

INTEGRATED TRANSPORT

Institution of
**MECHANICAL
ENGINEERS**

In 2013 the Government launched its 'Door to Door' strategy, which stated that sustainable travel choices do not just help cut greenhouse gas emissions, but, by reducing congestion, can contribute to improvements in safety, public health, and boost economic growth^[1]. Yet UK transport policy remains fixated on the idea that public transport is always better than private transport, and focuses exclusively on how journeys are made, and not on the why or when. It fails to consider the most truly sustainable measures that address transport demand: ie whether the journey needs to be made at all.

A new approach to an integrated transport policy is needed to challenge the public and private sectors to work together to address their impacts on transport infrastructure requiring an intelligent approach to modal shift. The Institution of Mechanical Engineers recommends:

- 1. Demand reduction:** Government should immediately reframe its local and national transport policies according to the priorities set out in the Institution's Transport Hierarchy (**Figure 1**).^[2]
- 2. Load spreading:** By 2020 the Department for Business, Innovation & Skills, supported by the Department for Transport and Her Majesty's Treasury, develop a strategy to incentivise and support the private sector to break free from outdated, unnecessary working practices that leave our transport network congested in the weekday morning and evening peak periods.
- 3. Low carbon:** The Department for Transport should encourage the adaptation of local transport policy by 2020, to encourage transport sharing schemes alongside its continued support for technologies that decarbonise and limit pollutant emissions from buses, taxis and other public transport modes.
- 4. Upgrade systems not components:** The Department for Transport needs to review of all current and planned infrastructure projects, with the development of a strategy to integrate them to deliver a planned resilient, optimised single transport network by the end of 2020.
- 5. Users must share the blame:** Freight companies must work with the Department for Transport to integrate road and rail freight networks, to maximise the off peak use of the transport network making use of the lowest impact mode of transport.

INTEGRATED TRANSPORT POSITION

BACKGROUND

In 2013 the Institution of Mechanical Engineers published its Transport Hierarchy Position Statement, which took a focused engineering look at system design^[2]. The Transport Hierarchy (**Figure 1**) sets objectives, grounded in the principles of sustainable development, to ensure resilience and adaptability in our transport network, with a focus on delivering societal needs. The combination of a multi modal network, sound engineering and a consensus of approach makes this a powerful tool to achieve the step change needed.

Importantly, decreasing the number of journeys, integrating transport modes and considering the most sustainable transport options, will ease congestion, which in turn will reduce cost and emissions.

CURRENT GOVERNMENT POLICY

The Department for Transport's 2013 Paper Transport: An engine for growth^[3] rightly states that we should be "thinking of our transport network as a connected whole, not a series of separate systems". However, the content focuses almost exclusively on increasing infrastructure capacity (the lowest of the Institution's four hierarchy priorities), very often in a piecemeal, mode-specific manner. It makes only passing references to "new technologies that have the potential to revolutionise how we travel" (Priority 3) and makes even less mention of "making public transport an easier option for everyone... and investing to support walking and cycling" (Priorities 2 and 1). There is no reference at all to reducing demand for journeys, which is the most sustainable form of any transport planning.

A further paper from the Department for Transport, produced in the same year, (Door to Door: A strategy for improving sustainable transport integration^[1]) sets out a vision for "a more integrated transport system that facilitates and enhances door-to-door journeys by sustainable means". This again fails to address minimising demand; why journeys are made, where they are made and when they are made. Instead it focuses on how journeys are made, including information provision, ticketing, connections and facilities.

This silo thinking is not uncommon. The CBI's infrastructure policy documents^[4] address the need to improve our transport network by increasing capacity, but all in isolation, without discussion of a multi-modal system or demand. However, the Institution of Civil Engineers (ICE), in its State of the Nation Infrastructure 2014 report,^[5] calls for the development of a "compelling national transport strategy, which establishes clear objectives, an investment hierarchy, and explains how the relationship between modes, local and national networks, and wider economic, social and environmental objectives should be reconciled". This report calls for multi-modal authorities in our major city regions.

The Institution recommends that government should immediately reframe its local and national transport policies according to the priorities set out in the Institution's Transport Hierarchy (**Figure 1**)^[2]; putting minimising demand as the top priority, and increasing capacity at the bottom. It should establish a properly resourced and supported expert body to do this, this role could be performed by the Transport Systems Catapult and would include experts from academia and industry. Major city regions should establish multi-modal authorities.

Figure 1: The Transport Hierarchy.

MORE SUSTAINABLE		
Priority 1	Minimise demand	Manage the reasons why transport is needed and the context in which transport demand is derived, to deliver the same access to services and activities with less powered/motorised transport.
Priority 2	Enable modal shift	Enable the choice of transport modes with the lowest environmental impacts, and enable easier changes between modes.
Priority 3	Optimise system efficiency	Increase all efficiency measures of transport modes and their use, particularly in terms of gCO ₂ /km for passengers and gCO ₂ /tkm for freight.
Priority 4	Increase capacity	After optimisation of the first three steps, any capacity increases that are required should be prioritised to the most efficient and sustainable modes.
LESS SUSTAINABLE		

CHANGING OUR POLICIES AND BEHAVIOURS

During the 20th century, office-based jobs were structured around standard working hours and relied on staff being present in the office to do their work effectively; in many businesses this is still the case: commuting distances have grown over time and long commutes are not considered unusual. Transport systems have evolved to cater for these inevitable morning and evening peaks.

School timetables, retail outlets, healthcare and leisure facilities also fit within this pattern, adding to the peak load. In addition there has been a move to centralisation of these services increasing transport demand still further. This has led to capacity expansion, much of which is utilised for only a few hours each weekday. A transport network which is relatively quiet for much of the day is an inherently inefficient system.

With the advent first of mobile phones, then email and laptops, followed by video conferencing and smartphones, many 'office' workers can carry out most or even all of their responsibilities remotely. These devices and systems enable working away from the office for one or more days a week (thus avoiding the need to travel completely, Priority 1 in the Transport Hierarchy), or mix their 'working at home' and 'in office' activities to avoid travelling during the morning and/or evening peaks. This provides us with a tremendous opportunity to improve our transport networks efficiency, by reducing peak-time demand and spreading that demand more evenly.

Policies that increase access to services and goods while reducing dependency on transport should be encouraged. For instance support for manufacturing with short (UK-based) supply chains, support for car sharing schemes, and in non-engineering realm, spatial planning to enable local economic networks and walkable communities will all impact on demand for transport, particularly at peak times. This can include support for hub and spoke distribution centres that are open at weekends. Service organisations such as Doddle have already adopted a business model which offers click and collect service for all your online shopping at your convenience from a convenient train station.

The Institution recommends that by 2020 the Department for Business, Innovation & Skills, supported by the Department for Transport and Her Majesty's Treasury, should develop a strategy to incentivise and support the private sector to break free from outdated, unnecessary working practices that leave our transport network congested in the weekday morning and evening peak periods, but relatively quiet at other times. Policies that reduce demand on the transport network should be given priority eg car sharing, local commercial networks collaborating on manufacturing logistics.

SHOULD WE SHIFT MODES?

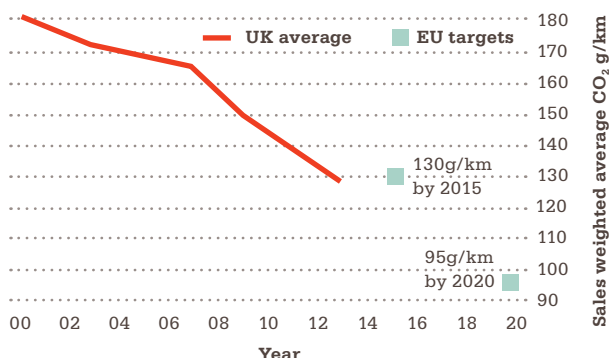
Recent UK transport policy has been to reduce greenhouse gas emissions, to help mitigate our impact on climate change. Modal shift has been a key part of these policies in terms of trying to enable people to choose less polluting modes of transport for shorter journeys, including walking, cycling and public transport (trains and buses), and on improving the fuel/energy efficiency of vehicles, particularly passenger cars.

Despite some notable exceptions, such as in London, relatively little has gone into shifting people to walking or cycling, and even less to avoiding journeys altogether; enabling access to goods and services locally is the key policy and spatial planning step required to avoid the need for powered journeys, and to enable walking and cycling journeys. The UK continue to have one of the lowest cycling rates in Europe, with just 2% of trips here made by bicycle compared to 10% in Germany, 20% in Denmark and 25% in the Netherlands^[6]. Getting more people cycling will have a major benefit not just for the transport networks, but for public health (through raised fitness levels and improved air quality). Dedicated cycling infrastructure and prioritising cycles on existing networks are part of the answer, but so too is developing the market for electrically assisted pedal cycles.

Most people choose their transport mode based on convenience, speed and ease of journey, rather than sustainability. Giving choices between journeys made by private vehicle or public transport modes can be beneficial, but the objective must not simply be "to force people to use the bus", but rather "to enable people to access services they need without depending on highly energy-dependent and high-embedded-energy private vehicles".

Bus occupancy in congested town and city centres is generally still low enough to mean that shifting all but the greenest of car occupants onto those buses will continue to make sense. In rural areas, where occupancy levels using public transport will always remain lower, alternative approaches may be needed, such as policies to ensure local access to services, and encouragement of active travel.

Figure 2: UK new car CO₂ trend^[7].



The transport challenge can be helped by non-engineering policies such as encouraging rural employment, favourable planning rules for establishment of new local economic activities such as new rural post offices, shops, crèches, shared offices, incubator centres; car/lift sharing, adaptation of the car club model to suit rural locations, and continued adaptation of bus services to suit rural communities.

As the emissions that are now released from new cars are much lower, more needs to be done to encourage upgrading, as well as the adoption of alternatives to traditional internal combustion engine cars such as hybrid or electric vehicles.

The Institution recommends that the Department for Transport needs to continue encouraging the market for low and ultra-low emissions private vehicles, as well as developing other low-carbon modes of transport such as buses. It should look at adapting local transport policy in the 2015–20 period, to encourage more transport sharing schemes alongside support for technologies that decarbonise and limit pollutant emissions from buses, taxis and other public transport modes.

AN INTEGRATED APPROACH

Key opportunities are available both in enabling a shift of demand to less unsustainable/energy-dependent modes (from air to rail, from car to bicycle), and in enabling journeys (freight and passenger) that include seamless interchange between different modes (such as air plus rail, car plus bicycle, train plus bus). Passengers and businesses would be better served, infrastructure more efficiently utilised and the environment better protected by this integrated approach.

Consider the opportunity of modal shift from air to rail. There are no major innovations likely to affect the basic premise that travelling by (electrified) rail will almost invariably be more sustainable than travelling by air, both within the UK and to our nearest neighbours. The key target area is short-haul journeys of less than three to four hours (by rail). As the All Party Parliamentary Group for an Integrated Transport Strategy noted in its 2014 report^[8], “integrating air and rail... has numerous benefits including modal shift from road to rail, potential air/rail substitution of short haul flights to release scarce airport capacity, wider airport catchments and customer choice, easier regional access to global markets, and a transformation of inward investment perceptions of the attractiveness of regional economies”.

This integration is not happening in the UK, with major infrastructure projects such as Crossrail, HS2 and airport/runway capacity expansion being developed in isolation.

For example, current HS2 plans means the route avoids Heathrow, by just a few miles, as it is estimated this could add an additional five to ten minutes to the London to Birmingham journey time. The Airports Commission had a remit to examine

“the current position in the UK with regard to aviation demand and connectivity, [and] forecasts for how these are likely to develop”, but had no requirement to consider alternative sustainable opportunities that would reduce the need for yet more new runways through modal shift to rail.

The Institution recommends that the Department for Transport needs an integrated approach to network development which encourages intermodal passenger and freight journeys, while actively investing in large infrastructure projects – ie not ‘upgrading’ individual silos such as the roads in isolation. This should take the form of a review of all current projects and planned infrastructure projects, and develop the strategies needed to integrate them to deliver a planned resilient, optimised single transport network by the end of 2020.

WHAT ABOUT FREIGHT?

The UK’s transport networks have evolved largely to cater for passenger journeys. The essential movement of the goods those people want and need to live, work and play has been treated as an afterthought. Good infrastructure for freight transport is essential for the UK’s long-term competitiveness, survival and growth. The freight on our roads currently accounts for 82%^[9] of all our goods moved and will probably remain the mode of choice, particularly for the last-mile deliveries. However, the development of high-speed rail links must be used as an opportunity to shift more freight onto the existing rail networks released, and to move more goods by high speed, particularly overnight.

Recent innovations in quieter vehicles and delivery systems can enable more efficient use of network capacity for freight, by allowing a higher proportion of loads to be delivered off-peak, at nights and weekends. In London, the Re-timing Deliveries Consortium’ is building on experience gained during the 2012 Olympics. It is a platform to progress retiming deliveries across London to reduce traffic and congestion during peak periods, and improve safety and air quality^[10].

The Chartered Institute of Logistics and Transport (CILT) reinforces many of these messages. Its 2014 A Vision for Transport Planning document highlights “information technology has the potential to revolutionise the way we use and manage transport... and to make better use of capacity”. It calls on the logistics and transport sectors to take the lead in promoting a reduction in freight and passenger traffic, by supporting alternatives to travel, reduced commuting distances and shorter, more localised supply chains. CILT has called for freight network capacity improvements through lorry-user charging, more urban hubs and the further integration of road and rail freight networks^[11].

The Institution recommends that freight companies must work with the Department for Transport to integrate road and rail freight networks, to maximise the off peak use of the transport network and to optimise the use of the lowest impact mode of transport.

RECOMMENDATIONS

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