



CENTRE FOR RESEARCH INTO
ENERGY DEMAND SOLUTIONS



Positive Low Energy Futures: *the transport and mobility bit*

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“How low can we go?”

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Climate solutions in transport

Transport **decarbonisation**:
demand increase, high
carbon infrastructures, car-
dependent lifestyles...

Climate science: next
5-10 years crucial

**Why
important?
Why now?**

- 3 broad options to do this
1. Decarbonize energy for mobility
 2. Nature based / CDR
 3. **Lower energy demand**

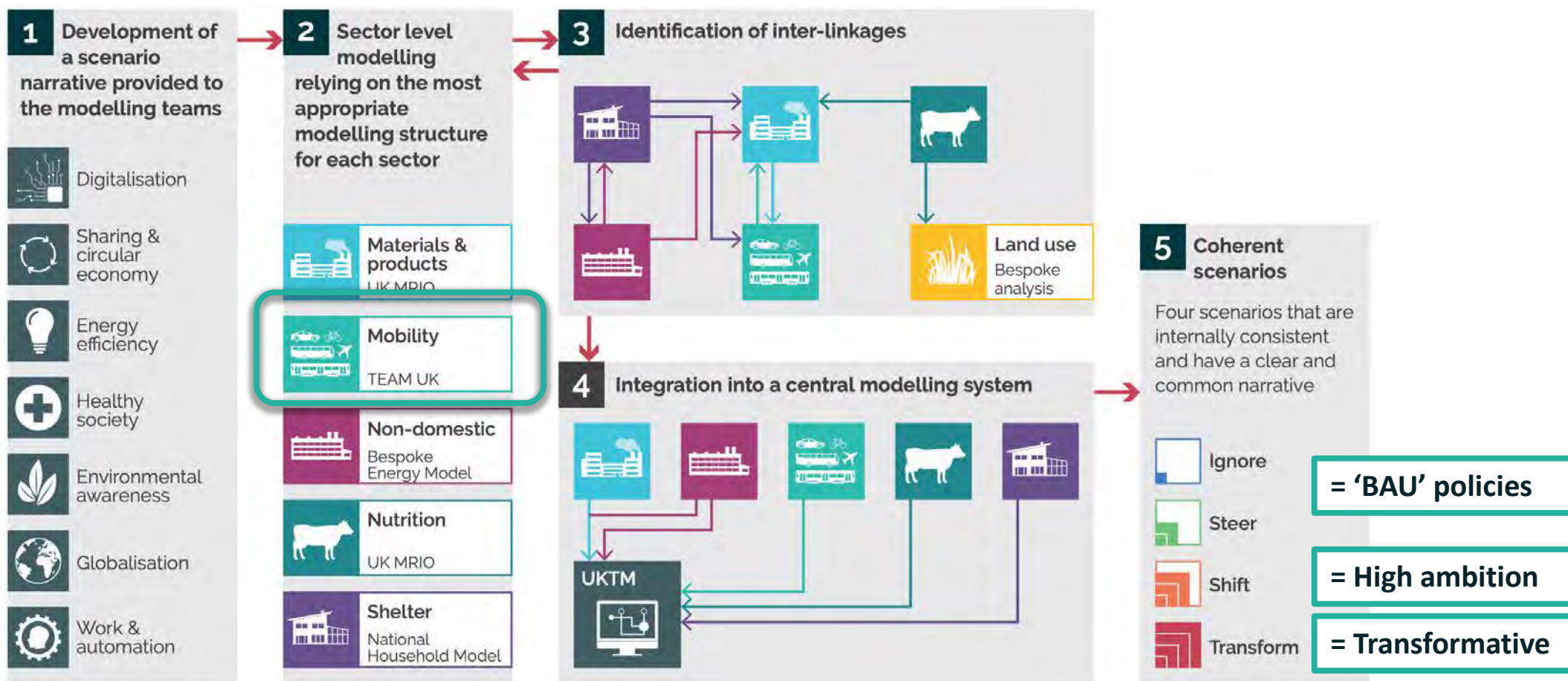
An **electric** future will take
some time

No way we can meet the decarbonization targets in 2035 and 2050 without
focusing on the amount of movement of people and goods

(ITDP 2021, Grubler et al 2018, Barrett et al 2022)

“How low can we take our energy demand for mobility
without impacting on our quality of life?”

Our approach to modelling energy demand



Transport sector – key elements of **scenario narratives**

- More rapid action to reduce **private** car use will be 'just' if paralleled by big increases in supply of **alternatives (shared, public, active)**
- #flyingless = means more domestic leisure and business travel
- “Non-transport transport factors” (e.g. wider socio-technical and policy shifts) will be as important as transport specific technology and policy change
- Fastest reductions achieved by **passenger travel** to compensate for challenges with freight decarbonisation (HGVs) and demand reduction
- Much more **radical market transformation of passenger vehicle fleet** than currently assumed as it will include rapid phase out of sale of high-polluting vehicles
- **Structure of labour market** results in significant changes to commuting and business travel: service & gig economy (=increase), 4 day working week (=reduction)
- **Devolution/ localisation** – changes to planning system and desire to work and play more locally

The UK can more than halve energy demand for mobility

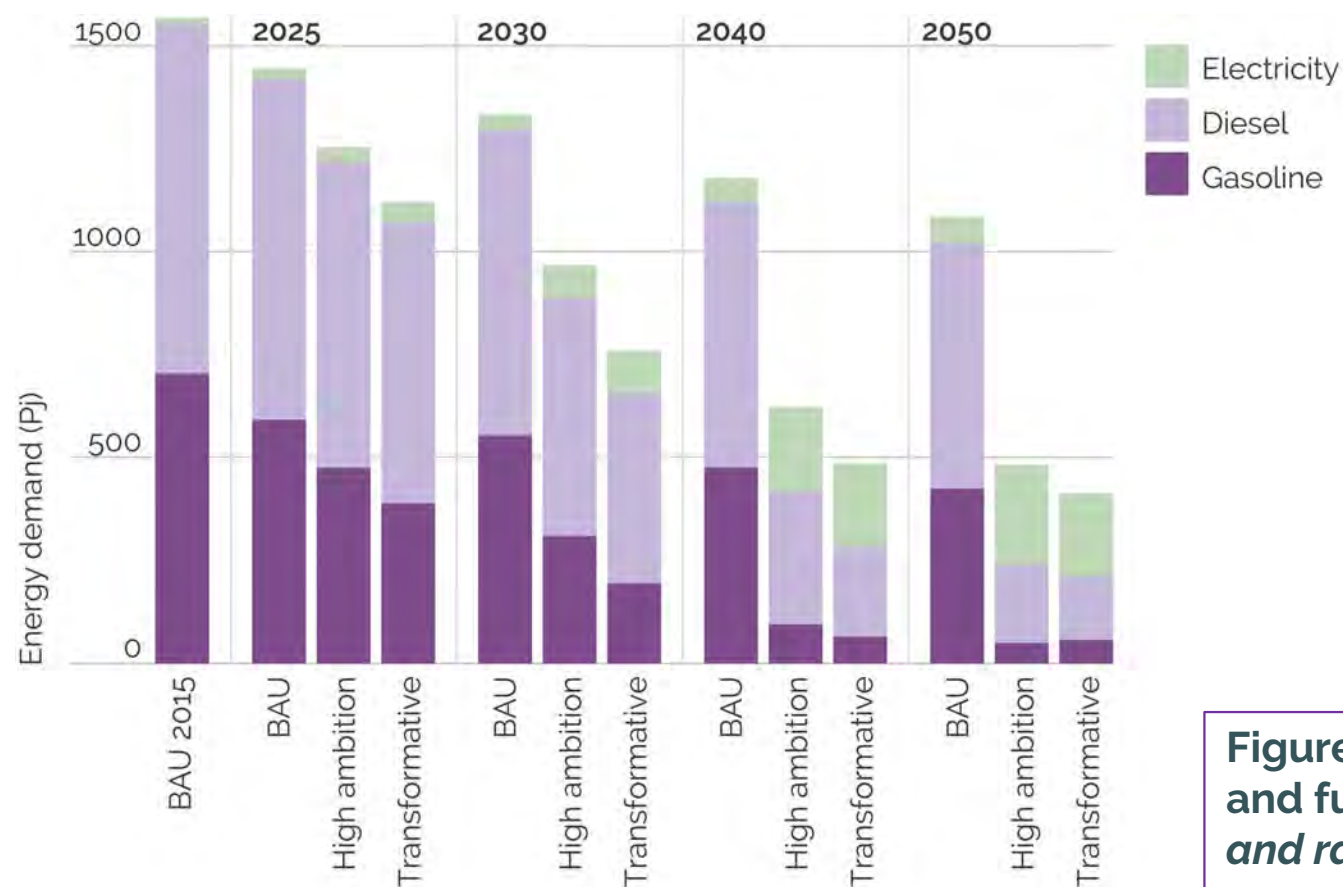


Figure: Energy use by mode and fuel – *transport by road and rail only*

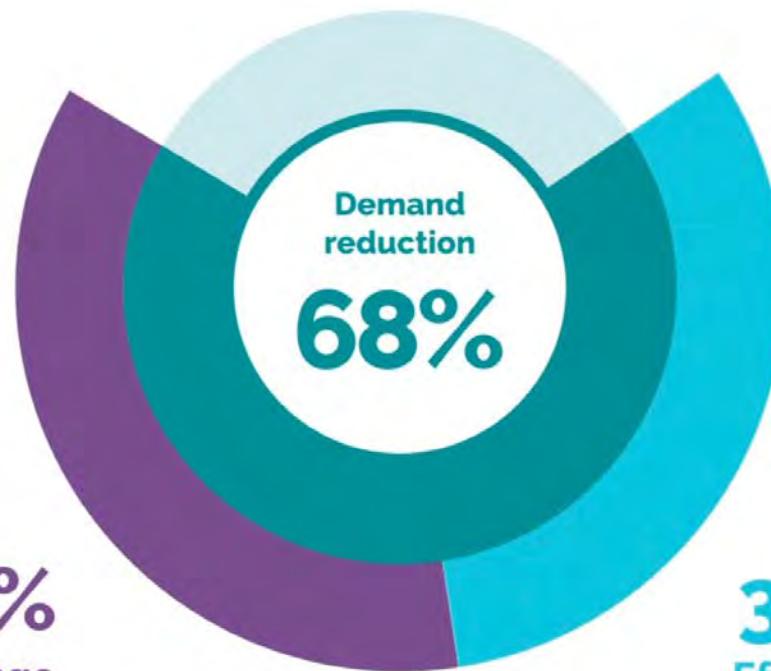


Transport

Better provision of local services to reduce the need to travel combined with electrified transport.

Avoid &
shift

36%
Social Change



Improve

32%
Efficiency

Number of trips and distance travelled per person stay roughly the same ... but we become more multi-modal



Figure shows change in trip mode shares (by trip distance)

Car mileage reduction (and car occupancy increase)

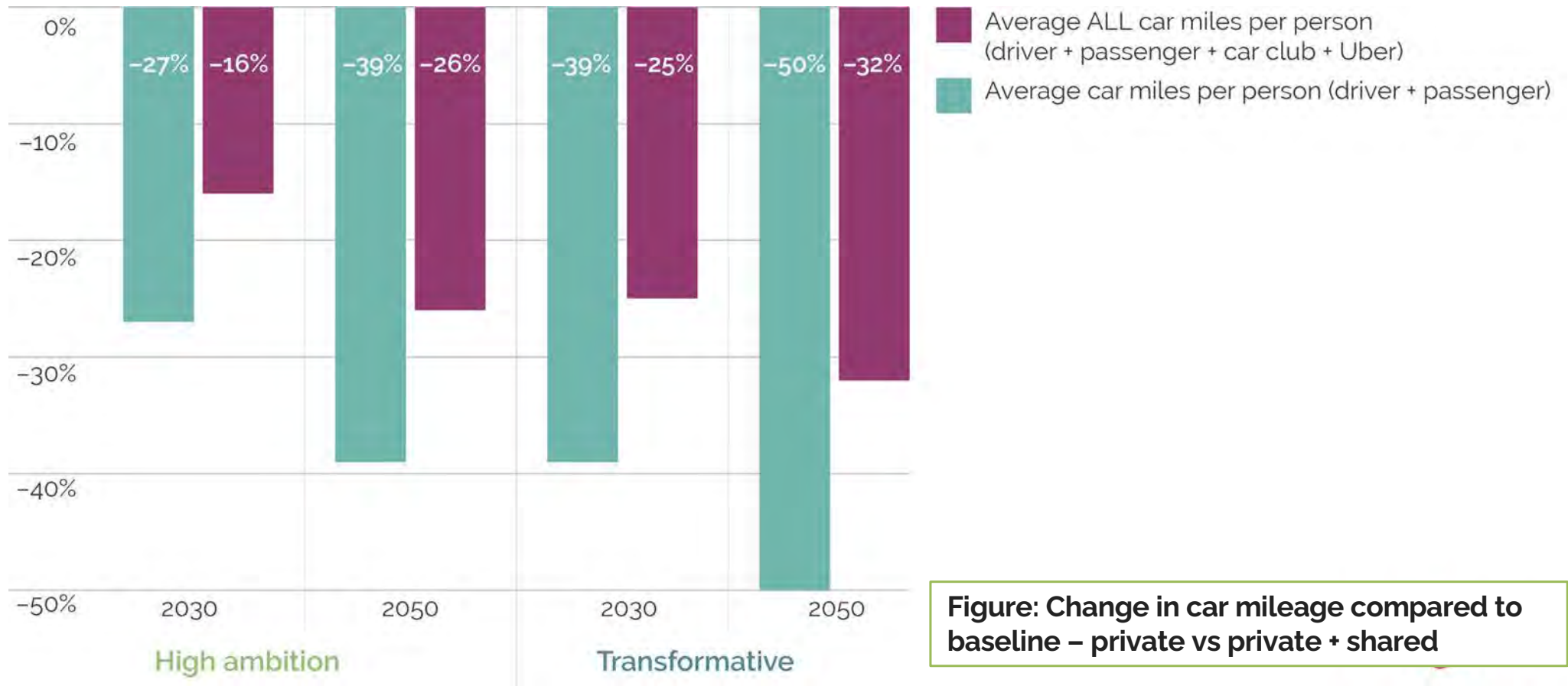


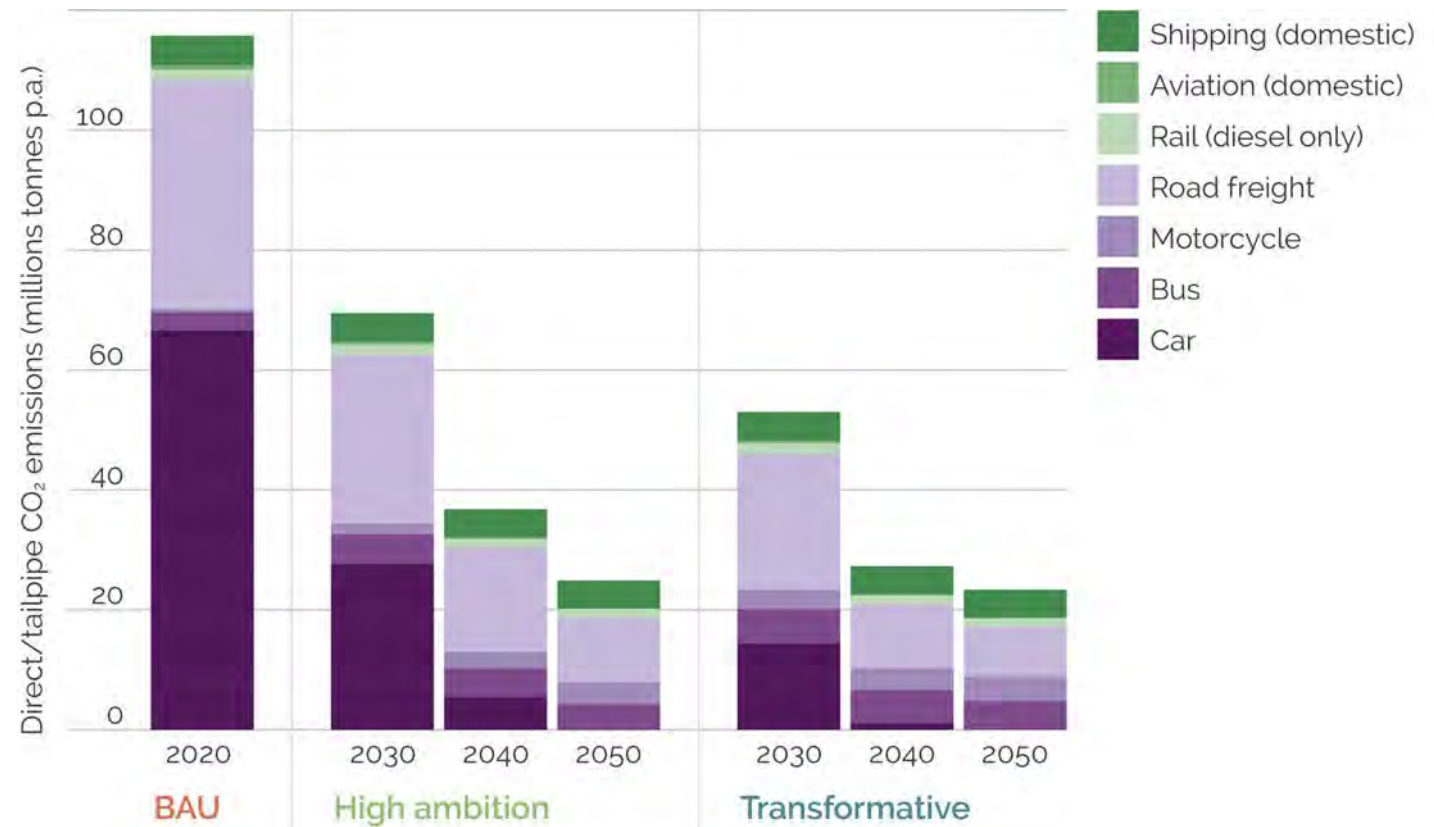
Figure: Change in car mileage compared to baseline – private vs private + shared

Lowering energy demand allows an increase in climate ambition

Direct CO₂ emissions are up to 54% (2030) and 80% (2050) lower than in 2020

Lifecycle carbon emissions from domestic transport are up to 48% lower than in 2020

By 2050: smaller car fleet, larger PT fleets





Amsterdam

How can this actually be achieved?

Key transport policies (1)

- No more road building or airport capacity expansion; some roads repurposed for shared, public & active mobility
- No more development on greenfield sites
- Integrated transport authorities in all urban/city regions (One network; One timetable; One ticket)
- Re-regulation of buses and railway under public control
- Massive investment in & prioritisation of public transport, walking and cycling – including e-bikes and on-demand services
- Rapid construction of networks of segregated cycleways in all urban areas and along all single carriageway roads radiating 15km from every settlement
- Car parking charges and infrastructure designed to encourage vehicle sharing
- Eventually, no private cars in centre of many urban areas
- Eco-levy applied to the whole system – the more you travel and the more polluting modes you use, the more you pay – revenue funds alternatives
- Air travel – frequent flier levy, APD

Key transport policies (2 – vehicle fleets)

- **Car fleet is reduced** as driving licence uptake is down and move to 'car usership'
- Incentives and parking priority for **shared fleets** (which also turn over quicker)
- Big increase in van fleet – but mostly electric from mid 2020s as **ICE ban** takes hold
- Large non-electric cars **banned** from sale from 2025 – only BEVs (for cars and vans)
- Substantially expanded bus fleet will be largely electric (but not all – coach, mini)
- Big investment in **charging infrastructure** in the 2020s
- Improved freight logistics, renewed push for consolidation centres
- Relatively small shifts from road to rail freight – capacity taken up by passenger rail
- **Phase out** of fossil fuel trucks by 2040

How low can we go? – concluding remarks

- Transformative changes in technologies, social practices, infrastructure and institutions can more than half energy demand for mobility
- It will be very difficult, more expensive and probably undesirable to meet carbon targets without these changes
- We can do this without compromising on our quality of life
- Climate Assemblies UK: Avoid more drastic car use restrictions further down the line
- But we seem some way off imagining and delivering the kinds of futures we arrived at
- Imperative that UK Government outline a more detailed strategy and supporting policies to enable energy demand reduction to fulfil its role in achieving rapid emission cuts



Transport

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Find out more at low-energy.creds.ac.uk/mobility

nature energy



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