



Decarbonising Wales' transport system while connecting people and places

Introduction

Decarbonising the transport system will be an essential component of achieving net zero in Wales.

This background paper summarises Wales' current transport emissions, and explores how the Welsh Government is implementing, or proposing to implement, policies to improve connectivity. Targets and aims for carbon emission reductions and behaviour changes are reviewed, to understand the economic and infrastructural support measures required to speed up the transition to net zero.

It forms part of WCPP's [work to support the Wales Net Zero 2035 Challenge Group](#), which was established as part of the Welsh Labour / Plaid Cymru Cooperation Agreement to examine potential pathways to net zero by 2035. Specifically, it is a contribution to challenge area 4: *How could people and places be connected across Wales by 2035?*

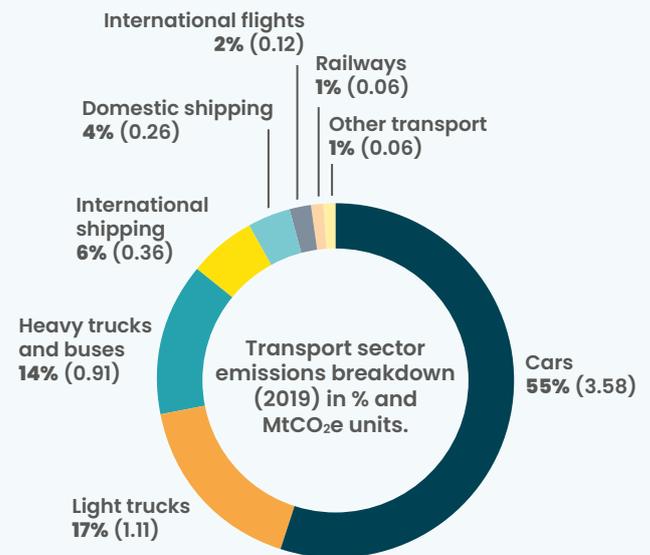
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Transport emissions

Transport currently makes up 16% of carbon emissions in Wales (Welsh Government, 2021a). Although there have been reductions in emissions from around 7 MtCO₂e in 1991 to 6.6 MtCO₂e in 2019, transport remains our third highest greenhouse gas emitting sector, behind industry and energy. Figure 1 illustrates the breakdown of emissions from the transport sector. Cars and light goods vehicles are the most significant contributors overall (Welsh Government, 2021a). Aviation and shipping pose major challenges to reducing emissions. Together they account for 6% of Wales' greenhouse gas emissions.

The Committee on Climate Change (CCC) has stated that Wales has made good progress in reducing emissions, but nevertheless is not on track to meet its targets overall (CCC, 2023).

Figure 1: Welsh transport emissions 2019 (MtCO₂e)

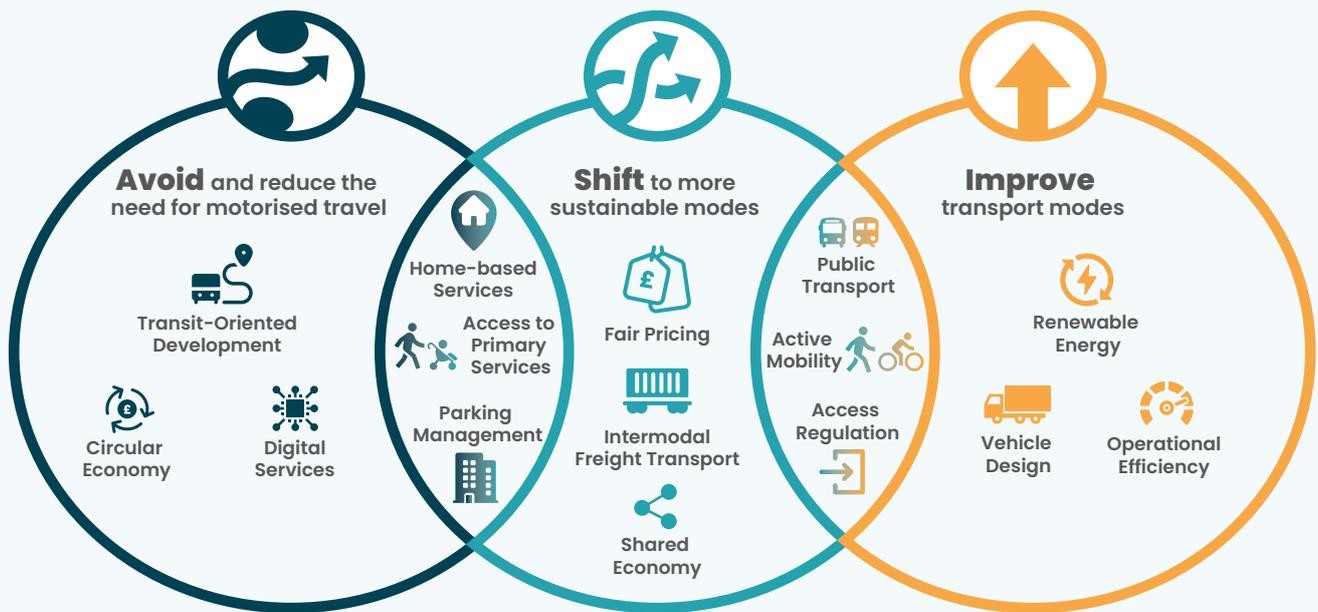


Source: Welsh Government, 2021a: 80

Cars and light goods vehicles are the most significant contributors while aviation and shipping pose major challenges to Wales' ability to reducing emissions.



Figure 2: Avoid Shift Improve measures to decarbonise transport



Source: Slocat, 2021: 6

Approaches to reducing emissions

Efforts to reduce transport emissions can be categorised using the **avoid-shift-improve** framework to categorise initiatives that support people to *avoid* unnecessary travel, *shift* to less carbon-intensive modes, and *improve* energy efficiency (Federal Ministry for Economic Cooperation and Development, 2019).

Figure 2 provides a non-exhaustive list of measures for illustrative purposes.

Below we review Welsh Government efforts in relation to the ASI framework and the devolved powers that are available.

Summary of Welsh Government targets for surface transport

Avoid	Shift	Improve
<ul style="list-style-type: none"> 30% of the Welsh workforce working from home 	<ul style="list-style-type: none"> 39% of journeys made by sustainable transport (from 32% in 2019) Active travel to account for 33% of all modes of travel by 2030 (from 27% in 2019) Public transport to account for 7% of all modes of travel by 2030 and 13% by 2040 (from 5% in 2019) 	<ul style="list-style-type: none"> Reduce emissions from passenger transport by 22% in 2025 and 98% by 2050 (from 2019 levels) 48% new car sales to be of ultra-low emissions vehicles by 2025 (from 1.2% in 2023) Plan for and invest in EV charging infrastructure: <ul style="list-style-type: none"> Strategic points every 20 miles 7 to 11 charging points per EV

Powers and policies

The Welsh Government has varying degrees of autonomy and responsibility over the main modes of transport: surface, aviation and shipping. The Welsh Government's Carbon Budget 2 (2021-2025) details policies and strategic targets for reducing carbon emissions, and specifies the plans for how changes in the transport sector will contribute to this. Powers, policies and strategic targets are presented for the three modes below (Welsh Government, 2021a).

Surface transport

The Welsh and UK governments share policy powers to decarbonise surface transport. New vehicle sales and some parts of the rail system are either reserved or dependent on UK-wide policy and regulation, whereas planning and delivery of local transport systems are largely the responsibility of the Welsh Government and Welsh local authorities.

In partnership with local authorities, the Welsh Government is developing and implementing policies to reduce surface transport emissions, using a transport hierarchy (Figure 3). There is an ambition for 39% of journeys to be made by sustainable travel modes by 2030 (for

example, public transport, walking or cycling) (Welsh Government, 2022a), an increase of seven percent on the 2019 estimate (Welsh Government 2022b). Planning policy in Wales encourages local authorities to incorporate accessible means of active travel and public transport into land use planning (Welsh Government, 2021b). The aim is to reduce emissions from passenger transport by 22% in 2025 (from 2019) and 98% in 2050 (Welsh Government, 2021a).

Policies aimed at supporting avoidance of surface transport include the remote working strategy, which aims for 30% of the workforce to be working remotely. This requires good broadband and digital connectivity. The remaining policies aimed at reducing emissions from surface transport focus on shift-improve initiatives of active travel, public transport, and electric vehicle charging (Welsh Government, 2022b).

The Welsh Government is not on track to meet its targets for reducing emissions from surface transport (Climate Change Committee, 2023). Whilst positive steps have been made in Wales to reduce traffic, van-kilometres have increased, and it is too early to say whether sufficient progress has been made post pandemic. Welsh Government proposals predominantly focus on shift-improve initiatives that encourage people to shift to more environmentally friendly forms of transport, and reduce emissions by using different fuels or energy systems. There are fewer initiatives focusing on reducing the need for travel.

Figure 3: Welsh Government Transport Hierarchy



Source: Welsh Government, 2022a: 22



Active travel

A key method of shifting modes of transport at the scale required proposed by the Welsh Government is to increase active travel from a current estimated proportion of 27% to 33% of modes of travel by 2030 and at least 35% by 2040 (Welsh Government, 2021a). As part of this, there is a pledge to spend £60 million on the development of a safe network for walking and cycling and a 20mph speed limit has been introduced in built up areas.

The Welsh Government also plan to develop longer distance commuter highways, encourage workplace travel plans (for example, showers) and support the use of e-bikes. There is an intention to increase the accessibility and affordability of cycling to socially and economically disadvantaged communities that may not currently have access to these services. Further considerations are given to ways of encouraging citizens to utilise this infrastructure, such as all-ages cycle training, and further expansion of bike-share schemes.

Research from CCC has shown that many car journeys could be shifted to walking and cycling (including e-bikes) by 2030, rising to 9-14% of journeys by 2050. In 2021, 25% of trips in England were under 1 mile, and 72% were under 5 miles (Department for Transport, 2022a).

A recent study based in Cardiff concluded that walking or cycling could realistically displace around 41% of car journeys, as half of car trips are currently less than three miles (Neves and Brand, 2018). This would also have significant impact on pollution levels in urban areas. Data from Bath found that 60-70% of journeys began and ended within the city limits, yet residents often downplayed the significance of these short journeys (Thorman, 2020). This illustrates that a substantial amount of driving over short distances is likely to be in areas where public transport and/or active travel are potential alternatives.





Public transport

Improving the provision of public transport is essential to enable a shift from car dependency to more sustainable modes of transport. The Welsh Government plan to increase the trip mode share of public transport from a current estimated proportion of 5% to 7% by 2030 and to 13% by 2040 (Welsh Government, 2021a).

The Welsh Government's Carbon Budget 2 states that policy provisions should consider both rural and urban contexts. The main proposals in the Carbon Budget 2 are to address restrictions of railway de-regulation, invest in infrastructure to modernise railway networks, improve core valley train lines, and develop bus-to-bus hubs in urban and rural areas. There are also plans for zero emission bus fleets and to decarbonise the rail network.

Ultra-low emissions vehicles

Many of the powers and responsibilities in the transition to ultra-low emission vehicles sit with the UK government. The UK government has moved back the ban on sales of fossil-fuel vehicles, from 2030 to 2035. CCC has warned that this date needs to be brought further forward, to no later than 2032.

While this regulation will make it impossible to buy new non-electric cars, there will remain many cars in circulation

and use, with a significant delay in electric vehicles (EVs) becoming the most common private vehicle. The current goal is that 48% of new car sales in Wales must be ultra-low emission vehicles by 2025, and all taxis and private hire vehicles must be zero emission by 2028 (Welsh Government, 2021a).

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EV uptake is dependent on the availability of charging stations. The UK government have an EV Charging Infrastructure Strategy, and aim to 'work closely with the Scottish and Welsh governments as they take forward their strategies' (Gov.UK, 2022: 31).

The Welsh Government published their EV Charging Strategy for Wales in 2021 (Welsh Government, 2021c). This included plans to roll out EV charging infrastructure to meet the predicted demand for 30,000-55,000 fast chargers and 4,000 rapid chargers in Wales by 2030.

The strategy aims to increase charging points available for individuals and for organisations that provide goods and services in a range of situations, including homes, workplaces and businesses. It also outlines plans for building regulations to



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require EV charging for all new homes. A CCC inquiry has found that the Welsh Government has not met five of its nine targets, and suggests that the lack of progress undermines the credibility of the strategy (Climate Change, Environment, and Infrastructure Committee, 2023).

The Welsh Government plans to accelerate the uptake of zero emission cars and vans by decarbonising the public sector fleet, introducing electric car clubs, and reviewing loan schemes. They are also planning to reduce emissions from freight and logistics activities by assessing the impact of next-day and last mile delivery, and introducing multi-modal hubs for cargo.

The strong emphasis on increasing EVs may not be enough to adequately reduce emissions (Hill et al, 2019). There are significant emissions associated with the 'embedded carbon' in the manufacturing process (a calculation which takes into account carbon emissions from production processes), as well as concerns over the disposal of batteries in the future. Some argue that switching to electric cars further entrenches private vehicles as the dominant mode of transport and so impedes more transformative and low-carbon visions of transport and mobility (Hill et al, 2019).

Additionally, because EVs require electricity, there is a need to secure renewable generation of energy for this to achieve desired effects. The supply of power is regulated by UK government.

Whilst overall emissions from transport in Wales have decreased over the years, car use itself has been steadily rising, increasing by 45% between 1993 and 2019 (Welsh Government, 2020b). This raises concerns about the feasibility of trying to change behaviour to encourage a move away from private car use. The Centre for Alternative Technology (CAT), based in Machynlleth, argues that to reach zero carbon in transport fossil fuel energy used for driving and flying needs to be eliminated. This is 'not a simple technical matter of switching to different fuels or energy sources but requires changes in attitudes, planning and infrastructure, economic incentives and political and institutional changes' (CAT, 2017: 72).

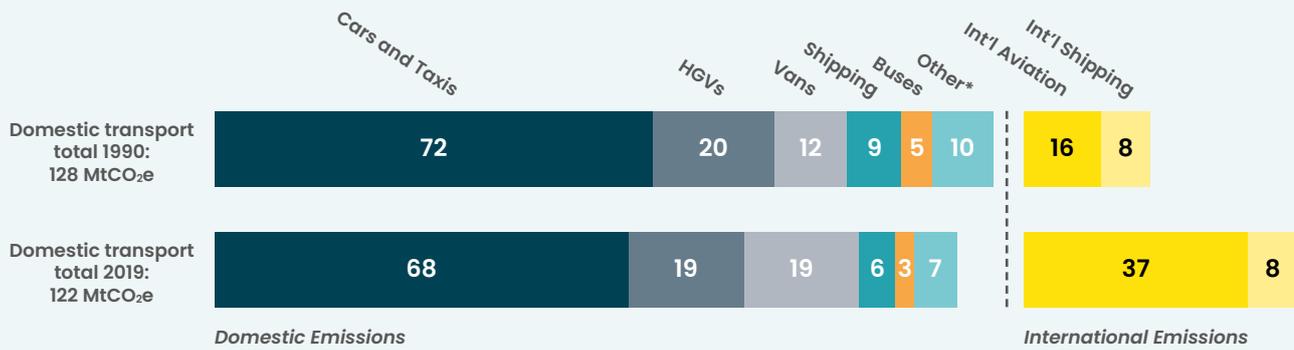
Aviation

Domestic aviation emissions reduced in the UK between 1990 and 2019, but were offset by the substantial growth in international aviation emissions during the same time period (see Figure 4). Aviation is set to be the largest emitting sector by 2050 (ECIU 2018).

Aviation is a reserved power. Decarbonising aviation is therefore dependent on UK government action, which is almost entirely focused on improve initiatives. The Welsh Government however does have the policy levers to manage airport expansion and aviation demand, and to prepare for sector decarbonisation. UK government policies include uptake of Sustainable Aviation Fuel (SAF) and a 'jet zero' strategy.

Jet zero sets out six policy measures aimed at reaching net zero in aviation by 2050: system efficiencies; sustainable aviation fuels; zero emission flights; markets and removals; influencing consumers; and addressing non CO₂. In April 2023, the UK government announced plans to speed up the design, manufacture and rollout of zero emission aircraft and infrastructure at UK airports.

Figure 4: Domestic and international emissions



*Comprises, in 2019: Rail, 1.8 MtCO₂e; Domestic Aviation, 1.5 MtCO₂e; Military Vehicles, 2.3 MtCO₂e; Motorcycles, mopeds and other road transport, 1.2 MtCO₂e.

Source: Department for Transport, 2022b: transport and environment statistics.

Jet zero commits to 70% passenger demand growth by 2050, compared to 2018 levels.

Jet zero has committed to 70% passenger demand growth by 2050 compared to 2018 levels. In contrast, CCC argue that demand management is the most effective method to reduce aviation emissions. CCC is critical of the jet zero approach, arguing that the heavy reliance on technology is expensive and high-risk (Climate Change Committee, 2023). CCC have called for a framework to be developed in cooperation with the Welsh Government to ensure airport expansions are not allowed to proceed.

The Welsh Government are working with Cardiff Airport on the future uptake of SAF, although there are concerns about its impact and sustainability. While it can be made from waste and crops and has the potential to reduce carbon emissions by 80% (Climate Change News, 2022), it is an expensive alternative in comparison to the currently used kerosene and potentially causes issues in relation to food production and availability, and deforestation (RSB, 2022). There are plans to build carbon recycling facilities in Port Talbot to convert industrial emissions into

SAF, but it is not clear when this will be operational (Welsh Government, 2023).

Shipping

Shipping has become the main transport mode for global trade. An estimated 11 billion tons of goods are transported by sea each year, and in the European Union shipping is used for 80% of total exports and imports (International Chamber of Shipping, n.d). Shipping is an extensive and growing producer of emissions, and there are concerns that without intervention its emissions production will undermine the Paris Agreement (European Commission, 2023).

The shipping sector is mostly reserved to the UK government. The UK government's clean maritime plan outlines a mix of plans for improving infrastructure and supporting innovation for the use of zero emission propulsion technologies. As with aviation, infrastructure and planning has a strong devolved element.

In 2020, UK domestic maritime vessels represented around 5% of the UK's domestic transport emissions - more than domestic rail and bus emissions combined (Department for Transport, 2022c). The UK government's 'Green Maritime Plan' lays out ambitions to develop infrastructure and innovation



for the use of zero emission propulsion technologies by 2035 (Department for Transport, 2019). The results of a consultation on domestic maritime decarbonisation are due to be published late 2023.

The Welsh National Marine plan includes supporting the ‘sustainable development of the ports and shipping sector through marine planning’, but efforts to avoid, shift or improve shipping have not been a core part of the Welsh Government’s decarbonisation plans (Welsh Government, 2019: 14).

Barriers to decarbonising the shipping sector include uncertainty about optimal solutions, and technology capability to develop commercially viable zero carbon fuel at the necessary scale. According to the International Chamber of Shipping an entirely new generation of fuels and propulsion systems will need to be developed, alongside a new global refuelling network (International Chamber of Shipping, 2020).

The Welsh Government are considering the impact of the forthcoming Infrastructure (Wales) Bill on shore power and electric charging infrastructure in all of Wales’ major ports. It is hoped that the Bill will establish a new process for consenting major infrastructure projects that will streamline and unify the decision-making process, helping to support port investment and development.

Conclusion

Decarbonising transport offers the Welsh Government opportunities to reduce emissions and work towards reaching net zero targets. The Welsh Government have a greater range of powers and responsibilities to reduce emissions from surface transport, compared to shipping or aviation. Shipping or aviation are largely reserved powers, though preparing Welsh ports and airports for decarbonisation is within the Welsh Government’s remit.

There are significant opportunities for action within surface transport, using avoid-shift-improve initiatives. Currently, most Welsh Government initiatives focus on shift-improve and significant economic and infrastructural support measures are required to help the Welsh Government achieve existing ambitions in these areas. A greater focus on initiatives that support people to avoid travel may help to speed up the transition to net zero.

Our associated report outlines the opportunities planned or implemented internationally that could facilitate accelerated decarbonisation of the transport sector.



[CLICK HERE](#) for Net zero 2035: Lessons from international initiatives to decarbonise transport

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