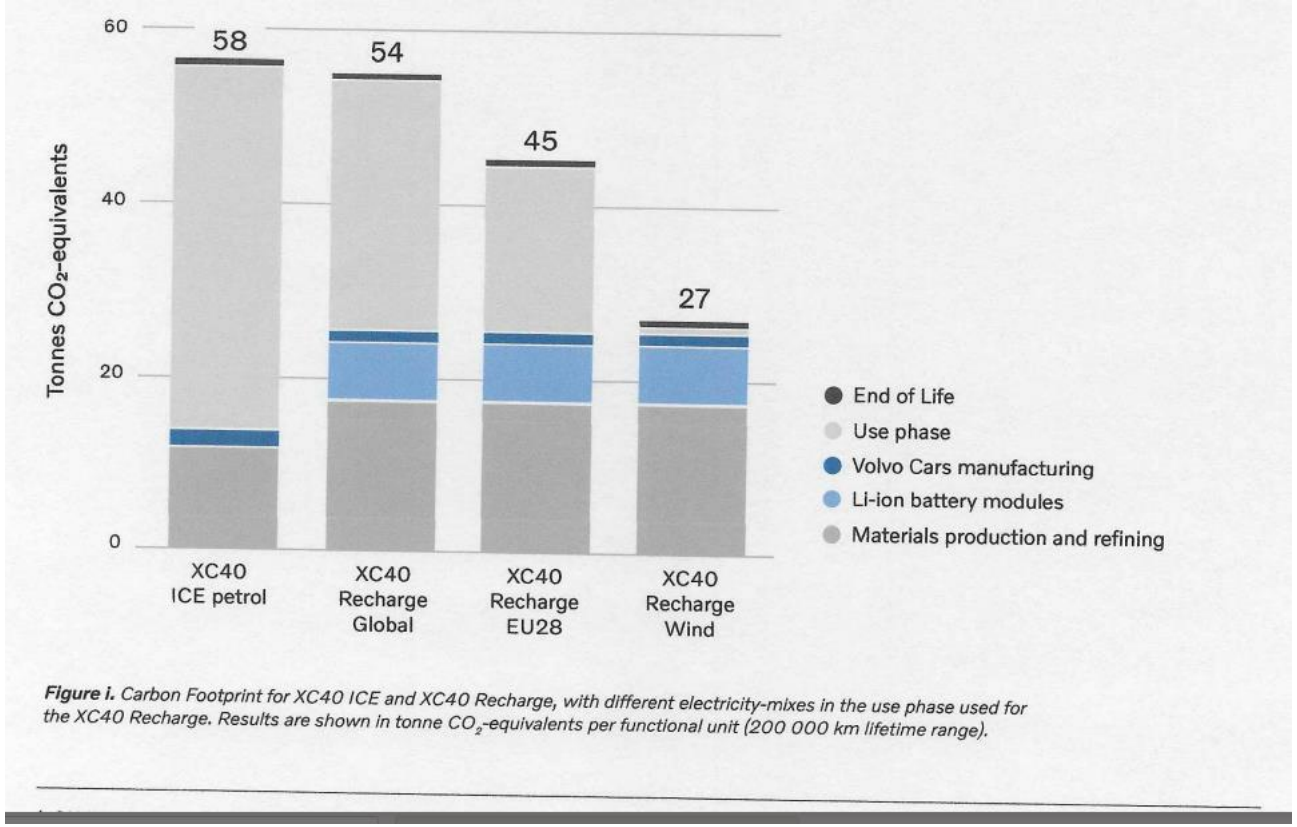


Figure i. *Carbon Footprint for XC40 ICE and XC40 Recharge, with different electricity-mixes in the use phase used for the XC40 Recharge. Results are shown in tonne CO_2-equivalents per functional unit (200 000 km lifetime range).*

TRANSPORT - OTHER

- Small petrol car (1 person) 180 gm/ km (Flying approx. 250gm/km)

So use other transport than private cars and flying….

- Train 49 gm/km UK intercity
  - But range 14 (French TGV) – 42 London u/ground - 90 some UK diesel
  - Worse if faster ; if more stops; Would be better if not so heavy
  - Data Heavily dependent on loading
- Coach 30 gm/km
  - & London bus hybrid diesel ½ full (If fully electric <10gm/km)
  - Data heavily dependent on loading of bus
- E-bike 3gm/km (for fuel only)
  - Less than manual bikes …..though these are also good!

NOT Ocean Cruising 251 gm/km

- As bad as flying similar distance

FOOD and HOME …. Philip…

OTHER

- Non food shopping 7% of total avge GHG
  - (Home – related covered elsewhere)
  - Clothes
    - Jeans 19kg to make
    - Leather shoes 15kg
    - Indoor clothes total 100kg say Say total 250kg (2%) of annual footprint, but avoid fast fashion / low use
  - Computers (incl TV, phones)
    - 2.5% of world GHG
    - 5% of this in cryptocurrencies NO!!!
- General message
    - Buy good quality can be lowest lifetime GHG option
    - Maintain, Repair
    - Keep using a long time
    - Reuse / recycle at end of life

- Pets Average dog 770kg / yr 6% of total avge GHG……
    - But assuming 1 dog for family of 3, comes down to 2%
  - Smaller dog the better!

OTHER

- Health / Education / Public Services 10% of total
  - Comes with ‘existing’ in UK
  - Will hope that authorities responsible will reduce totals

- BUT
  - More people inevitably means more GHG
  - Having 3+ children is a very difficult to reconcile with reducing carbon footprint
  - Politically difficult to address …..COP26 silent on population growth

  - Avoid inter-continental travel for marriageable ages – localise gap-years!

SUMMARY

- Hard to avoid the ‘hair shirt’ to make dramatic difference?
  - Flying, especially long haul
  - Cruises
  - No large fast cars
  - Avoid food which has been flown in
  - Don’t waste energy heating home
  - Drop the pressure for more grandchildren
- But significant reductions possible
  - Change to an electric car quite soon (and get on your (E-)-bike)
  - Insulate your house fully – change to fuel pumps in a few years’ time
  - Watch red meat and waste food
  - Repair, re-use, share equipment wherever possible

BREAK

Group contributions to Societal change

- This U3A group !
  - Use of excess wind and solar power
  - (The right type of) New Nuclear
- Political parties
  - Green, Labour, Libdems, Conservative
- Government – National and Local
- Other pressure groups
  - Extinction Rebellion and off-shoots

Extinction Rebellion - Demands

1.Tell the truth

All institutions must communicate the danger we are in. We must be clear about the extreme cascading risks humanity now faces, the injustice this represents, its historic roots, and the urgent need for rapid political, social and economic change.

2.Act now

Every part of society must act now to reduce greenhouse gas emissions to net zero by 2025 and begin protecting and repairing nature immediately. The whole of society must move into a new precautionary paradigm, where life is sacred and all are in service to ensuring its future

3.**Be the change**

We demand a culture of participation, fairness and transparency. The Government must create and be led by a Citizens' Assembly on Climate and Ecological Justice. Only the common sense of ordinary people will help us navigate the challenging decisions ahead.

Extinction Rebellion

- What they and offshoots have done
  - Initial appearance
    - Climate Emergency initiatives (Councils etc)
    - Demonstrations – eg in London
  - Insulate Britain
  - Disinvest in Fossil Fuel

- ?? Citizens Assembly idea

Extinction Rebellion - justifications

- Existential threat requires greater attention than being given by society / politicians
  - Justifies exceptional methods
  - Comparison with USA Civil Rights / Gandhi in India

- Non-violent ….and includes (generally, arguably) respectful attitudes ….but
  - Only way to get to be heard includes disruptive activities

Extinction Rebellion - arguments against

- Extreme methods alienate potential supporters
  - Possible they could reduce political support needed for change
- Proposals could create difficulties in establishing practical way forward
  - (eg no interim fossil fuels ➔ societal chaos)
- Methods create an excuse for clampdown on protest

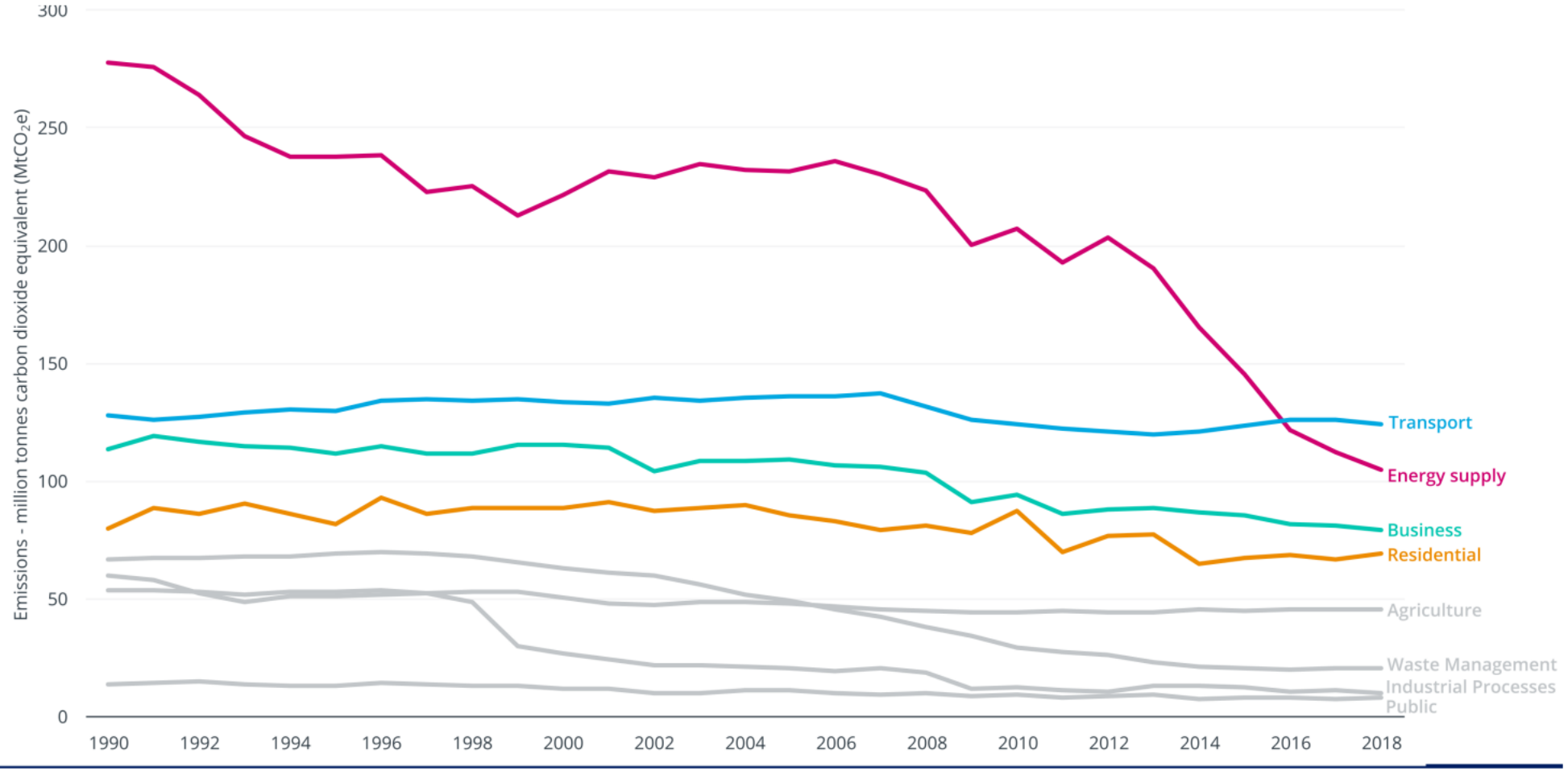
2022/3 Planning

- Basics
  - **? 2nd Wed in month?**
  - Find external speakers
  - Exploit links with National U3A

- Volunteers appeal for – noted on next slide where possible

2022/3 Planning

- Proposed schedule to include: Speaker?
  - Update on government plans – UK / EU / COP
  - Ongoing political challenges
    - Cost of energy / energy security
    - Extinction Rebellion / Net zero push back (External Ext Rebellion speaker)
  - Adaptation plans and progress (flood prevention / small islands / heatproofing)
  - Significant sector challenges: latest progress and plans
    - Hydrogen (Warwick)
    - Carbon Capture and Storage
    - Food, farming and forestry – revisit
    - Fracking – UK potential (Andy Wood? / external)
  - Economics
    - The economics of power generation (Warwick / external?)
    - Carbon taxes – including cross border green taxes
    - Update on UK funding – taxes, green surcharges, green subsidies

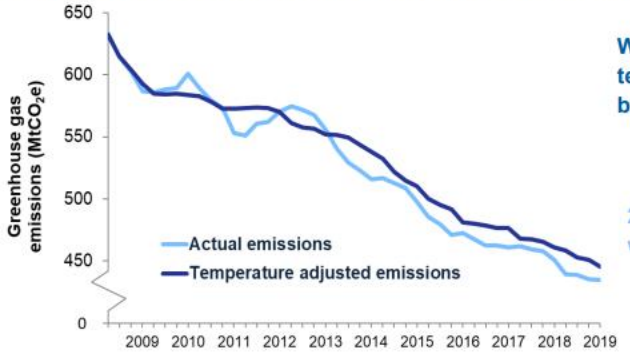


Source: Institute for Government analysis of: *Final UK greenhouse gas emissions national statistics*, BEIS, February 2020
Note: Net negative emissions from LULUCF not shown.

UK emissions and the individual(2019)

Usage	**UK MT total**	**Per person (Tonnes)**
Surface Transport	120	1.8
Buildings	90	1.3
Manufacturing/Construction	60	0.9
Agriculture / Land	50	0.7
Electricity Supply	50	0.7
Aviation	40	0.6
Other, incl waste, shipping	80	1.2
S-Total	**490**	**7.3**
IMPORTED	200 – 300!	
Grand Total		

Adjusting emissions for external temperature does not change the long term trend



While actual emissions fell by 3.6% temperature adjusted emissions fell by 3.4% between 2018 and 2019

2019 annual average temperature warmer than long term average by **0.5°C**

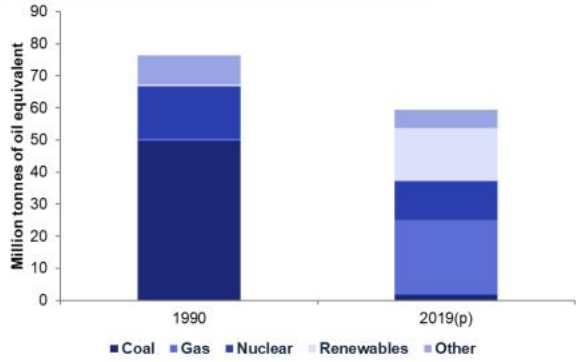
Temperature adjusted emissions estimates remove the estimated effect of external temperatures
Emissions are calculated for each quarter, with the preceding four quarters summed to create a rolling annual total

The energy supply sector experienced the largest reduction in CO_2 emissions in 2019

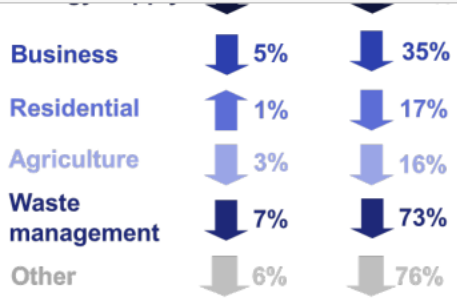
	2018-2019 % change	1990-2019 % change
Energy supply (including power sector)	↓ 8.4%	↓ 62.8%
Business	↓ 1.9%	↓ 42.1%
Transport	↓ 2.8%	↓ 4.6%
Residential	↓ 1.8%	↓ 16.7%
Public	↑ 0.5%	↓ 40.1%

For the sectors not included here, provisional CO_2 estimates for 2019 cannot be made as they cannot be derived from the energy statistics. Final 2019 estimates for all sectors will be published in February 2021, which will include total emissions by sector.

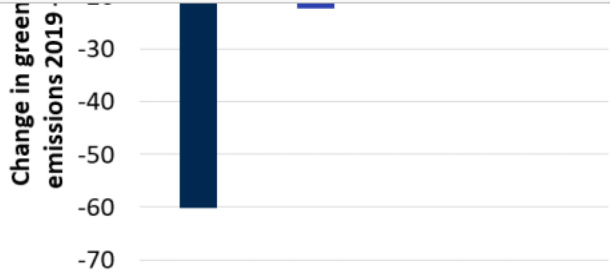
The reduction in power sector emissions has been driven by a shift away from using coal for electricity generation towards gas and renewables



Further information: www.gov.uk/government/collections/provisional-uk-greenhouse-gas-emissions-national-statistics
Enquiries: ClimateChange.Statistics@beis.gov.uk
Responsible statistician: Georgina Smalldridge **Tel: 020 7215 0206**

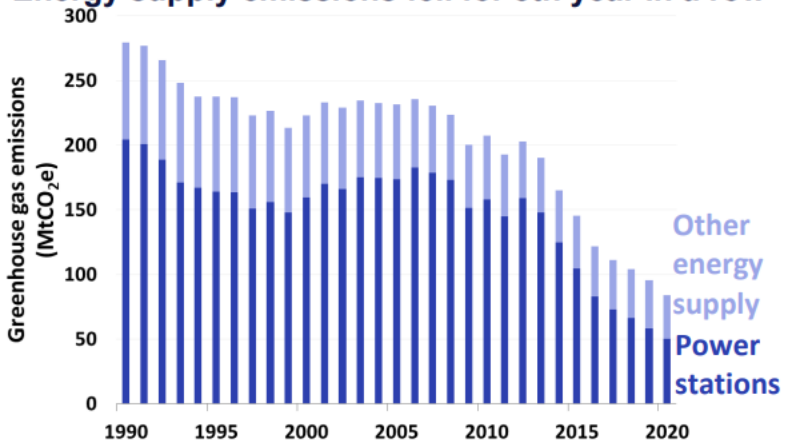


Others include Public, Industrial Processes and the Land Use, Land Use Change and Forestry (LULUCF) sectors. The percentages may not sum to 100% due to rounding.



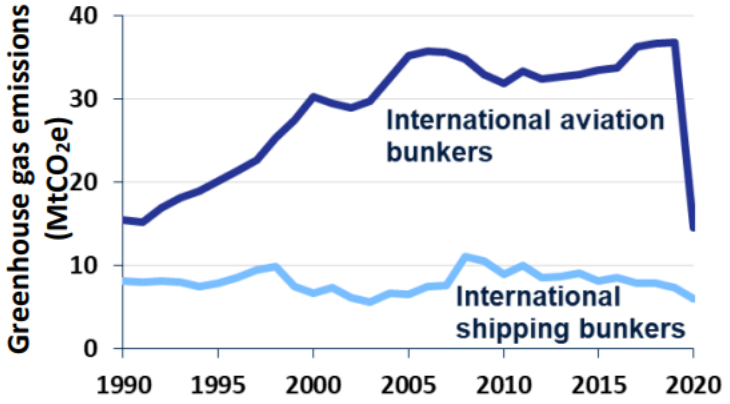
Road vehicles make up around 90% of transport emissions each year and accounted for 21 $MtCO_2e$ of the overall 23 $MtCO_2e$ fall in transport emissions in 2020, with 17 $MtCO_2e$ being from passenger cars.

Energy supply emissions fell for 8th year in a row



Energy supply emissions fell by 59% between 2012 and 2020 and accounted for 68% of all emission reductions in this period. This is mostly due to large reductions in the use of coal in power stations.

From a peak in 2019, emissions from UK-based international aviation bunkers fell 61% in 2020



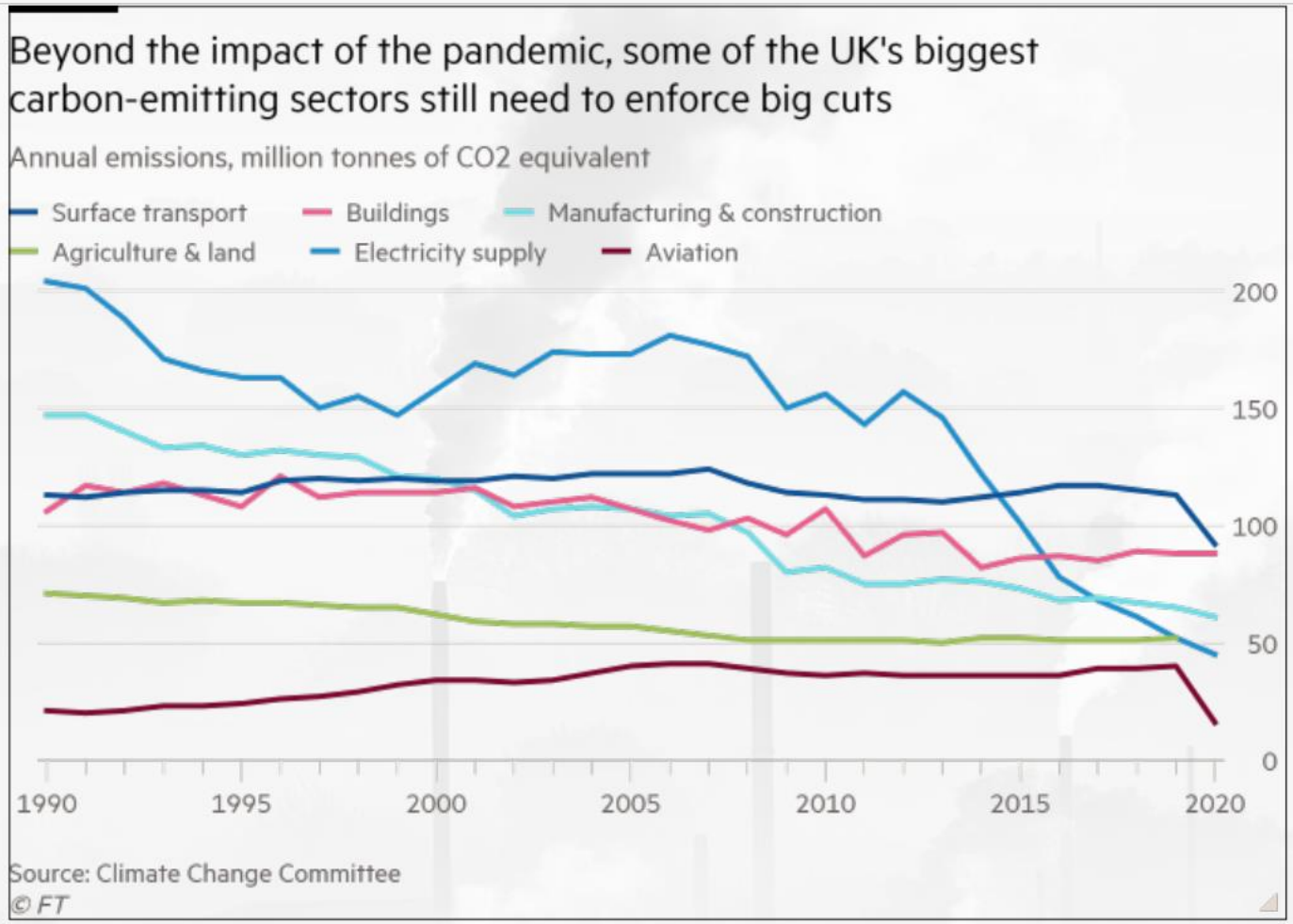
These international fuel bunker emissions are not included in the UK emission totals shown elsewhere that only include domestic transport.

Further information: https://www.gov.uk/government/collections/final-uk-greenhouse-gas-emissions-national-statistics
Enquiries: GreenhouseGas.Statistics@beis.gov.uk
Responsible statistician: Christopher Waite **Tel: 020 7215 8285** **Media enquiries: 020 7215 1000**

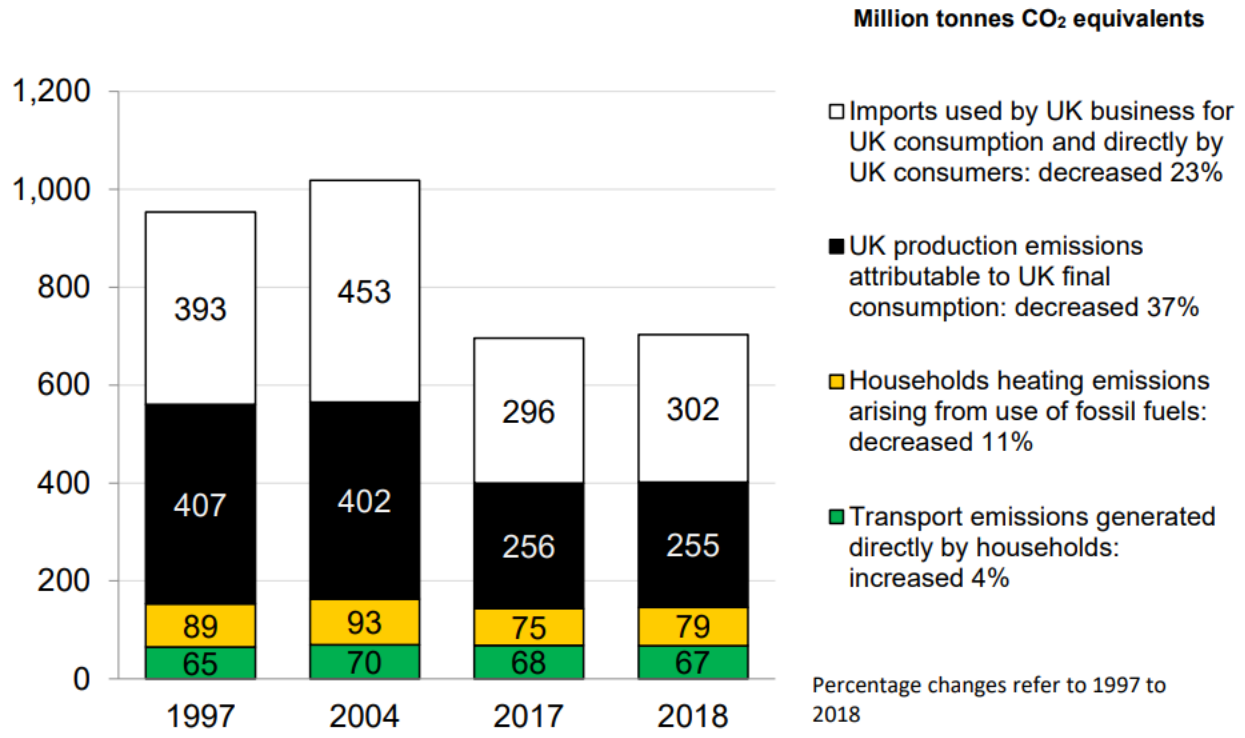
Progress on Net Zero

- Lockdown measures led to a record decrease in UK CO_2 emissions in 2020 of 13% from the previous year.

UK CCC 2021 Progress Report to Parliament



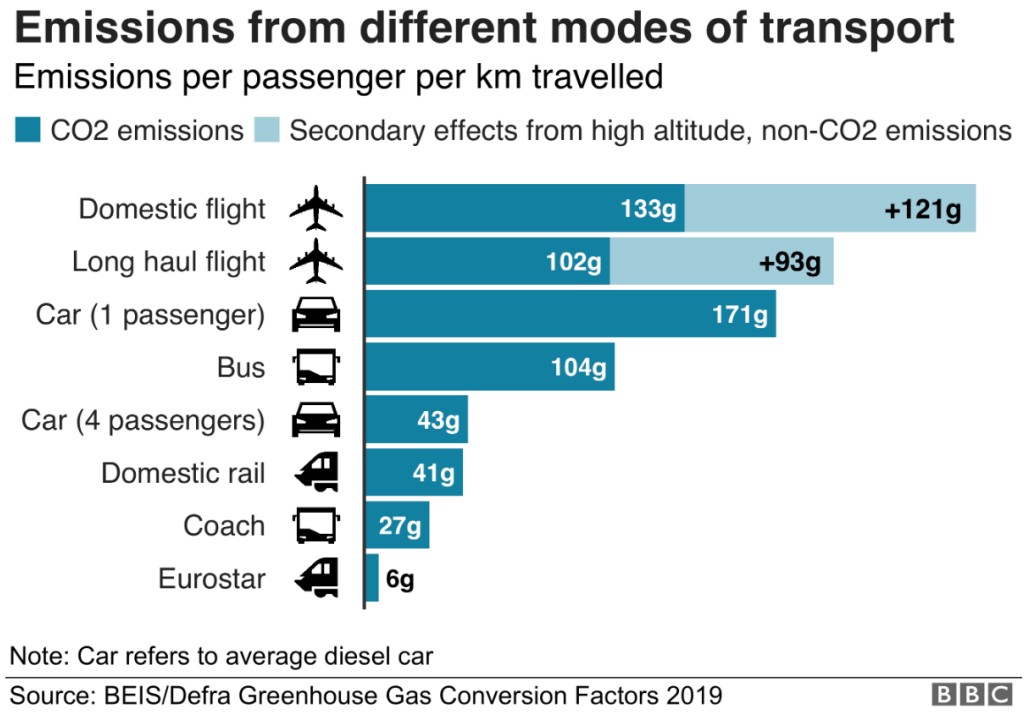
2017 and 2018



In 2018 total greenhouse gas emissions associated with UK consumption were 26 per cent lower than in 1997 when this series begins. Figure 2 sets out the changes in each of four main activities that make up the total, including the peak in 2004.

Emissions associated with UK production, were 37 per cent lower in 2018 than 1997 levels. These emissions accounted for 36 per cent of the total GHG footprint in

TRANSPORT



- Average car has 1.6 passengers ….so data for that needed
- Bus …..why 104??? Does Richard S have data?
- Rail 90g for some UK diesel…. Check UK satefy and standard board (BBC)
- Eurostar 9g using example check paris – Bordeaux HST
- Cruising 251g+/km per Carnival / BBC (And lower berth!)
- E-Bikes 5g/km

FOOD

- Page 114 diets compared …. Note meat / dairy some airfreight gives 75kg / wk = 3800 yr (1500 min!) waste / airfreight / meat/dairy

Heating

- A Heat pump – to convert or not to convert?
  - Is now the right time?
  - What do the economics typically look like?
- Insulation still to do
  - What do the economics typically look like?
    - Maybe standard existing house …… with extra on challenging such as single skinned brick house
- Draughtproofing
- Solar on roof
  - (Given Warwick's general comments that not worth it, is this the message)
- Green energy suppliers?
  - Does this help and if so how when we all use the same electrons

- Lower temperatures
- More pullovers

Heating - continued

- Use of car battery to feed grid
- Smart meters

Food

- Reduce / eliminate meat eating
- Reduce / eliminate dairy
- Match diet to seasonally, locally available products
  - Avoid air freighted products
- Reduce waste