# GREEN RECOVERY REPORT:

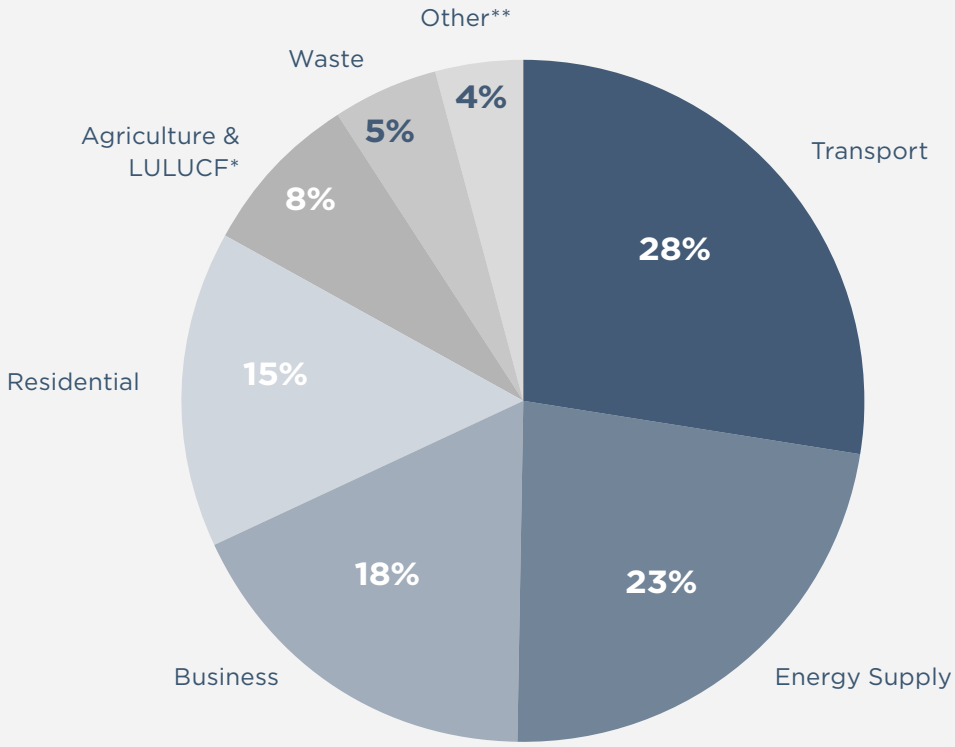
# DO WE HAVE THE ENERGY TO DECARBONISE TRANSPORT?

ADDLESHAW GODDARD

TRANSPORT IS THE SECTOR WITH THE HIGHEST GREENHOUSE GAS EMISSIONS. WE HAVE 30 YEARS TO DECARBONISE IT BUT WHAT FUELS WILL REPLACE PETROL AND DIESEL? HOW DO WE GET THE ENERGY AND THE TRANSPORT SECTORS TO WORK TOGETHER?

# UK DOMESTIC GREENHOUSE GAS EMISSIONS 2018



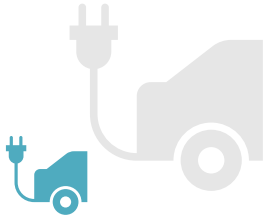



*Includes Land Use, Land Use Change and Forestry

**Includes Public and Industrial Processes emissions

Source: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/932122/decarbonising-transport-setting-the-challenge.pdf

**CONCENTRATING ON SURFACE TRANSPORT (ROAD AND RAIL) FOR NOW, THERE ARE TWO MAIN FUEL OPTIONS FOR REPLACING PETROL AND DIESEL, BUT EACH HAS ITS ISSUES.**



## ELECTRIFICATION

You've probably seen more electric cars on the road recently, although you might not have heard them coming. The latest sales figures from the SMMT show that hybrids and full battery electric vehicles are increasing their market share.

### YEAR TO DATE

| | YTD 2021 | YTD 2020 | % CHANGE | MKT SHARE -21 | MKT SHARE -20 |
|---|---|---|---|---|---|
| **Diesel** | 17,844 | 46,625 | -61.7% | 12.6% | 20.4% |
| **MHEV diesel** | 8,979 | 6,918 | 29.8% | 6.3% | 3.0% |
| **Petrol** | 71,655 | 139,193 | -48.5 | 50.6% | 60.8% |
| **MHEV petrol** | 14,019 | 9,606 | 45.9% | 9.9% | 4.2% |
| **BEV** | 9,776 | 6,562 | 49.0% | 6.9% | 2.9% |
| **PHEV** | 9,255 | 6,844 | 35.2% | 6.5% | 3.0% |
| **HEV** | 10,033 | 13,125 | -23.6% | 7.1% | 5.7% |
| **TOTAL** | **141,561** | **228,873** | **-38.1%** | | |

**BEV** - Battery Electric Vehicle
**HEV** - Hybrid Electric Vehicle
**PHEV** - Plug-in Hybrid Electric Vehicle
**MHEV** - Mild Hybrid Electric Vehicle

Source: https://www.smmt.co.uk/wp-content/uploads/sites/2/February-Fuel-2021-and-YTD-cars.png

## BY 2030 YOUR NEXT CAR – AT LEAST YOUR NEXT NEW CAR - WILL HAVE TO BE ELECTRIC (OR AT LEAST HYBRID, UNTIL 2035). CAN THE GRID COPE?

National Grid, who look after the GB electricity network, think it can. In fact, they think that electric vehicles (EVs) can help support the growth of renewable energy generation. Not what you were expecting to hear? A few years ago, there were predictions that electric cars could overload the grid when everyone plugged them in after work, exacerbating peak demand. But now National Grid are looking at vehicle to grid technology, where EVs act as "batteries on wheels" and can send power back to the grid when demand is high, and draw power back from the grid at night, say, when renewable energy supply is high. Digitalisation of the energy system and using data via smart meters makes all this possible – see our previous report, Open Data and Digitalisation.

But in practice we've found that the grid can't always cope. It can be very expensive to connect an EV chargepoint in an area where there isn't enough capacity, as the cables need reinforcing first and the customer (the EV chargepoint installer) has to pay for this. So some areas that are either remote from an electricity connection, or where the network is already overloaded, may miss out on the infrastructure needed for EVs.

There is an opportunity here for large fleet operators to install EV chargepoints at their depots and many are already doing so. They face the same challenges in rural areas though.

The Government has powers in the Automated and Electric Vehicles Act to require large fuel retailers or service area operators to provide public charging points but so far has left it to the market to do this; the powers remain if the market does not provide the infrastructure needed. They have also consulted on whether to require every new building to have an EV chargepoint. We're still awaiting the outcome of this but we expect there will be some obligations on landlords, which will drive chargepoint installations.

For trains, the ideal option is to electrify the entire rail network but it's expensive and in some cases (where there are tunnels or low bridges for example) not practical. Network Rail's Traction Network Decarbonisation Plan looks at battery electric or hydrogen trains for parts of the track that can't be electrified. See Suzanne Moir's article Net Zero in the Railways in this edition of Transport Times for more detail.

# HYDROGEN

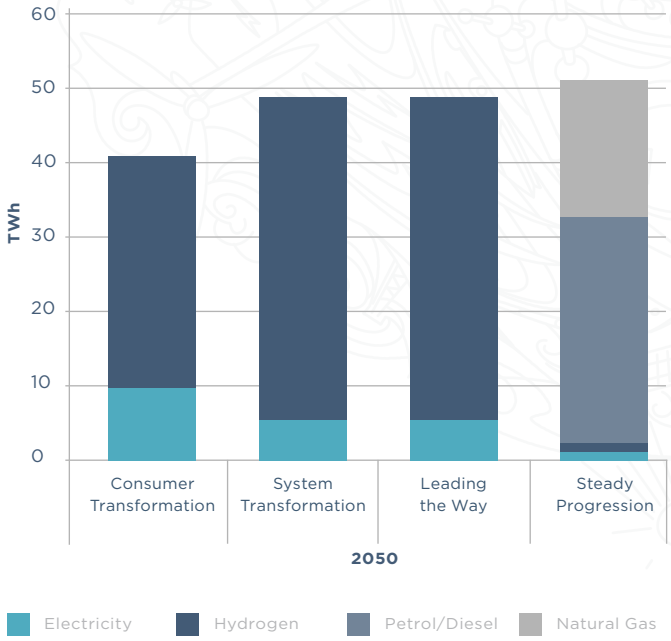
This is where the other fuel option, hydrogen, comes in. We've already done a report on this: see Can hydrogen carry us to net zero by 2050? The main problems with hydrogen are its inefficiency and its (current) high production costs. The technology is simply not yet as advanced as battery technology, so investors see it as high risk.

Hydrogen is likely to end up powering larger, heavier vehicles like lorries, some buses and maybe some trains, as the amount of power needed means batteries end up being too big and heavy. One of our clients found this when looking at building a battery-powered ferry: 80% of the cargo space was taken up by the batteries alone.

Refuelling a hydrogen vehicle is similar to refilling a petrol or diesel tank; and they can go further on a full tank than an EV can on a full battery.

National Grid's Future Energy Scenarios 2020 forecast that most HGVs will end up being hydrogen powered, at least in all the scenarios that meet the net zero 2050 target.

## HGV FUEL MIX IN 2050




We'll need a network of hydrogen refuelling stations to make this feasible, which means a network of pipes to carry the hydrogen around. That's expensive, so we expect hydrogen refuelling stations to cluster around centres of hydrogen production. The Liverpool City Region hydrogen bus trial is a good example of this, making use of the hydrogen produced by the BOC Linde plant in St Helens to fuel up to 25 hydrogen fuel cell buses which will operate along the St Helens – Liverpool bus corridor.

There may end up being a geographical split in the vehicles we see on UK roads, with more EVs in urban areas where there are more chargepoints (and shorter average journeys) and more large hydrogen vehicles in rural areas and areas near industrial clusters. We commented on this last year in our article The road to net zero: can hydrogen vehicles pave the way?

# OTHER OPTIONS

Electricity and hydrogen are the two main green transport fuel options, but they are not the only ones. Chugging along quietly in the background for many years now is the Renewable Transport Fuel Obligation (RTFO) which requires transport fossil fuel suppliers to source a proportion of their fuel from renewable sources such as biofuels, or to 'buy out' of their obligation by paying a fixed price per litre. The buyout price recently increased from 30p to 50p per litre. The RTFO is set to run until 2032 and encourages the use of biofuels where possible.

Another option is biogas. We have clients who are using the biogas resulting from their production processes to fuel their vehicles – a perfect closed loop.

Recently, the UK Government legislated for E10 petrol to become the standard. E10 petrol contains up to 10% renewable ethanol, reducing $CO_2$ emissions.

Most clients we've talked to are technology neutral: they will choose the fuel that best fits their needs, looking at the costs and benefits of each. The Government's Transport Decarbonisation Plan, due to be published in the next few weeks, is likely to recommend a range of options rather than plumping for one fuel over another. We can see this in the way they are funding both electrification (e.g. the £500 million Rapid Charging Fund) and hydrogen (e.g. the £3 million Tees Valley hydrogen transport hub trial) projects.

# CROSS-SECTOR COMMUNICATION

Historically, the energy and transport sectors in GB have been quite separate but if we are to decarbonise transport and reach net zero emissions by 2050, they will need to work more closely together. It's encouraging to see National Grid planning a series of high-powered EV chargepoints along the motorway network, looking at where electricity and transport demand meet. But too often projects stall because transport and energy are not aligned. There is no point in a local transport authority mandating that all new buses must be hydrogen powered if there is nowhere to refuel them and the costs or practicalities of installing a new network are prohibitive. Network Rail is the largest non-regulated electricity consumer in the UK. They are working on their final Traction Decarbonisation Network Strategy and have published an Environmental Sustainability Strategy, acknowledging the need to work ever more closely with the electricity industry.

Addleshaw Goddard work in both the energy and the transport sectors and can help clients put a deal together. We are currently helping Network Rail with their procurement for a renewable energy corporate power purchase agreement for a portion of their non-traction electricity.

The Government is funding R&D for new traction technologies, but once they become more mainstream they are expecting the private sector to step in and provide the finance. They are also developing new business models for hydrogen projects and we can help advise how to use these for a transport or energy project.

# CONTACTS

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