2G3S

How to pay for better bus services?

by Edward Leigh

Smarter Cambridge Transport

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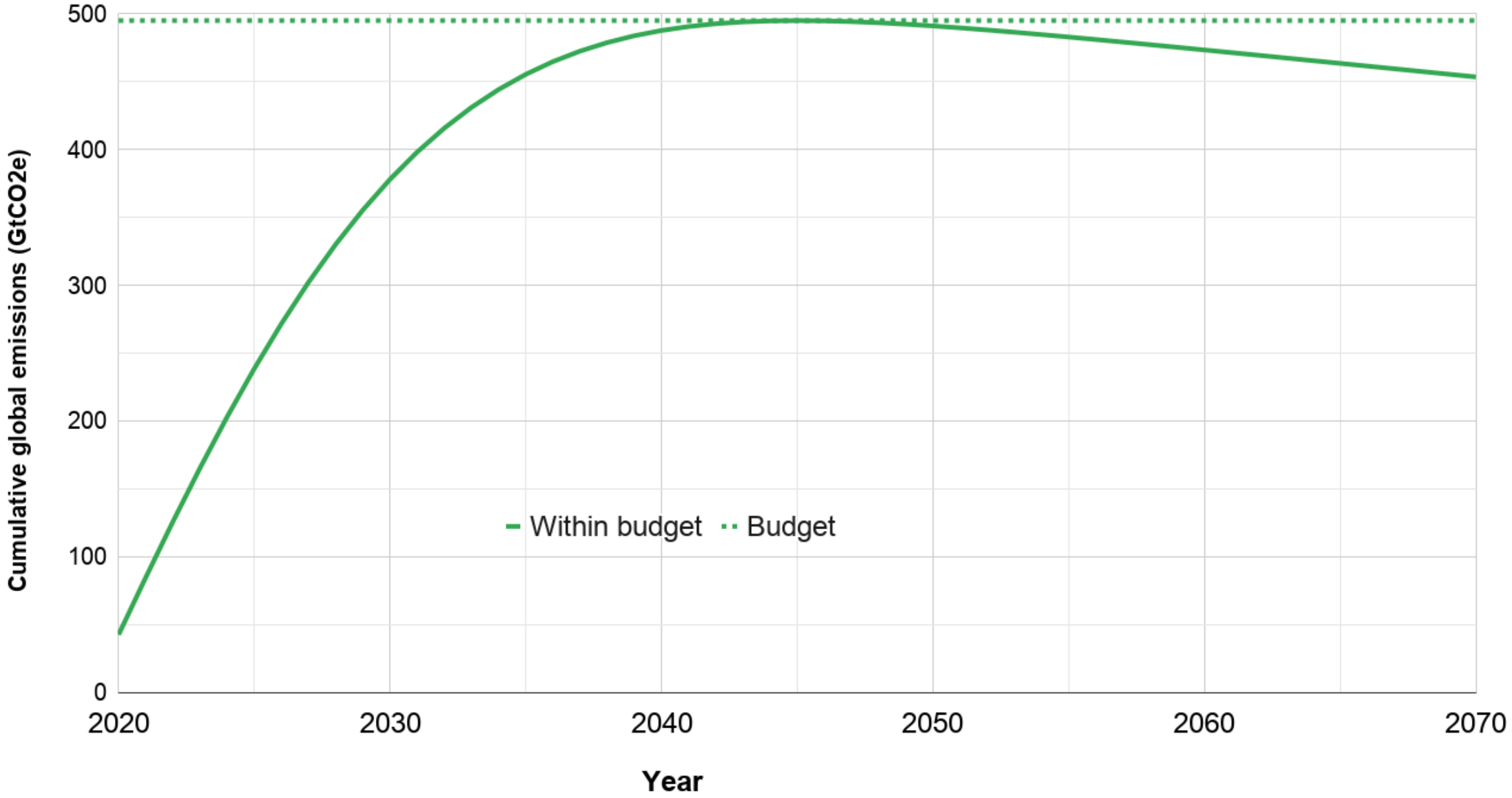
Why do we need better bus services?

Why do we need better bus services?

1. They provide affordable mobility for people who cannot drive or do not have access to a car.
2. They make car-free living viable for more people.
3. They reduce congestion: one bus travelling at 20mph can replace 1km of car traffic.
4. Modern buses emit less air pollution than a typical diesel car.
5. Buses emit less CO_2 per passenger-mile than cars.

Won’t electrification of vehicles decarbonise transport?

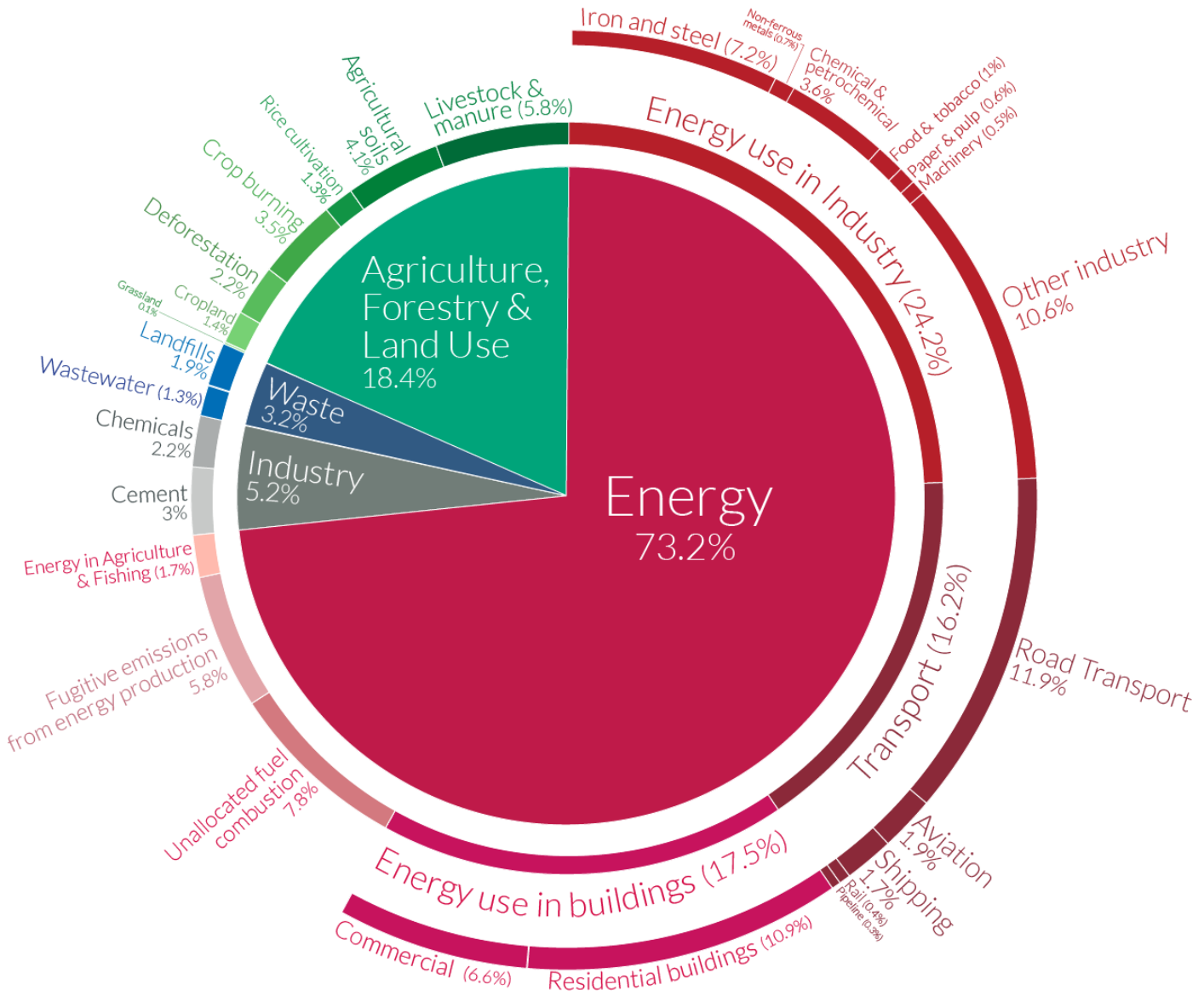
Cumulative global carbon emissions



Global greenhouse gas emissions by sector

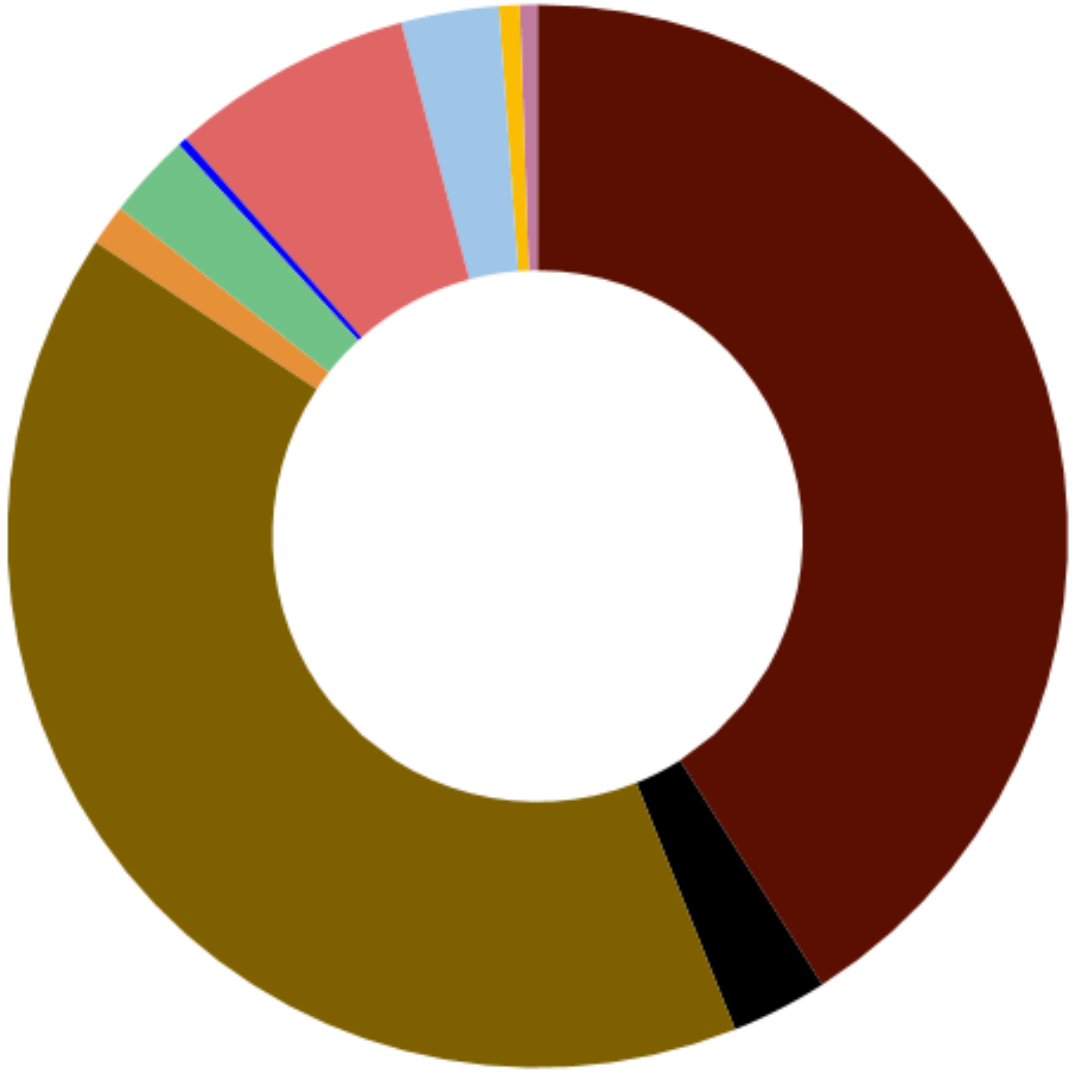
This is shown for the year 2016 – global greenhouse gas emissions were 49.4 billion tonnes CO_2eq.

Our World in Data



Source: Climate Watch, the World Resources Institute (2020).

UK energy sources 2019



- Oil 41%
- Coal 3%
- Gas 40%

} 84%

- Traditional biomass 1.2%
- Nuclear 2.6%
- Hydropower 0.3%
- Biofuels 7.4%
- Wind 3.0%
- Solar 0.6%
- Other renewables 0.5%

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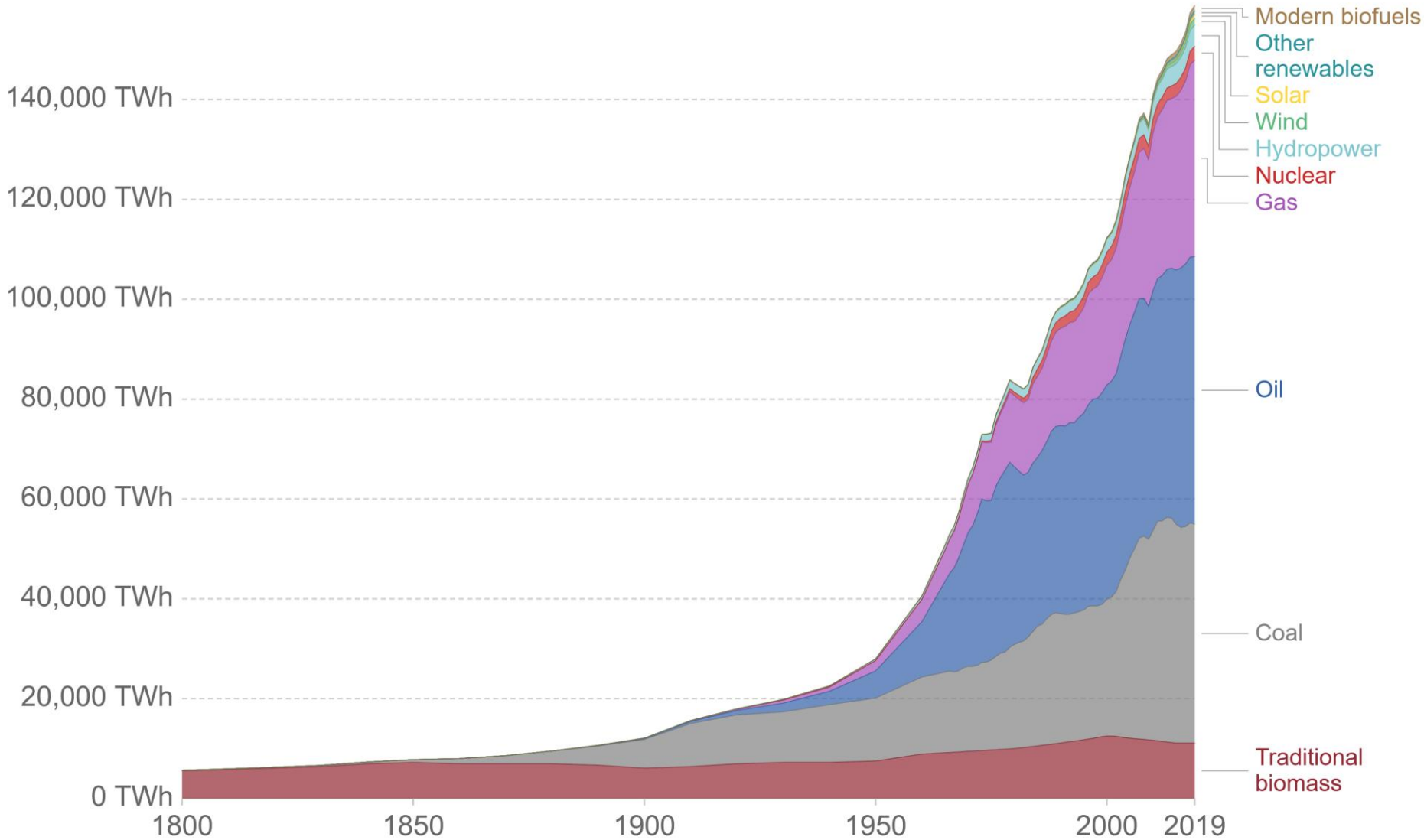
Global direct primary energy consumption

Direct primary energy consumption does not take account of inefficiencies in fossil fuel production.

Our World in Data



Source: Vaclav Smil (2017) and BP Statistical Review of World Energy

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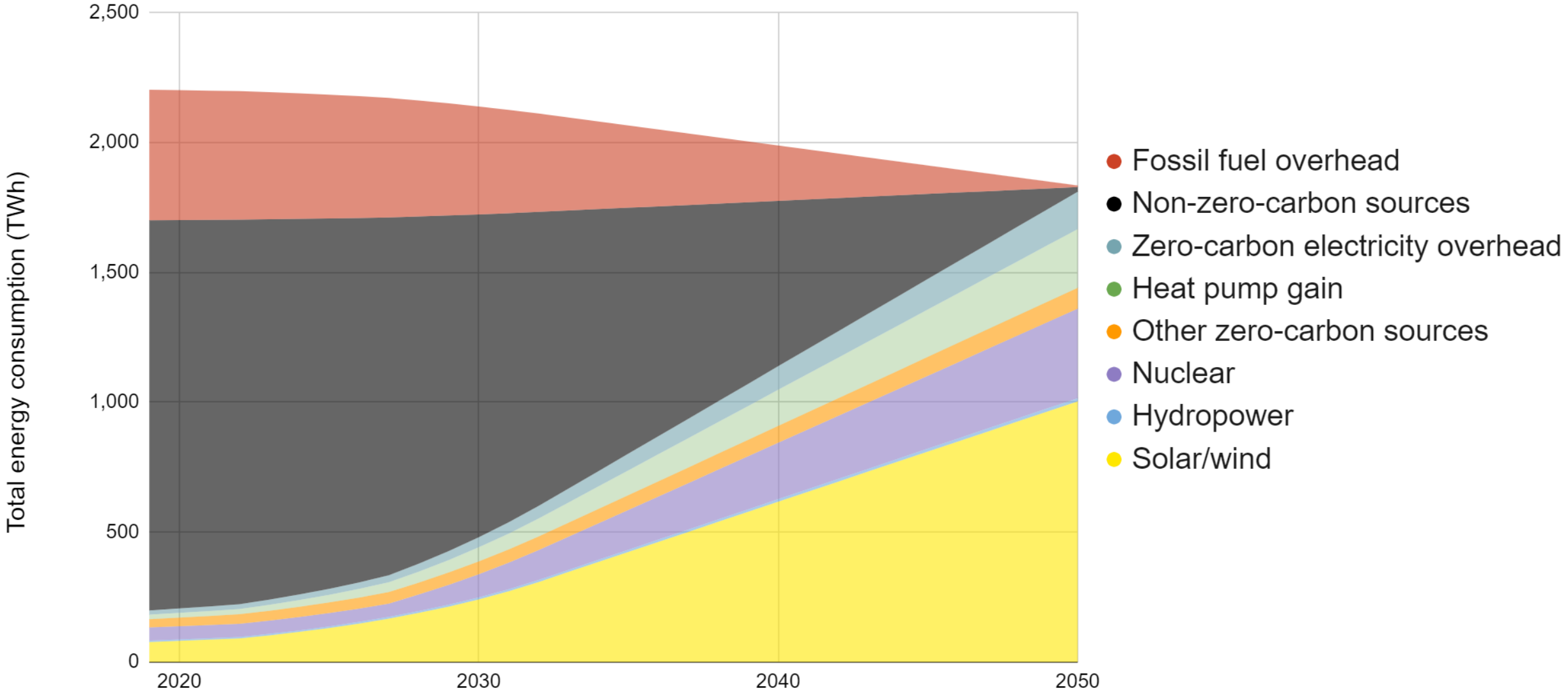
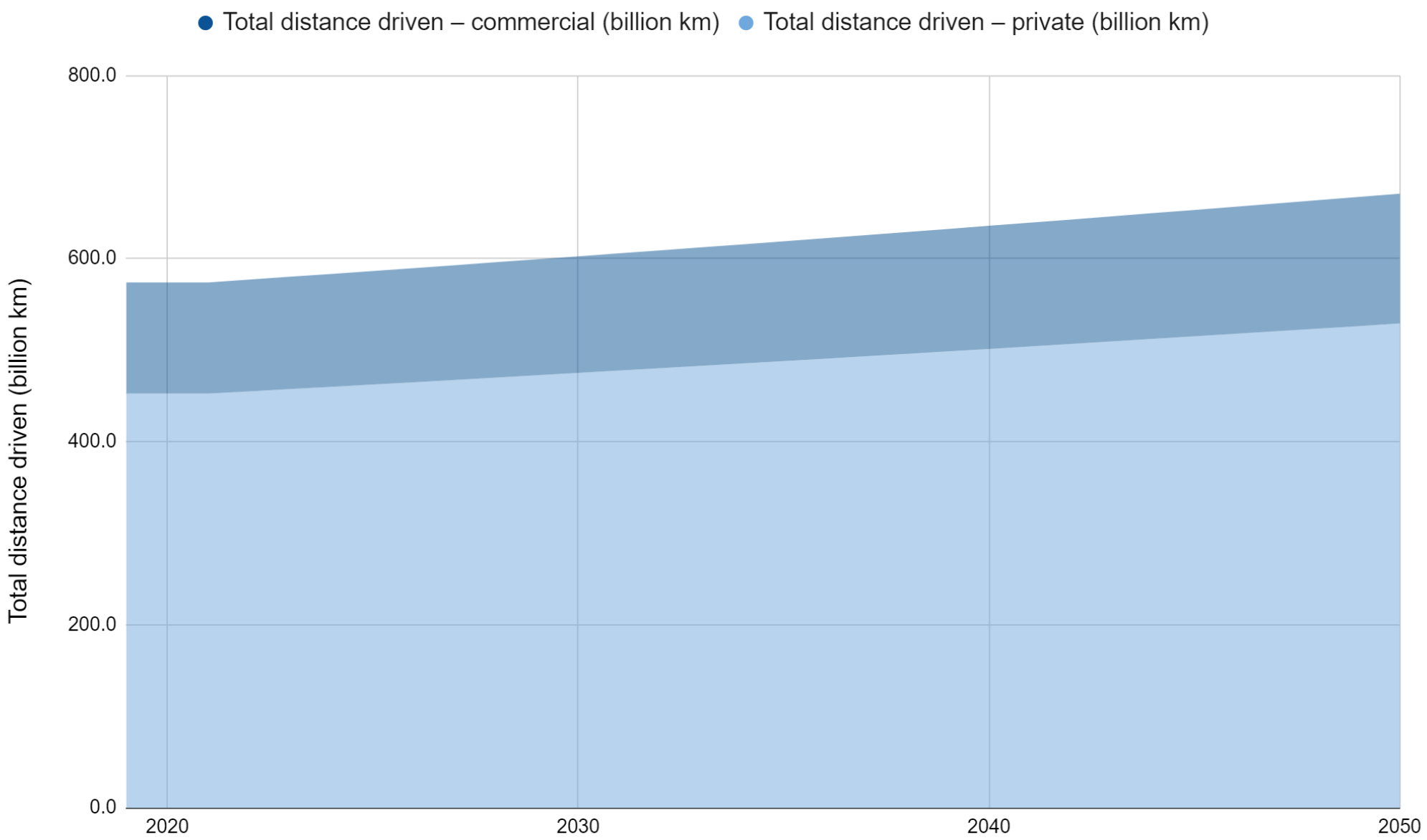
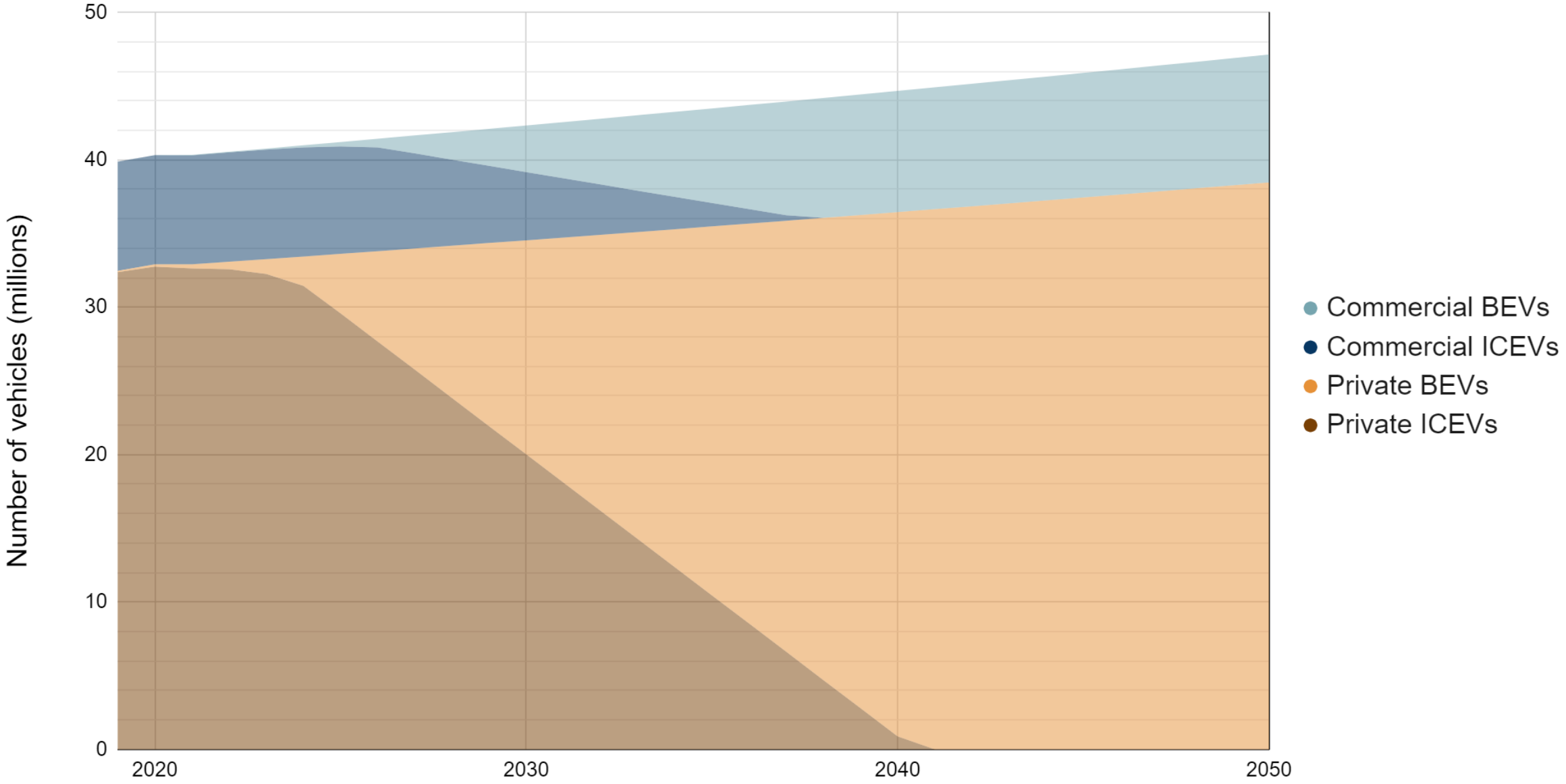
Scenario for zero-carbon UK energy mix in 2050



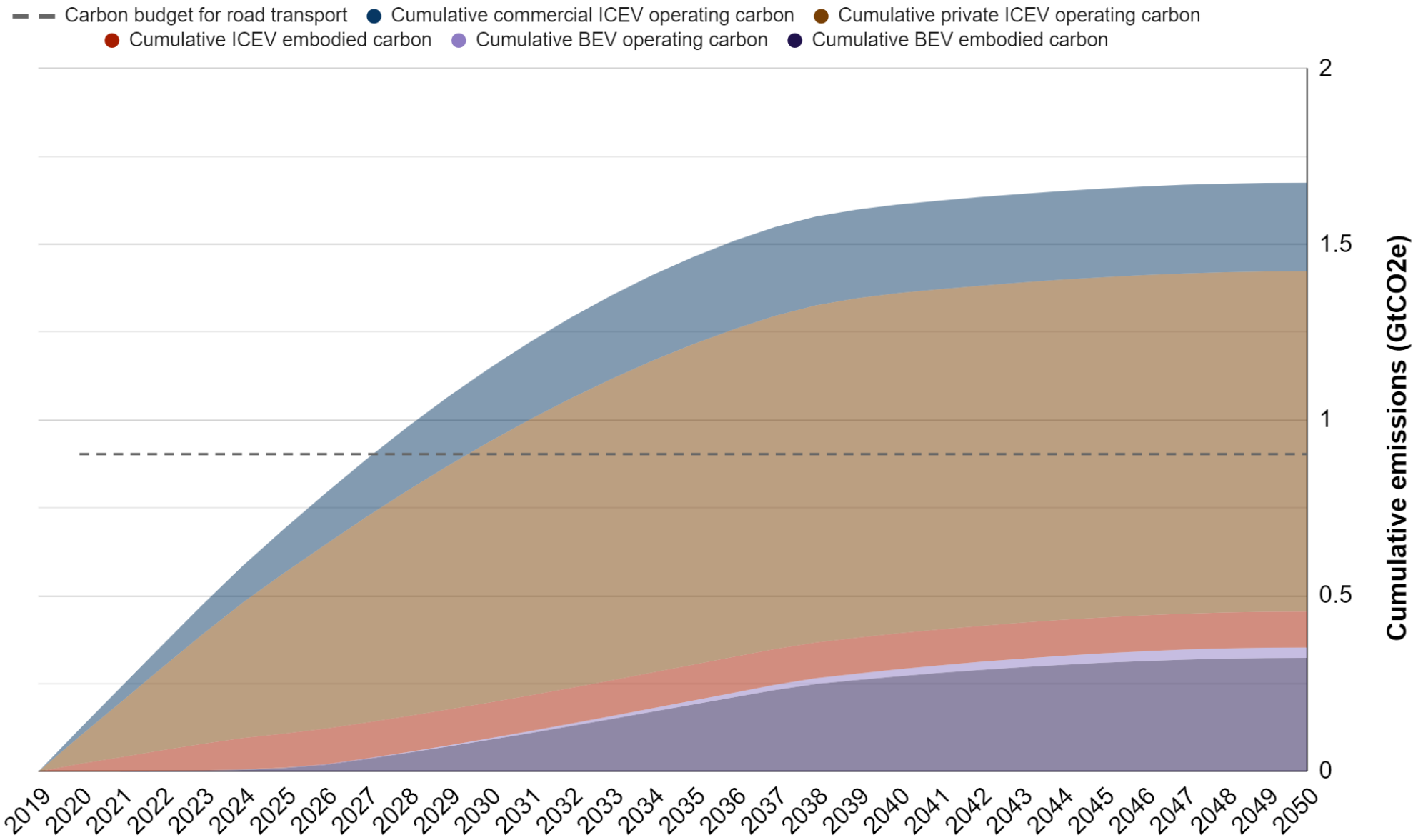
Business-as-usual total vehicle-mileage



Business-as-usual vehicle mix



Business-as-usual road transport emissions

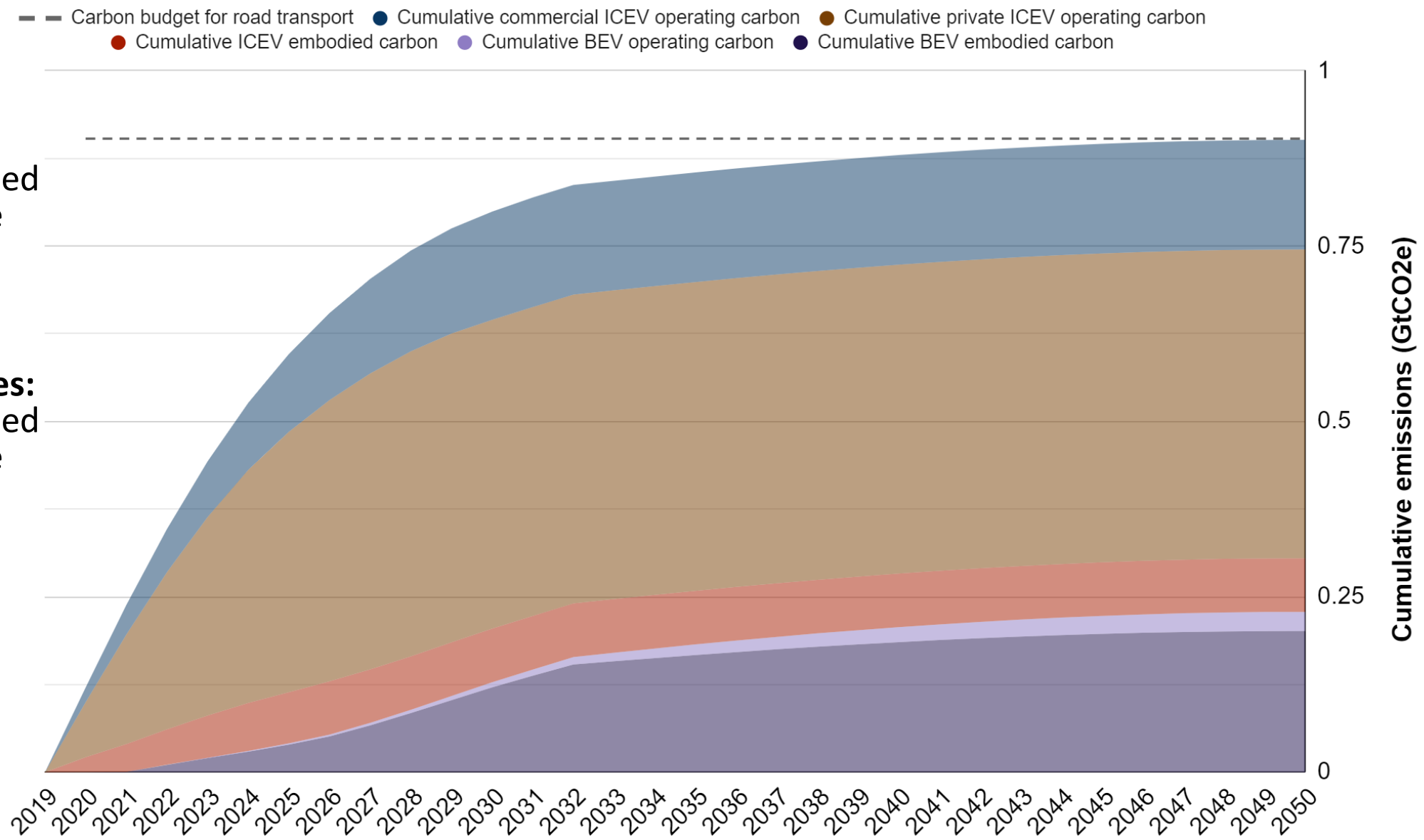


How can we stay within budget?

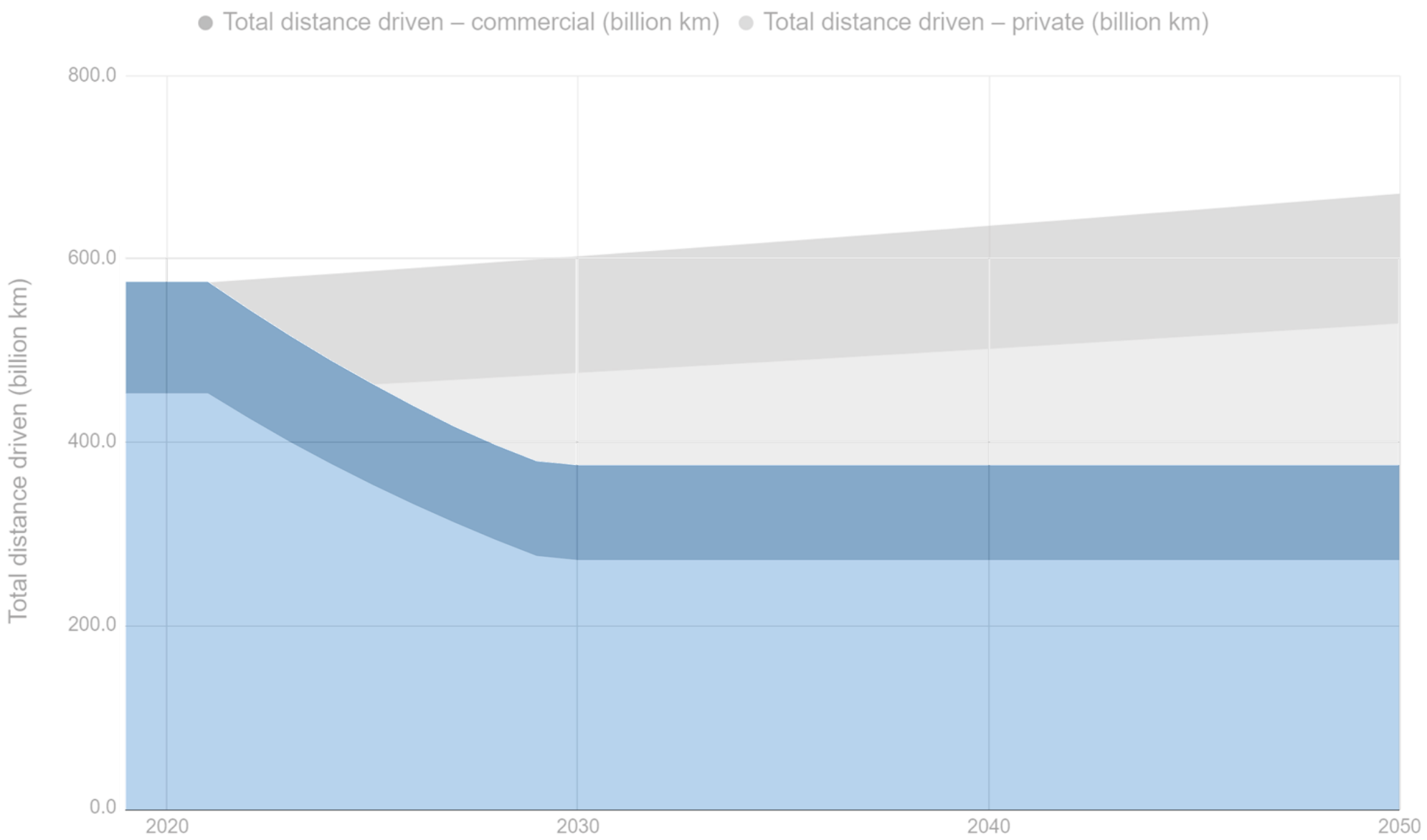
Private vehicles: total mileage reduced by 40%; per-vehicle mileage increased from 13,750 to 20,000 km/year

Commercial vehicles: total mileage reduced by 15%; per-vehicle mileage increased from 16,350 to 25,000 km/year

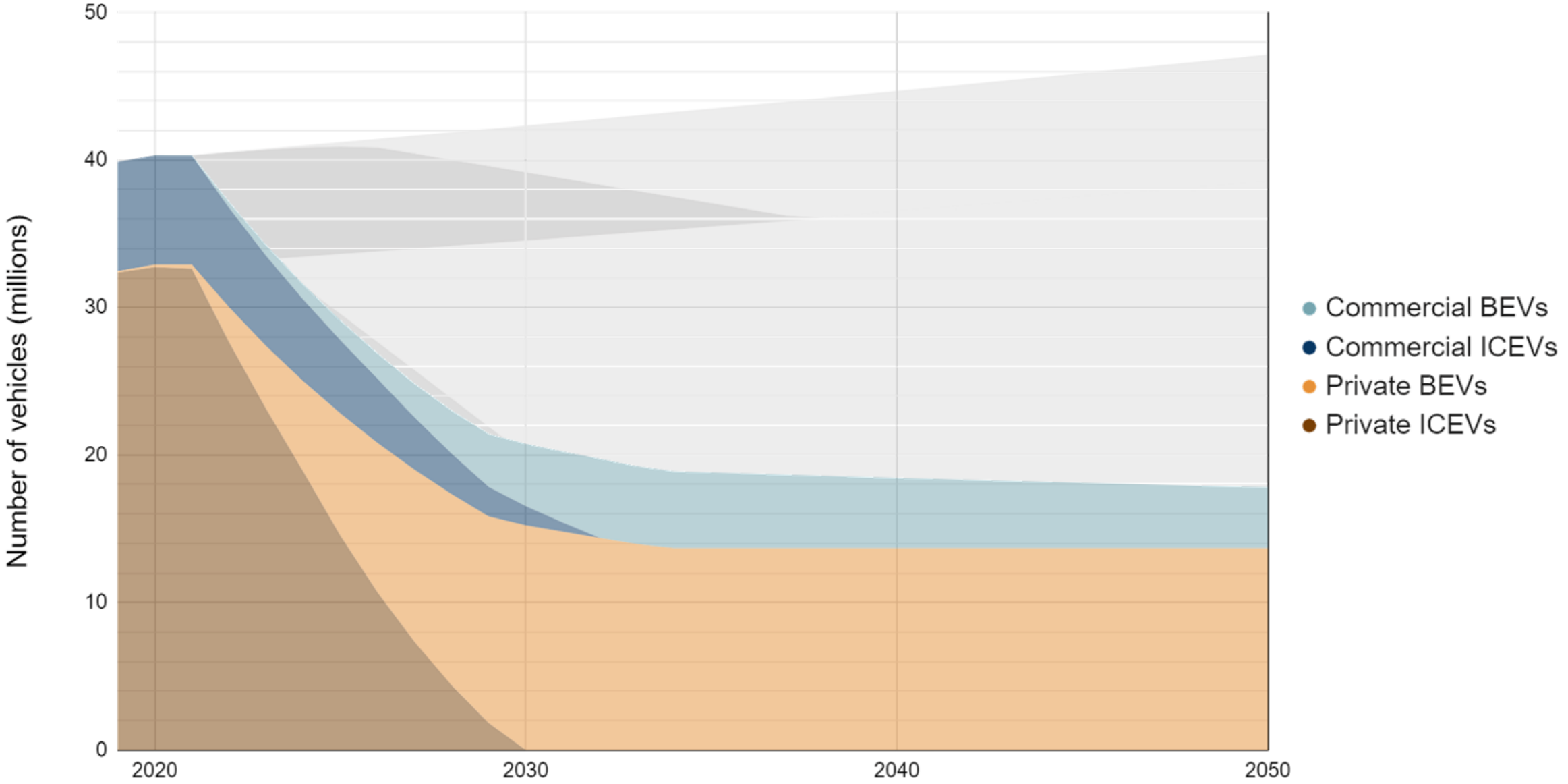
ICEVs scrapped at a rate of 5–6%/year



Within-budget total vehicle-mileage



Within-budget vehicle mix



Vehicle electrification is **necessary**
but **not sufficient**
to decarbonise road transport.

We must also **reduce total vehicle-miles**
and use vehicles **more efficiently**.

The case for road pricing

Respond effectively to the climate emergency

Replace diminishing tax revenues from fossil fuels

Poll time!

1. Fund public transport for the long term

Road pricing can provide additional funding to support:

- Wider coverage of bus services.
- Longer hours of service (6am to midnight, 7 days a week).
- Higher frequency of services (reducing connection times).
- More diversity of services: express, local, feeder, demand-responsive.
- Multi-operator through-ticketing and fare-capping.
- Service-level agreements to provide backup transport in the event of disruption.

2. Disincentivise solo-occupancy driving

With improved infrastructure and services for active and public transport, road pricing can:

- Increase the cost of car trips that could be made by active travel or public transport.
- Reduce the attractiveness of owning a car.
  (so private car is not the default mode for every trip)
- Reduce the per-km cost of club and rental vehicles
  (making it more attractive not to own a car).

3. Incentivise freight efficiencies

- Increase vehicle-distance costs to reward higher load factors and more use of local distribution depots.
- Make rail freight comparatively more cost-efficient.
- Increase cost for large vehicles to enter urban areas to promote use of multi-operator consolidation/breakout depots.

4. Avoid the rebound effect

- We tend to vary consumption to fit our budget.
- In the UK:
  - Fuel duty & VAT add **>150%** to cost of fuel
  - VAT & Climate Change Levy add just **9%** to cost of electricity
- There's no cost for self-generated (e.g. home solar) electricity.
- So we'll drive more!

5. Replace fuel tax revenues

The UK treasury stands to lose around £32 billion in annual tax revenues, or 5% of total tax revenues:

Fuel duty revenue lost	- £27.2 billion
Net VAT on fuel revenue lost	- £6.4 billion
Climate Change Levy on electricity	+ £1.1 billion
Net VAT on electricity	+ £0.71 billion
Net loss of revenue	**- 31.8 billion**

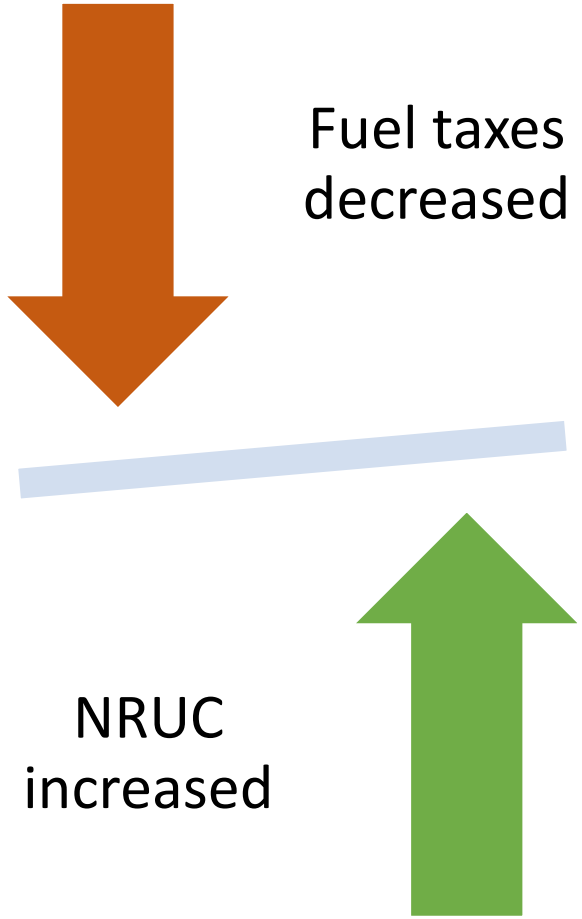
The case for road pricing in summary

1. Secure long-term funding for public transport
2. Disincentivise solo-occupancy driving
3. Incentivise efficient movement of freight
4. Avoid the rebound effect from lower BEV running costs
5. Replace petrol/diesel tax revenues before they dry up

How to introduce road pricing in three simple steps

Road pricing: **Step 1**

- Frame a National Road User Charge (NRUC) as a utility payment that replaces fuel taxes, pound-for-pound.
- Calculate liability on distance and vehicle weight alone.
- Replace fuel taxes with NRUC incrementally over, say, three years.
- Adjust NRUC increments to offset decrease in fuel taxes.
- Don’t discount NRUC for BEVs.



Road pricing: **Step 2**

- Increase total revenue from NRUC relative to fuel taxes.
- Channel the additional revenue into supporting public, active and shared transport.
- Use deliberative democratic techniques to test ways to increase revenues, and to prioritise its investment

In the UK, this could be achieved by setting NRUC to replace VAT-inclusive fuel taxes, and not permitting businesses to reclaim NRUC, netting about **£3.7 billion**.

Researchers at Transport for Quality of Life estimate that **£2.7 billion** would be sufficient to fund a Swiss-style, comprehensive bus network in England.

Road pricing: **Step 3**

- Design variable-rate NRUC.
- Use deliberative democratic techniques to test policies, implementation and public messaging.
- Run pilots, for instance with HGVs and taxis.
- Roll out nationally.

Key takeaways

1. The carbon budget for road transport requires **large and rapid reductions in vehicle-mileage**.
2. Vehicle electrification alone is **not sufficient**.
3. A **National Road User Charge (NRUC)** can:
   - Replace fuel taxes
   - Raise additional funding for sustainable transport
   - Incentivise modal shift and efficient use of vehicles
4. **Deliberative democracy** has a crucial role in smoothing the way to introduce an NRUC.

Thank you for listening!

Edward Leigh

edward@smartertransport.uk

Smarter
Cambridge Transport