Quantifying classic car emissions

2022

Assigning a figure to the carbon footprint of classic cars has long been a challenge. In this report, we attempt to find an answer.

loop

Welcome

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About loop
loop is a specialist automotive PR and communications agency producing award-winning work for clients across Europe and internationally. From our base at Bicester Heritage, the heart of the UK's classic automotive scene, we deliver a full service covering everything from simple stories to key projects, for clients stretching right across the automotive, engineering and technology sectors.

President Richard Nixon, White House Photo Office, U.S. National Archives.
One Millionth Morris Minor, Nuffield Organization.
Motorists queuing for rationed petrol © BP plc, reproduced with kind permission.

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Introduction

It's perhaps only natural, as we become more aware of our environmental footprint, that we should look more closely at our activities in the hope of understanding their true impact. For owners of older vehicles, the arguments for replacing them with something more modern have been around for years. But as many enthusiasts begin to feel the pressure of increased environmental scrutiny, it's become clear that quantifying the carbon footprint of classic and historic vehicles is more than a little problematic.

In this report, we consider some of the complexities at play while attempting to quantify the CO_2 emissions of the UK's classic car fleet.

In the interests of simplicity, we have chosen to focus this report on classic cars alone, deeming historic trucks, buses and motorcycles to be outside the scope of our research for now.

The birth of vehicle emission standards

Prior to the creation of formalised standards, vehicle emissions were largely unregulated with little incentive to test a car's environmental performance, let alone keep accurate records.

Fig. 1

President Richard Nixon signing the Clean Air Act of 1970 at the White House. Looking on are William Ruckelshaus, Administrator of the Environmental Protection Agency (left), and Russell E. Train, Chairman of the Council on Environmental Quality.

Source: U.S. National Archives

The United States became one of the first countries to enact emissions standards as it sought to tackle the growing air quality problems in areas such as Los Angeles, a city synonymous with smog. Beginning with the Motor Vehicle Air Pollution Control Act of 1965, an amendment to the Clean Air Act of 1963, the US set a series of targets for the reduction of carbon monoxide and hydrocarbon emissions.

In 1970, the legislation was greatly expanded to include additional pollutants with tougher targets, policed through a new vehicle testing regime that ensured those targets were being met. The administration of these efforts came under the remit of the newly-formed Environmental Protection Agency (EPA).

The European Economic Community (EEC) soon followed with a series of accords that, by the late 1980s, were strict enough to require the use of a catalytic converter. By 1992, these regulations had grown into a legal framework that we recognise today as the 'Euro' standards.

Tab. 1

Euro emissions standards

Tier	Date
Euro 1	July 1992
Euro 2	January 1996
Euro 3	January 2000
Euro 4	January 2005
Euro 5a	September 2009
Euro 5b	September 2011
Euro 6b	September 2014
Euro 6d-Temp	September 2017
Euro 6d	January 2020
Euro 7 (proposed)	2025

However, even by the most generous official definition, it's clear that almost all classic vehicles on UK roads today pre-date formalised standards under which their emissions might have been assessed. For our exercise, that means that no data exists with which to quantify their environmental performance, and we must rely on other metrics.

Defining a classic

What is a classic car?

Agreeing upon a definition for what constitutes a classic car has always been notoriously difficult, clouded by subjective opinions and often thwarted by unusual edge cases.

FIVA, the Fédération Internationale des Véhicules Anciens, the body that represents historic vehicle owners' interests in Europe, defines a classic as 'a mechanically propelled road vehicle which is at least 30 years old, preserved and maintained in a historically correct condition, not used as a means of daily transport, and which is therefore a part of our technical and cultural heritage.'

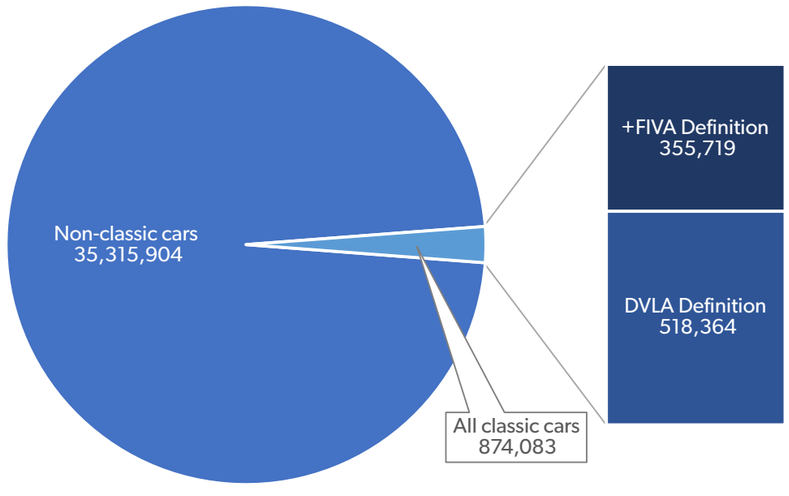
The DVLA define it differently, granting 'historic' status to vehicles built or first registered more than 40 years ago provided that no 'substantial changes' have been made to the vehicle in the last 30 years.

Given the rise in popularity of more modern classics – the 'young timers' – for our purposes we will consider any car manufactured prior to 1992 to be worthy of inclusion.

Fig. 2

Number of classic cars by definition vs. total parc.

Source: DVLA



How many classic cars are there?

Using our definition, the DVLA database[1] holds details of 412,568 classic cars licensed for use on UK roads as of May 2022, with an additional 461,515 cars declared as SORN (Statutory Off-Road Notification), for a total of 874,083.

However, that includes 249,520 cars (84,893 of which are SORN) for which the DVLA has no known build date. Looking at the manufacturer recorded against these vehicles – a list that includes automotive greats from Austin Healey to Wolseley – it's clear most, if not all, are likely to fall within our definition of a classic. As a result, these vehicles have been included in our analysis.

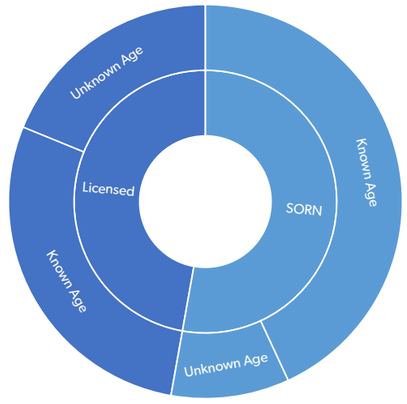


Fig. 3

Number of classic cars, licensed and SORN, in the UK

Source: DVLA

Fig. 4

The Morris Minor is the most popular car for which the DVLA has no recorded build date, with 17,918 vehicles of indeterminate age.

Photo: Nuffield Organization

1 DVLA, df_VEH0124: Vehicles at the end of the quarter by licence status, body type, make, generic model, model, year of first use and year of manufacture

Defining a classic

What are the most popular classics?

It's perhaps not surprising that the most popular make with classic enthusiasts in the UK should be British. With 45,657 vehicles registered for use on our roads, the top spot falls to MG, followed closely by Ford. The British theme continues with the trio of Triumph, Austin and Morris taking third, fourth and fifth respectively.

Tab. 2

Top 10 most popular makes of licensed cars

Source: DVLA

Make	Licensed cars
MG	45,657
FORD	40,524
TRIUMPH	30,394
AUSTIN	27,913
MORRIS	27,335
VOLKSWAGEN	24,785
JAGUAR	18,419
MERCEDES	14,216
ROVER	10,819
PORSCHE	9,999

The picture is slightly different when we look at cars currently declared as SORN. Here, Ford takes top billing, with 63,778 cars laid-up in storage or secured in a lock-up, followed by Volkswagen with 44,171. Austin, MG, and Mercedes fill out the rest of the top five.

Tab. 3

Top 10 most popular makes of SORN cars

Source: DVLA

Make	SORN cars
FORD	63,778
VOLKSWAGEN	44,171
AUSTIN	27,606
MG	22,853
MERCEDES	20,542
ROVER	19,908
BMW	18,182
TRIUMPH	17,381
MORRIS	14,179
PORSCHE	13,633

The most popular individual model is the MGB, with 24,810 licensed, followed by the Morris Minor. Abingdon is well represented in the top ten with the MG Midget also claiming fourth place.

Make	Model	Licensed cars
MG	MGB	24,810
MORRIS	MINOR	14,898
FORD	ESCORT	9,844
MG	MIDGET	9,353
VOLKSWAGEN	BEETLE	7,405
AUSTIN	MINI	7,255
VOLKSWAGEN	GOLF	6,034
JAGUAR	E TYPE	6,027
TRIUMPH	STAG	6,024
MERCEDES	200	5,167

Tab. 4

Top 10 most popular models of licensed cars

Source: DVLA

Fig. 5

Most popular models of the top 10 most popular makes of licensed cars

Source: DVLA

Defining a classic

Again, the picture changes when we consider vehicles declared as SORN. It seems there are an awful lot of Ford Escorts and VW Golfs tucked away awaiting their turn in the limelight – far more than there are on the road, in fact. We also begin to see the emergence of more modern icons such as the Ford Sierra and Fiesta, as they make an appearance in the top ten.

Tab. 5

Top 10 most popular models of SORN cars

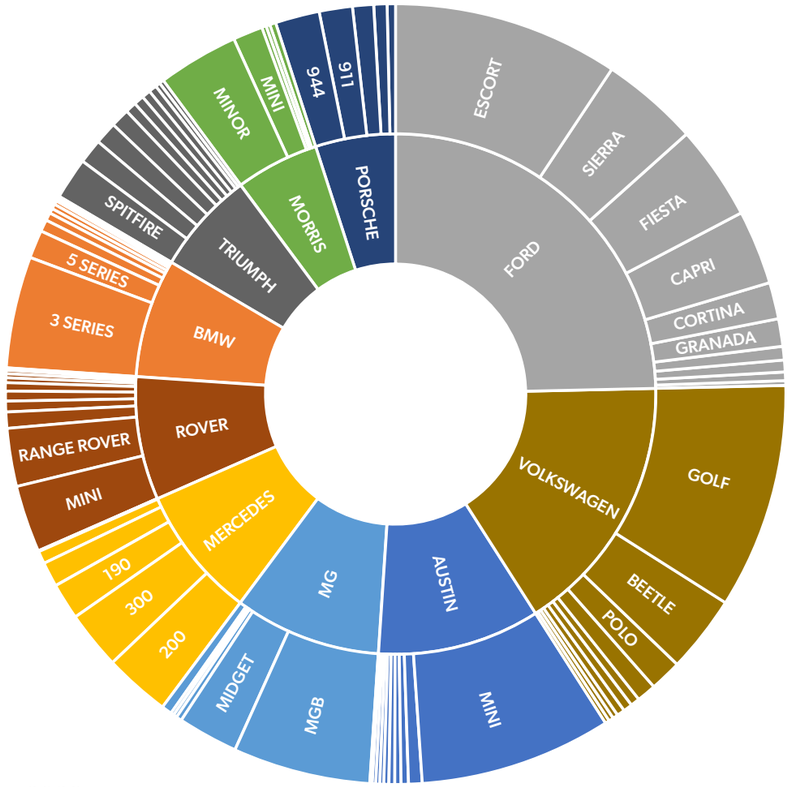
Source: DVLA

Make	Model	SORN cars
FORD	ESCORT	22,051
VOLKSWAGEN	GOLF	22,005
AUSTIN	MINI	18,751
MG	MGB	13,435
BMW	3 SERIES	10,905
FORD	SIERRA	9,557
FORD	FIESTA	9,247
MORRIS	MINOR	7,896
VOLKSWAGEN	BEETLE	7,559
FORD	CAPRI	7,254

Fig. 6

Most popular models of the top 10 most popular SORN cars

Source: DVLA



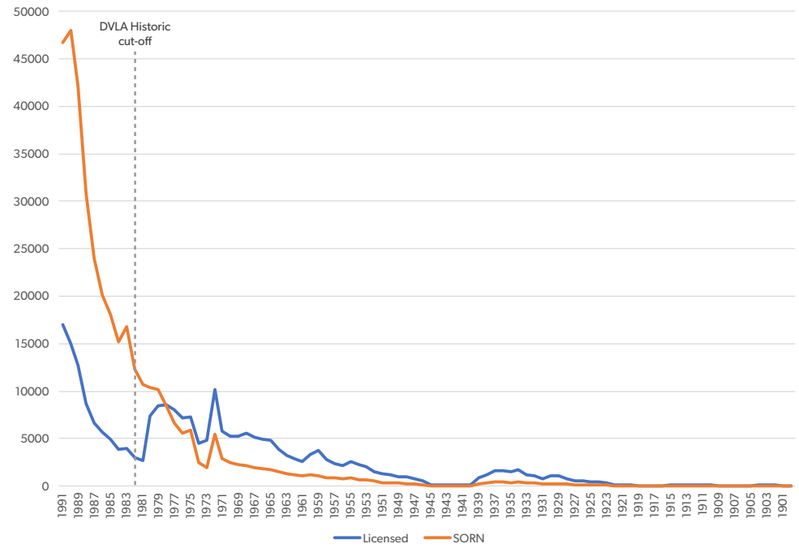
What are the most popular years?

As you'd expect, it's the younger classics that are most prevalent in our figures, although there are a couple of interesting peaks and troughs in the data.

Fig. 7

Licensed and SORN classic cars by year of manufacture

Source: DVLA



The first is a substantial drop in the number of vehicles from the 1980s licensed for use on our roads, with the vast majority currently declared as SORN. Once we reach the 1970s, the story is reversed with the number of SORN and licensed cars crossing over in 1978.

There's a pronounced peak in models made in 1972, both licensed and SORN. This may be attributable to the Vehicle Excise Duty (VED) exemption for classic vehicles which, until the Government created the rolling 40-year rule in 2014, only recognised vehicles constructed before 1st January 1973.

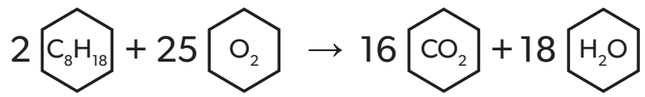
Vehicles made during the war years are understandably few and far between, although there is a healthy up-tick in the number of classics made during the 1930s.

Methodology

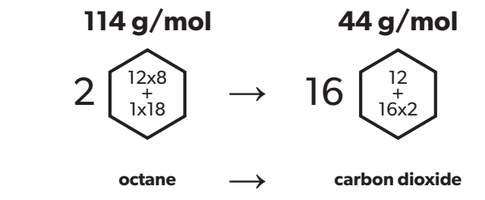
Given the lack of official emissions data, we must develop an alternative methodology.

Although we think of petrol and diesel engines as a purely mechanical process, at their heart lies a chemical reaction – combustion – which occurs when a substance reacts with oxygen to release energy, usually in the form of heat and light. When the fuel is mixed with air and ignited inside the engine, a predictable reaction takes place. So predictable, in fact, that we can assign a formula to it.

Petrol is made up of many hydrocarbons but is usually approximated as octane, whose chemical formula is C_8H_{18}. When it burns it reacts with oxygen from the air, with the carbon (C) oxidising to carbon dioxide and the hydrogen (H) oxidising to water. Complete combustion of our fuel, therefore, can be written like this:



The molar mass of carbon is 12.0107 g/mol, while the molar mass of hydrogen is 1.00784 g/mol. During combustion, it combines with oxygen (15.999 g/mol) in the air. Using these masses, we can now establish exactly how much CO_2 is produced:



Therefore, 1kg of petrol: 1000/228 x 704 = 3087.72g

The density of petrol varies but in the UK one ton is defined[2] as 1343.79 litres, or 0.7442 kg/m^3. That means we can say 1 litre of petrol produces:
3087.72 x 0.7442 = 2297.88g, or **2.3kg of CO_2**.

There are variances due to the formulation of fuel and the engine itself, but the chemistry remains much the same.

What is molar mass?

Molar mass, often called the molecular weight, is the mass of one mole of a substance, with one mole defined as the number of atoms in 12 grams of carbon.

While that sounds complicated, an easier way to think of it is as the sum of the atomic mass of all the atoms in a molecule. The atomic mass of each element is shown in the periodic table that's been with us for more than 150 years.

For example, water which we know as H_2O has a molar mass of two times hydrogen's mass of 1 plus one of oxygen, 16, which equals 18. We express that in grams per mole, or g/mol.

Petrol stations in the UK have recently switched to E10, a blend that contains up to 10% bioethanol. The Department for Business, Energy & Industrial Strategy kindly publishes a figure for the amount of CO_2 produced from the typical formulation of petrol that's available at filling stations across the UK. However, to permit a more representative picture of greenhouse gas (GHG) emissions in our calculations and to make later comparisons easier, we will use the published conversion figures[3] for CO_2e which are 2.19352kg and 2.51233kg for petrol and diesel respectively.

What is CO_2e?

CO_2e, or CO_2-equivalent, is a measure created by the United Nations' Intergovernmental Panel on Climate Change (IPCC) in order to make the effects of various greenhouse gases comparable.

Each greenhouse gas (GHG), whether carbon dioxide, methane, nitrous oxide or fluorinated gases, has a different climate change impact. CO_2e provides a means of expressing that impact in terms of the amount of CO_2 required to achieve the same effect.

In short, it's a simple way to gather all GHGs into one measure.

Combined with fuel consumption data, this information can be used to calculate the emissions of our classic cars.

2 Department for Business, Energy & Industrial Strategy, Digest of United Kingdom Energy Statistics (DUKES) 2021

3 Department for Business, Energy & Industrial Strategy, Government conversion factors for company reporting of greenhouse gas emissions, 2021

Trends

Fuel consumption trends

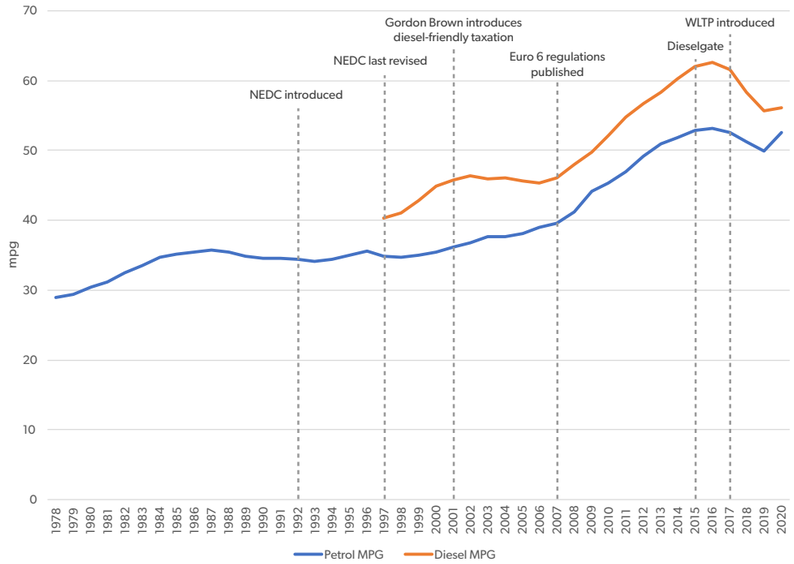
Fuel economy has been on an upward trajectory almost since the day the car was invented, or at least since marketing departments realised it could be used to differentiate their products from their competitors.

Both the Department for Transport and the Society of Motor Manufacturers and Traders (SMMT) track the average fuel consumption of new cars. Unfortunately, their records[4] for petrol vehicles only stretch as far back as 1978, while reporting for diesel cars didn't start until 1997.

Fig. 8

Average fuel consumption of new cars (1978-2020)

Source: DfT



Interesting as this information is, it is based purely on the official fuel consumption figures provided by car manufacturers at the time which, until the recent switch to WLTP reporting, are widely regarded as unattainable in the real world.

4 Department for Transport, Transport Statistics Great Britain (TSGB), Average new car fuel consumption, 2005, 2021

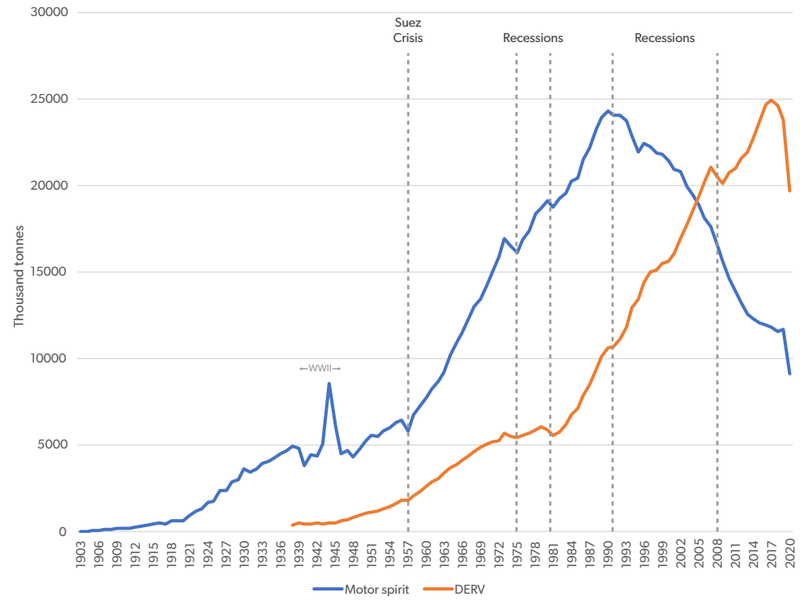
Delving into the archives

Since the birth of the motor car, the Government has kept records[5] of fuel sales – then called 'motor spirit' – and these are available from our old friend the Department for Business, Energy & Industrial Strategy. Data prior to 1938 is derived from handwritten tables that can trace their origin all the way back to 1870, while subsequent figures are available from the appropriate DUKES (Digest of United Kingdom Energy Statistics).

Fig. 9

Historic Inland Deliveries of Petroleum Products, 1903-2020

Source: DfBEIS



The graph paints a picture of the escalating reliance on fossil fuels over the last 120 years, with petrol consumption peaking in 1990 at 24.3m tonnes, before diesel takes over in 2005 to finally reach its zenith of 24.9m tonnes in 2017. The spectre of the global pandemic clearly plays its hand as fuel usage drops sharply in 2020.

5 Department for Business, Energy & Industrial Strategy, Historic Inland Deliveries of Petroleum Products, 1870-2020

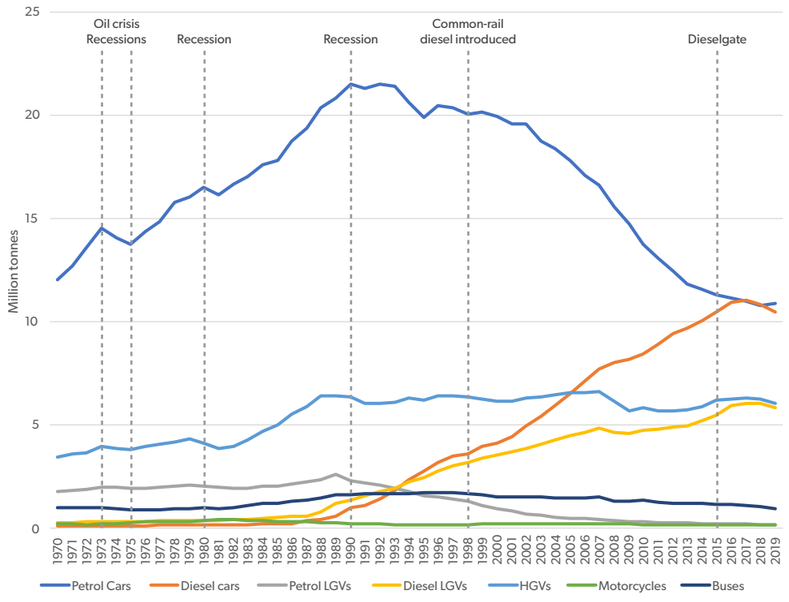
Trends

The Department for Transport is kind enough to break these figures down by vehicle type[6] from 1970, from which we can deduce sufficient trends to calculate fuel use by vehicle type back to 1949.

Fig. 10

Fuel use by vehicle type, 1970-2018

Source: DfT



The graph reinforces the impacts of diesel's emergence. Its use in cars begins an inexorable climb in the final years of the 1980s as it starts to take over from petrol, with its adoption accelerating in 2001 as new vehicle taxation based on CO_2 emissions is introduced.

This effect is mirrored in the figures for light goods vehicles, too, with diesel enjoying a head start over cars of a year or two before the idea of a petrol LGV all but fades into memory.

Recessions of the mid-1970s, early 1980s, and the global financial crisis of 2008, all leave their own indelible marks on history.

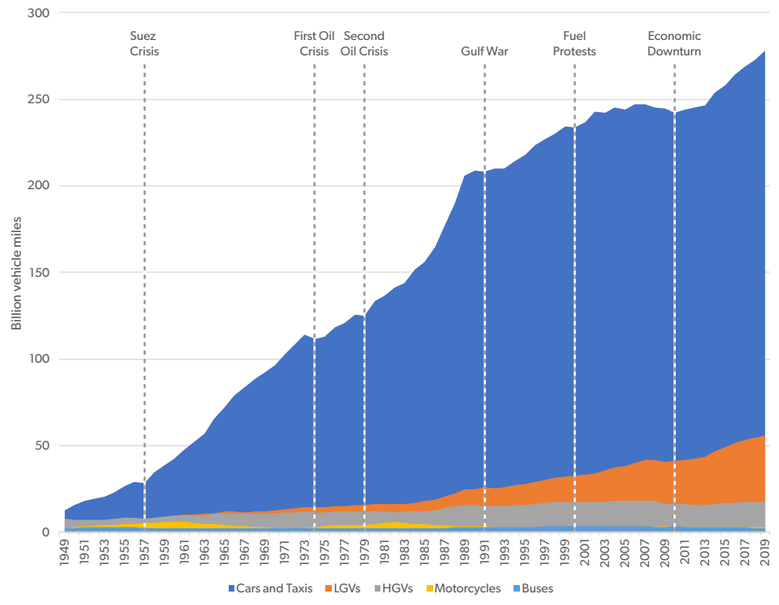
6 Department for Transport, Road transport energy use by vehicle type, split by Diesel for Road Vehicles (DERV) and petrol, 1970-2018

The rise in car use is plainly apparent in the DfT's National Road Traffic Survey[7], which details the miles travelled by different road users since 1949. Private cars and taxis clearly dominate modern traffic, although the rise of internet shopping and home deliveries are likely behind the increase in the number of vans on our roads and the miles they travel.

Fig. 11

Road traffic (vehicle miles) by vehicle type, 1949-2019

Source: DfT



Elsewhere, the impact of world events leave their various marks. The Suez Crisis of 1956 saw five months of petrol rationing and a four day working week for many factories. However, the effects of the 1973 oil crisis were much longer-lasting, the result of an embargo by the Organization of Arab Petroleum Exporting Countries and an attempt to 'weaponise' oil production in order to achieve political influence. The hardship would be repeated as a second oil crisis took hold in 1979 during the onset of the Winter of Discontent. Better times were ahead, though, with the 1980s bringing strong economic growth and opportunity for many. The Gulf War flattened the peaks in 1991 as oil prices spiked, while the fuel protests of 2000 and the 2010 economic downturn similarly leave a tell-tale mark.

7 Department for Transport, National Road Traffic Survey, TRA0101: Road traffic (vehicle miles) by vehicle type in Great Britain, annual from 1949

Trends

These are the events our classic cars have lived through, and their impacts are still felt today, not just in the data but in the very fabric of our vehicles. Smaller, more fuel-efficient cars with miserly engines were hurriedly rushed to market during the difficulties of the 1970s. Even in America, where a 6-litre V8 was considered *de rigueur*, by 1981 the fleet average[8] had dropped below 3-litres for the first time ever. And the effect on overall fuel economy was pronounced.

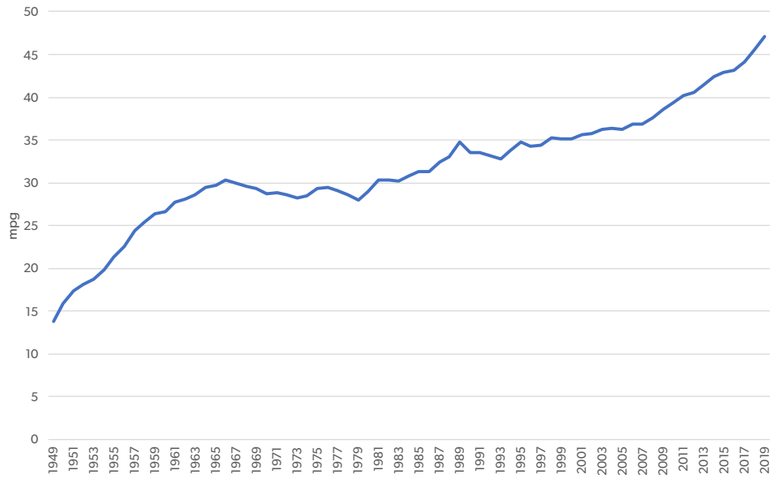
Calculating fuel economy

Combining what we've learnt about fuel usage and miles travelled over the last 70 years, we can now estimate how average fuel economy in miles per gallon (mpg) has changed over time.

Fig. 12

Estimated average mpg (UK), 1949-2019

Source: Our analysis



By its nature, this analysis includes the entire mix of new and old cars on the road at any given time, and therefore cannot be entirely indicative of the average mpg of new cars alone. However, countering this is the fact that cars have been gaining in reliability over the years and now last much longer than they used to. In fact, in 1994, the average UK car[9] was just 6.7 years old; by 2021, that had risen to 8.8 years, the highest figure since records began.

8 U.S. Department of Energy, Transportation Energy Databook: Edition 22, Table 7.10: Sales-Weighted Engine Size of New Domestic and Import Automobiles by Size Class, Sales Periods (1976-2001)

9 Department for Transport, VEH1107: Licensed vehicles at the end of the year by number of years since first use

The Suez Crisis

In 1956, the BBC reported[1] the owner of a petrol station in Denham, Buckinghamshire, as saying: "We are almost afraid to serve our regular customers. When motorists saw a car being filled they stopped and waited. In five minutes we had a queue of 50 cars waiting, and had to turn them away."

SOURCE: BP plc

If it wasn't for the fuel shortages of 2021, this would sound laughable. Petrol had been in short supply since the President of Egypt, Gamal Abdul Nasser, took over the running of the Suez Canal, effectively blocking the supply route from the Middle East.

In response, the Government introduced petrol rationing for a five month period, with motorists allocated enough fuel to cover 200 miles a month. Farmers, religious ministers, and local authority workers were permitted 600 miles a month, while doctors, midwives, disabled drivers and vets were allowed whatever they needed.

Ford and Vauxhall plants were among the businesses and factories that switched to a four-day working week in the face of a 10% cut in fuel deliveries. Although rationing officially ended in May 1957, deliveries to industry remained below their normal levels until fuel supplies stabilised, while surcharges on petrol prices imposed to compensate garages and oil companies for the loss of revenues were allowed to continue temporarily.

Rationing was estimated to have cost oil firms £4m (£102m today[2]) in lost revenue and the Ministry of Power about £20,000 a week (£½m) to enforce. The scheme was administered by 700 drafted-in driving instructors who could now return to their usual jobs.

1 BBC, Motorists panic as petrol rations loom

2 Office for National Statistics, Consumer price inflation time series, RPI

Calculating emissions

With our estimates for vehicle mpg over time, we can now calculate an emissions figure for every classic car in the UK fleet.

The calculation itself is quite straightforward, converting mpg to L/100km, before multiplying by the appropriate conversion factor[10] to give us a figure for each car's CO_2e output in grams per kilometre (g/km).

$$CO_2e\ g/km = \frac{1}{\frac{mpg}{4.546} \times 0.01609344} \times 2.19352 \times \frac{1000}{100}$$

We know from various studies[11] that the national average annual mileage for classic and historic vehicles in the UK is 1,200 miles or 1,931km p.a. Multiplying this by the result of the formula above gives us the total annual emissions for each car in the classic fleet, while repeating it for every vehicle in the DVLA database gives us the total combined emissions of all the UK's classic cars.

641.6 kg

The average annual CO_2e emitted by each classic car in the UK in kilograms

264,707 t

The total annual CO_2e emissions of all classic cars in the UK in tonnes

10 Department for Business, Energy & Industrial Strategy, Government conversion factors for company reporting of greenhouse gas emissions, 2021
11 Federation of British Historic Vehicle Clubs (FBHVC), National Historic Vehicle Survey, 2020/21

In perspective

To the average person, those numbers might not mean a great deal without some benchmark to view them against. In the context of the UK's overall emissions[12], the environmental impact of every classic car in the country is so small as to be almost invisible, accounting for just 0.22% of all transport emissions.

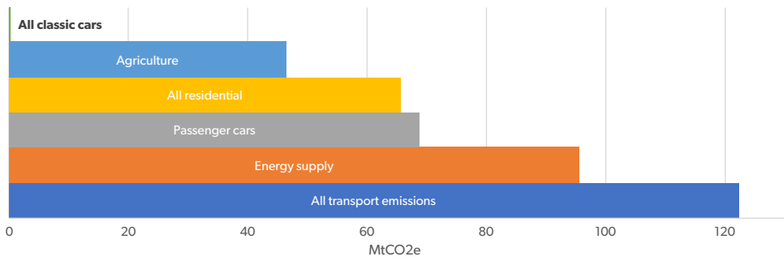


Fig. 13

Comparison with UK's overall annual emissions

Source: DfBEIS, Our analysis

At the individual vehicle level, the carbon footprint of a classic car becomes easier to understand, with 1,200 miles in a historic vehicle ranking slightly below a roundtrip flight from London to New York[13], a typical three-day Christmas[14] period for one person, or a touch more than three lattes[15] a day for a year.

Fig. 14

Comparison with various typical emissions

Source: SAS, Flight Emissions Calculator; Stockholm Environment Institute, The Carbon Cost of Christmas; Our analysis; UCL, Carbon cost of your daily coffee; Dell, Latitude 5510 Product Carbon Footprint; Apple, iPhone 12 Product Environmental Report

However, an average classic car's annual carbon footprint is still nearly double that of four years' use of a typical business laptop[16], or about the same as running seven brand new Apple iPhone 12s[17] for three years.

12 Department for Business, Energy & Industrial Strategy, Final UK greenhouse gas emissions national statistics, 2019 (pre-pandemic)
13 SAS, Flight Emissions Calculator
14 Stockholm Environment Institute, The Carbon Cost of Christmas
15 UCL, Carbon cost of your daily coffee
16 Dell, Latitude 5510 Product Carbon Footprint
17 Apple, iPhone 12 Product Environmental Report

Q&A

Are these figures totally accurate?

Without attaching a PEMS (Portable Emissions Measurement System) device to every single vehicle and recording their emissions over the course of a year, it's impossible to be 100% accurate. Any methodology will have to make assumptions and compromises, not least because of the number of vehicles involved and the historical nature of the data, much of which is missing. We've tried to be as accurate as we can with the data available, and present our findings in a transparent way.

Do these figures take the deployment of E10, a bioethanol petrol blend, into account?

The conversion factors used to calculate the CO_2e emissions are based on the typically-available blend of fuels at petrol stations across the UK, and are therefore representative of the current state of the E10 roll-out. However, there is some anecdotal evidence to suggest that fuel economy is reduced in vehicles running on E10. At present no official studies exist to quantify this, and as the impact is currently not well understood, we have chosen not to weight our figures to compensate.

Have any vehicles been excluded from the analysis?

Many Land Rovers are registered as LGVs and, as we've concentrated on cars alone, have therefore not been included in these calculations. Their exclusion does not affect the accuracy of our numbers as their fuel use and mileage are classified separately to passenger cars. We intend to produce a follow-up report that will detail their emissions separately.

We have also excluded all vehicles declared as SORN. As the DVLA data is released annually and presents a snapshot of the vehicle register at the time it is produced, it's possible some of these vehicles are returned to the road for part of the year – perhaps to coincide with the classic car show season – before being redeclared as SORN. No official records are available to quantify the frequency with which this occurs. The DVLA's rolling Vehicle Excise Duty (VED) exemption for historic vehicles means there is now less incentive to declare as SORN other than for 'young timers' or long-term reasons.

Figure 12, the estimated average MPG, goes as far back as 1949. What happens beyond this?

For the relatively small number of vehicles built prior to 1949 where our estimated fuel economy calculations have no data, we have used a fallback value of 13mpg.

In addition, the DVLA data does not distinguish vehicles by fuel type in a way that can be correlated with year of manufacture. Our estimated mpg figures are therefore a weighted average of both petrol and diesel fuel economy.

Have electric conversions been taken into consideration?

A small but rising number of classic vehicles have been converted to electric propulsion. As this is generally not reported in the DVLA data, we have not been able to compensate for this. We would, however, expect the impact to be almost negligible.

Abbreviations

C	Carbon
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DERV	Diesel Engined Road Vehicle
DfBEIS	Department for Business, Energy & Industrial Strategy
DfT	Department for Transport
DUKES	Digest of United Kingdom Energy Statistics
DVLA	Driver and Vehicle Licensing Agency
EEC	European Economic Community
EPA	Environmental Protection Agency
FIVA	Fédération Internationale des Véhicules Anciens
g	Gram
g/km	Grams per kilometre
g/mol	Grams per mole
GHG	Greenhouse gas
H	Hydrogen
H_2O	Water
HGV	Heavy goods vehicle
kg	Kilogram
kg/m^3	Kilograms per cubic metre
L/100km	Litres per 100 kilometres
LGV	Light goods vehicle
mpg	Miles per gallon
$MtCO_2e$	Million tonnes of carbon dioxide equivalent
NEDC	New European Driving Cycle
OAPEC	Organization of Arab Petroleum Exporting Countries
SMMT	Society of Motor Manufacturers and Traders
SORN	Statutory Off-Road Notification
VED	Vehicle Excise Duty
WLTP	Worldwide Harmonised Light Vehicles Test Procedure

References

DVLA, df_VEH0124: Vehicles at the end of the quarter by licence status, body type, make, generic model, model, year of first use and year of manufacture, www.gov.uk/government/statistical-data-sets/vehicle-licensing-statistics-data-files

Department for Business, Energy & Industrial Strategy, Digest of United Kingdom Energy Statistics (DUKES) 2021, www.gov.uk/government/statistics/digest-of-uk-energy-statistics-dukes-2021

Department for Business, Energy & Industrial Strategy, Government conversion factors for company reporting of greenhouse gas emissions, 2021, www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021

Department for Transport, Transport Statistics Great Britain (TSGB), Average new car fuel consumption, 2005, 2021, www.gov.uk/government/statistical-data-sets/tsgb03

Department for Business, Energy & Industrial Strategy, Historic Inland Deliveries of Petroleum Products, 1870-2020, www.gov.uk/government/statistical-data-sets/crude-oil-and-petroleum-production-imports-and-exports

Department for Transport, Road transport energy use by vehicle type, split by Diesel for Road Vehicles (DERV) and petrol, 1970-2018, www.gov.uk/government/statistical-data-sets/tsgb03

Department for Transport, National Road Traffic Survey, TRA0101: Road traffic (vehicle miles) by vehicle type in Great Britain, annual from 1949, www.gov.uk/government/statistical-data-sets/road-traffic-statistics-tra

U.S. Department of Energy, Transportation Energy Databook: Edition 22, Table 7.10: Sales-Weighted Engine Size of New Domestic and Import Automobiles by Size Class, Sales Periods (1976-2001), tedb.ornl.gov/wp-content/uploads/2019/03/Edition22_Full_Doc.pdf

Department for Transport, VEH1107: Licensed vehicles at the end of the year by number of years since first use, www.gov.uk/government/statistical-data-sets/vehicle-licensing-statistics-data-tables

BBC, Motorists panic as petrol rations loom, news.bbc.co.uk/onthisday/hi/dates/stories/november/29/newsid_3247000/3247805.stm

Office for National Statistics, Consumer price inflation time series, RPI, www.ons.gov.uk/economy/inflationandpriceindices/datasets/consumerpriceindices

References

Federation of British Historic Vehicle Clubs (FBHVC), National Historic Vehicle Survey, 2020/21, www.fbhvc.co.uk/news/article/fbhvc-national-historic-vehicle-survey-reveals-significant-contribution-to-uk-economy

Department for Business, Energy & Industrial Strategy, Final UK greenhouse gas emissions national statistics, 2019 (pre-pandemic), www.gov.uk/government/statistics/final-uk-greenhouse-gas-emissions-national-statistics-1990-to-2019

SAS, Flight Emissions Calculator, www.flysas.com/gb-en/sustainability/emission-calculator

Stockholm Environment Institute, The Carbon Cost of Christmas, www.sei.org/publications/carbon-cost-of-christmas

UCL, Carbon cost of your daily coffee, www.ucl.ac.uk/news/2021/jan/analysis-heres-carbon-cost-your-daily-coffee-and-how-make-it-climate-friendly

Dell, Latitude 5510 Product Carbon Footprint, www.delltechnologies.com/asset/en-uk/products/laptops-and-2-in-1s/technical-support/latitude-5510-pcf-datasheet.pdf

Apple, iPhone 12 Product Environmental Report, www.apple.com/environment/pdf/products/iphone/iPhone_12_PER_Oct2020.pdf

About loop

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