Doing More for Less
Non-Fossil Fuel Transport

Introduction

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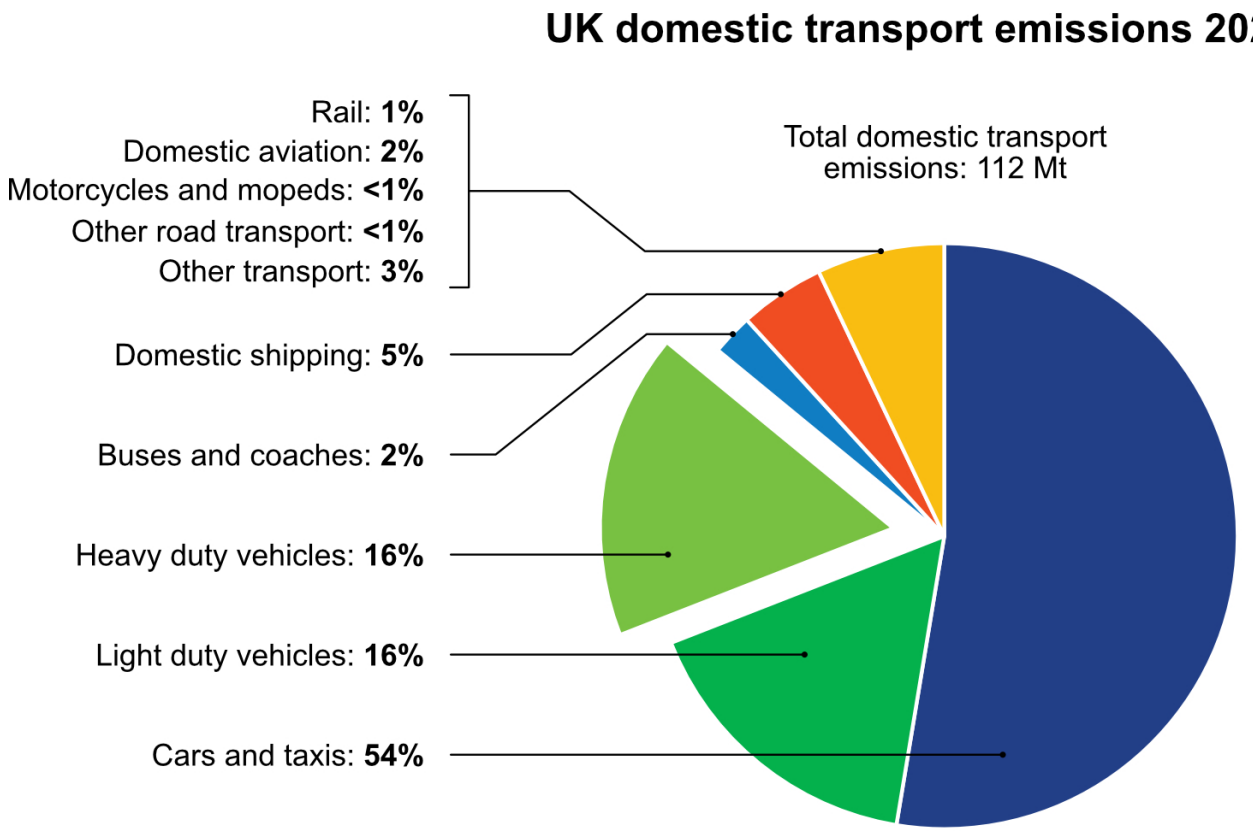
Introduction

- Transport sector worldwide responsible for 23% of total energy related CO_2 emissions
- About one third is due to freight
- Consider the various modes of transport
  - Maritime
  - Aviation
  - Land Transport
    - road vehicles
    - rail

Introduction continued

- Very few UK publications on decarbonising transport
- Consultation on a New Heavy Goods Vehicle CO_2 Emissions Regulatory Framework 2026



Introduction continued

- Very few UK publications on decarbonising transport
- Decarbonising Transport. A better, greener Britain. Department of Transport. A Boris fantasy
- October 2025. Unlocking the benefits of the clean energy economy. Department of Energy Security and Net Zero. Not much mention of transport.
- December 2023. Net Zero Government Initiative – UK Roadway to Zero Government Emissions. No use at all.

Maritime

- 11% of total transport emissions worldwide
- Low-carbon shipping technologies are being developed (but slowly)
  - Dual fuels for new-build ships
  - Ammonia fuel retrofit
  - Hydrogen fuelled ferries (particularly Norway)
  - Cargo ships with vertical sails and solar panels (but need back-up engines)
  - Onshore Power Supply (OPS) electrical power systems for moored ships in port
    - 46% of cruise ships worldwide already capable
    - Compatibility of electrical frequency and voltage is a problem
    - Leading ports include Hamburg

Maritime continued

- UK Ports with OPS
  - Port of Southampton – mainly cruise terminals
  - Portsmouth International Port – cruise and ferries
  - Port of Aberdeen – offshore supply and service ships
  - Montrose Port Authority – offshore service ships
  - Heysham Port – 2026 installation. Also for ship charging
  - Belfast – all berths
  - Dover – cruise terminals
  - Harwich – passenger ferry
  - Milford Haven – cruise and ferries
  - London Gateway

Maritime continued

- The International Maritime Organisation have published:
- International Convention for the Prevention of Pollution from Ships, 1973, as modified by the 1978 and 1997 Protocols
- 2023 IMO Strategy on GHG reductions from ships adopted
- 2025 IMO amendments to Convention voted down by USA

Aviation

- Aircraft contribute 2.5% to global CO_2 emissions
- Aircraft use conventional petroleum based fuels
  - Traditionally Jet A-1 (unleaded kerosene) or naphtha-kerosene
  - Some synthetic fuel blends are being developed
  - Bio-fuels, liquified biomass and vegetable oils
  - Compressed Natural Gas (CNG) or Liquified Natural Gas (LNG)
  - None of the above options eliminate GHG!
  - The current best option is hydrogen
  - An even better solution would be less or nil tourist and business flights
  - Do Airships provide a solution?

Land Transport

- Land transport can be divided into:
  - Road vehicles
    - Freight vehicles
    - Farm vehicles
    - Buses and coaches
    - Passenger vehicles
    - Construction vehicles
  - Rail transport
    - Passenger trains
    - Goods trains

Land Transport – Road Vehicles

- Land transport can be divided into:
  - Road vehicles
    - Freight vehicles
    - Farm vehicles
    - Buses and coaches
    - Passenger vehicles
    - Construction vehicles
- Good progress has been made in the electrification of vehicles using mainly batteries
- Most new buses and delivery vans are battery powered in the UK
- 5.5% of cars are battery powered with another 3% hybrid

Land Transport – Road Vehicles

Land Transport – Road Vehicles continued

- No new petrol and diesel cars to be sold in the UK after 2030
- Aims to phase out new petrol and diesel vehicles by 2030
- Investment in public EV charging infrastructure is crucial
- Over 12,000 chargers available as of March 2026
- As of March 2026, there are over 5,800 zero-emission vehicles in the public sector fleet.

Land Transport – Rail

- Steps being taken to decarbonize rail transport
- Operators to introduce cleaner lower emissions trains
  - including bi-mode units that can switch to electric power on electrified routes
  - work progressing on tri-mode trains which can operate with diesel, electricity or battery power
    - TransPennine Express has successfully trialed the technology
    - Grand Central plan to introduce in 2028
- Government investing in electrification schemes such as TransPennine Route upgrade
- Working with Network Rail to identify where further electrification can deliver the greatest benefits
- Supporting the development of battery-powered trains
  - Including a fast charge trial with Great Western Railway

Land Transport – Rail

Land Transport – Rail

UK Non – Fossil Fuel Transport

- The next version will include examples

Thank you for listening

Questions?