CILT (UK) Response to the Review of Net Zero: call for evidence

October 2022

Introduction

The Chartered Institute of Logistics and Transport (CILT) is a professional institution embracing all transport modes whose members are engaged in the provision of transport services for both passengers and freight, the management of logistics and the supply chain, transport planning, government and administration. Our principal concern is that transport policies and procedures should be effective and efficient, based on objective analysis of the issues and practical experience, and that good practice should be widely disseminated and adopted. The Institute has a number of specialist forums, a nationwide structure of locally based groups and a Public Policies Committee which considers the broad canvass of transport policy.

The numbered paragraphs align with, and address consecutively, the questions posed in the consultation.

1. Net Zero was originally seen as a means of addressing the climate change imperative and this remains entirely valid. However, events of recent months in Ukraine and the consequent spiralling of carbon-based fuel prices have added an urgent economic driver to Net Zero. The direct impact of high fuel costs on consumers and businesses, plus the economic turbulence they cause, mean that - far from 2.5% p.a. growth - the UK is heading into a recession.

   It is thus essential that we reduce our reliance on internationally traded carbon-based fuels as quickly as possible in favour of home-produced renewable and nuclear energy. With a lower and more resilient energy supply, costs should stabilise and the conditions for growth restored. In parallel, investment in renewables and nuclear will itself inject billions of pounds into the economy and kick start growth.

2. The supply of renewable energy is inadequate to meet emerging needs and considerable wind, solar, wave, tidal and nuclear generation will be required.

   Energy storage will also need to be considerably enhanced as wind and solar generation may not match demand patterns. We see compressed air as the optimum means of storing energy until it is required, with air being compressed into large scale storage vessels when surplus energy is being generated. When demand exceeds supply, pressurised air would be released to generate electricity via a turbine.

   The high voltage electricity transmission network may need strengthening in certain areas to reflect the new geography of generation, most notably from coastal sites to main consumption areas. Local electricity distribution networks will also need strengthening to provide capacity for much greater usage, as gas and, petroleum, diesel and heating oil diminish progressively to zero.

We consider that electric alternatives are - or will be - available for most purposes, but that transport presents the greatest challenges. The sector now produces c.40% of carbon emissions and this will increase as other sectors decarbonise more rapidly. Battery electric cars and vans are now an everyday reality and progress is being made with buses and HGVs with a range of c.200km, which will cater for a high proportion of local and regional distribution.

Long distance HGVs, however, present a much greater challenge as it is extremely difficult to carry enough energy in a battery to move a 44 tonne HGV over long distances. Motorway electrification (the Electric Road System) is technically feasible, but erecting high voltage wires over a public road for use by free-steer HGVs has huge operational and safety challenges. Comparable rail systems use tightly guided vehicles and operate on a largely private infrastructure, but still carry challenges. These would be multiplied many times over on a motorway, where a careless HGV driver could very easily bring down the overhead cables onto private cars and other traffic.

Creating an ERS would require the whole of the motorway and trunk road system to be fitted with catenary, plus the associated power supply, sub stations etc, and would probably cost tens billions of pounds of public money. Payback on this investment would be entirely dependent on usage by HGVs, which is very uncertain as many hauliers have no appetite for equipping their vehicles with pantographs, preferring to use battery power as a means of decarbonising their operations. A network of rapid charging points at key locations would be a much better investment.

We do not see hydrogen playing a major role in transport decarbonisation. Where it is available as a by-product from local industry, it is eminently sensible to use hydrogen to power the local bus fleet, refuse collection vehicles etc. However, producing green hydrogen (from offshore wind etc) consumes 3 times the energy compared with using electricity in is prime form. This, coupled with major challenges and costs of transporting hydrogen (existing pipelines are not suitable) to the point of use, along with storage and safe on-board tankage, present challenges of a level that we do not believe can be overcome in an economically viable manner.

By contrast, rail decarbonisation is relatively straightforward. Overhead (and 3rd rail) electrification is a mature technology, very widely used across Europe, and already covers over 40% of Britain's rail network. Electrification costs are higher in the UK than the rest of Europe but encouraging progress is being made in identifying ways of reducing UK costs to the European average. This is particularly true of lower and medium speed lines (up to 75mph) which do need the complex installations required for high-speed lines of 125mph and more. Much of the UK intercity network is already - or is in the process of being - electrified and it is the medium speed cross country routes used by freight and regional passenger services that are to the fore, so the lower electrification costs in prospect for such routes are highly relevant.

Battery trains are now entering service and are very likely to offer the best option for local passenger services away from electrified routes. Rapid recharging (10 minutes) every 100 miles or so, generally at a point where the train is stationary for this length of time anyway at the end of a route where it turns back, allows high daily mileages - comparable with the diesel trains they would replace. Batteries will also be able to power heavy freight trains at low speeds on freight branch lines and sidings off the electrified network.

Maritime transport and aviation are extremely challenging on a global scale but somewhat less so over shorter distances. Battery ferries, with shore-based charging, are emerging and are likely to cater for most ferry routes, while battery planes for 'island hopping' and potentially some regional routes are beginning to look viable. Long haul aviation looks unlikely to achieve zero carbon and will need to use low liquid carbon fuels. The global maritime sector is looking more hopeful, with ammonia and wind assistance looking the most promising technologies, but still faces major challenges.

3. The private sector is willing and able to invest in zero carbon vehicles and other equipment, but will only do so if it can see clear Government commitment to providing the essential infrastructure on which they can operate. Plans and strategies are insufficient - real and rapid progress is needed on the key investments in renewable energy production, transmission and availability, where and when it is required.

   In the transport sector this means widely available fast charging for road vehicles, short-haul planes and ferries.
   For rail it means electrification of the main freight routes to allow modal switch to rail of long-haul road trunking over 300km, plus a proportion of hauls in the 200-300km range and some bulk commodities moving 100-300km. It is calculated that over a third of all HGV tonne kilometres are generated by such trips and could switch to rail, using intermodal equipment such as containers and swap bodies.

   A 10-year programme to electrify around 800 miles would allow c.95% of rail freight to be electrically hauled. It would also allow a number of passenger services to switch to electric trains, generating further benefits and payback on the investment. The programme should start with c.50 miles of 'infills', where short gaps in the wires (as little as 2 miles in some cases) mean that diesel locos have to be used for journeys of 200 miles or more. Around 2 million freight train miles a year could be decarbonised just from the initial infill schemes.

   It should be noted that, in advance of electrification, the much lower rolling resistance of steel wheel on steel rail means that modal switch from HGVs to diesel-hauled freight trains saves around 70% of carbon emissions. This can be achieved today with little or no investment. Government could encourage and incentivise companies to reduce their carbon through modal shift by increasing the extremely small budget for the Mode Shift Revenue Support scheme. This is currently delivering BCRs over 5 and is always oversubscribed, meaning that companies wishing to reduce the carbon footprint of their supply chains are unable to do so, for want of a few £000s of support.

   For passenger rail, clarity is required about which routes would best be electrified and which would use battery trains. The former consist generally of dense suburban networks in the Midlands and North plus the few remaining intercity routes not already electrified, or covered by the Freight electrification package. The latter will need provision of rapid charging points at key locations and the conversion of diesel and electric trains to battery power. Trial conversions are already underway and are showing considerable promise. The reduction in commuting (particularly into London) and business travel has left many hundreds of suitable trains surplus and available for conversion. No further suitable units should be scrapped, as even those dating from the 1980/90s are eminently suitable for conversion to battery trains.

4. As indicated in 3 above, businesses need clear Government commitment to providing the essential infrastructure on which they can operate. Plans and strategies are insufficient - real and rapid progress is needed on key investments in renewable energy production, transmission and availability, where and when it is required.

5. Strategic clarity about renewable generation and transmission with a firm, funded delivery plan for each sector. The time for 'wait and see what develops' has now passed and prevarication is in danger of taking over. The state of public finances may dictate that implementation is slower than would be desirable, but that is not a reason for delaying agreement to a plan, with a commitment to release funds as soon as possible and prioritisation of the elements with the best cost/benefit ratio. Not everything will cost tens of billions of pounds and it is vital that small schemes with good BCRs are authorised, both to reduce further emissions in line with the ICC's Code Red warning about containing temperature rises to 1.5C by 2035 and as a sign of Government commitment and intent.

6. The two are largely aligned. The sooner we reduce our dependence on imported gas and oil by substituting UK-generated renewables and nuclear the better, from both an energy security and Net Zero 2050 perspective.

   Carbon capture and storage (CCS) also has a part to play and the ABP et al Humber scheme shows promise. The UK is blessed with huge voids in the North Sea from which gas and oil have been extracted over the last 50 years and which would allow captured carbon to be sequestrated sine die. This would permit limited amounts of UK-produced coal to be burnt at Ratcliffe and West Burton power stations, plus biomass at Drax and Lynemouth, without emitting carbon to the atmosphere.

   In the very short term (<5 years), with inadequate nuclear generation and insufficient gas, it may be necessary to use coal without CCS as a last resort, to ensure power is available on cold, calm, foggy winter days when renewable wind and solar generation is very low.

7. Probably limited, since most countries are developing their own solutions and many are much further advanced than the UK. There may be niches where we can establish commercial advantage, such as battery trains - which are already being exported to the USA - and low-cost electrification for lower speed lines. France and Germany are far ahead on high-speed rail, but have done little specifically on lower speed lines for freight. Rail systems in the Middle East and Australia could use their huge solar capability much more effectively by electrifying rather than going down the highly energy-inefficient hydrogen route.

8. As noted in 3 above, rail freight has a substantial growth opportunity based on modal switch of the trunk leg of supply chains from road to rail. Based on DfT road freight statistics and industry knowledge of its members, CILT estimates that over a third (38%) of HGV tonne kilometres are suitable for modal shift to rail. This reflects the range of services that rail already provides successfully on a daily basis - bulk goods, such as aggregates, moving over 100km (less in some circumstances) and consumer goods moving over 200km.

Modal shift to rail would cater for most road trunking over 300km, plus a proportion of hauls in the 200-300km range and some bulk hauls between 100 and 300km in length. Most flows switching to rail would use intermodal equipment, such as containers and swap bodies, to avoid unnecessary handling and provide facilities such as refrigeration as and when required.

Such modal shift could treble rail tonne kilometres but, contrary to some contentions, this would not swamp the rail network. Modern freight trains carry the equivalent of 50-80 HGVs, so there is a high multiplier for each service which is introduced. Taking the routes followed by trunk HGVs and applying this to the rail network, most main lines would see an extra 1 or 2 freight trains an hour in each direction, which should not be unachievable, particularly with less commuter and business passenger travel post Covid. Further, this is calculated on the basis of an 18-hour day, to allow for continued passenger peak periods in the morning and evening - which may or not be the case.

Two routes - the West Coast Main Line (WCML) and Felixstowe to the Midlands & North (F2MN) would see 3 or 4 extra freights an hour. HS2 frees up substantial capacity on WCML(S) and capacity enhancement plans for F2MN are well-developed, albeit currently unfunded. WCML(N) needs further analysis in light of changing plans for HS2 north of Crewe, but it is likely that 'dynamic loops' - extra tracks alongside the existing line where freight trains can slow down to be overtaken by fast passenger services - at 2 or 3 locations in Cumbria and Southern Scotland would provide the necessary extra freight capacity. It follows that adequate capacity exists on most of the network and can be provided at relatively modest cost on the two route sections which need enhancement.

Businesses are already switching from road to rail to reduce their carbon footprint. In recent months, Coca Cola has switched around 30% of its trunk HGV trips to nightly trains from Yorkshire to both London and Scotland. Similarly, Highland Spring will shortly be sending 40% of its bottled water south from Scotland to the Midlands by rail. In both cases, HGVs are used for the short leg to the final destination, which are generally well within the range of battery trucks. Tesco is already using battery HGVs to move swap bodies from a rail terminal in South Wales served by one of seven daily trains that operate for the retailer, which plans to add an extra service every six months. The Tesco chairman stated at their 2021 annual results presentation that, as well as reducing carbon emissions, rail had enabled Tesco to largely avoid the HGV driver shortage that many businesses suffered last autumn.

Rail-connected warehousing is key to making the best of rail trunking, as part of a multimodal supply chain operation, and commercial property developers are investing substantial amounts in Strategic Rail Freight Interchanges (SRFIs). These provide an on-site intermodal terminal that allows containers and swap bodies to be loaded to rail without going on public roads, which saves c.£80 for every load so despatched.

Third Party Logistics providers (3PLs) are similarly investing in rail and intermodal terminals. Maritime Transport - the UK's biggest container haulier - is investing over £50m in terminals to enable it to switch as much as possible from road to rail. Maritime runs around a dozen trains a day and a similar number are operated by two Scottish hauliers - J G Russell and W H Malcolm - between Daventry and Central Scotland. These 'rail 3PLs' buy whole trains from rail operators and sell spaces to customers who do not have sufficient volume for a dedicated train, thereby

aggregating sufficient volume for viable train. Such multi-customer trains - and aggregators willing to assemble them - will be a key aspect of modal switch of trunk hauls to rail.

9. Lack of Government commitment to and funding of essential investments in the rail freight network, both capacity enhancement on key routes such as F2MN and electrification of even the short 'infill' referred to in 3 above. BCRs for such freight are generally good to excellent - 4 is common, 5 or 6 are not at all unknown.

   The private sector is eager to invest in new electric locomotives, intermodal terminals and wagons, but will not do so without Government (Treasury) commitment to provide the necessary infrastructure. Some evidence of action to back up the many supportive Government policy statements about growing rail freight is now imperative and urgent. It need not involve much expenditure at the outset - the programme of Infill electrification and a start on F2MN capacity enhancement would send strong signals to the private sector and encourage investors who are becoming increasingly sceptical about Government's true commitment to loudly declared policies.

   Government (DLUHC) can also assist by strengthening planning policy guidelines and practices for rail terminals, which are an essential component of multimodal supply chains and modal shift. There is inevitably local opposition to a new rail freight terminal, but it is vital that national strategic imperatives like Net Zero 2050 are not frustrated. Classing large SRFIs as NSIPs has been very effective and this approach needs to be extended to smaller terminals, particularly at the edge of urban areas where there is considerable pressure for more housing. This is understandable but housing is a relatively footloose land use which can be located at a wide range of sites, whereas a rail terminal has, by definition, to be alongside a rail line. Such sites are essential for rail to bring both consumer goods and bulk products into the urban area for final delivery by battery trucks.

   The cost of a new rail siding at a manufacturing plant or quarry can be a high barrier to entry. The Scottish and Welsh Governments have successful Freight Facility Grant (FFG) scheme that helps defray some of the cost and reduces the barrier to entry and thus carbon reduction. The Highland Spring scheme mentioned above only went ahead because of an FFG and similar grants to Tarmac for moving cement from Dunbar and Breedon Aggregates for moving slate waste from Llandudno Jn helped transfer hundreds of thousands of tonnes to low carbon rail haulage. It would be very helpful to decarbonisation initiatives and a worthwhile use of public sector resources if the currently suspended FFG scheme in England was reactivated by the Westminster Government (DfT).

   The critical importance of aggregators assembling multi-customer trains to enable businesses with only a few loads per day to use rail has been stressed above. The aggregator, however, faces considerable commercial risk in launching a new multi-customer service, since he has to bear the full costs of the train from Day One, while customers understandably want to see that the train is operating successfully before committing their business. It would greatly assist the introduction of such services if there was a short-term 'incubator' grant to reduce the initial commercial risk. This would last no more than a few months and could potentially contain a repayment clause, which would be triggered after a year or so of viable operation. (DfT)

10. There is considerable scope for greater use of the Channel Tunnel for through long-distance rail services to replace the very long road hauls into and out of the UK, using the fully electrified rail route through the tunnel and all the way to the Midlands, the North and Scotland.

    There are currently daily services bringing French mineral water and Spanish produce (including fresh and chilled produce) into the UK for UK retailers. There are also daily trains carrying Toyota cars from Burnaston to the continent, returning with French and Czech built cars for the British market. Jaguar Land Rover have a daily service bringing aluminium coil from Germany for use in Solihull and Halewood, which returns with recycled aluminium for processing.
    These services demonstrate the viability of the Channel Tunnel, but much more import/export traffic could use the route. The main need is for aggregators to assemble traffic into multi-customer trains on each of the key routes to/from Germany, Poland, Italy etc

    There are also green opportunities with Deep Sea trade. At present, all trains from the major ports of Felixstowe, London Gateway and Harwich are diesel-hauled, with just a few of the Felixstowe trains changing to electric locos at Ipswich. There are clear and obvious opportunities to substantially reduce the carbon footprint of our deep-sea trade flows by electrifying the rail links to these ports.

    London Gateway is just over 2 miles from the electrified network, but these two miles mean that trains are diesel hauled for many hundreds of miles, to the North and Scotland. Around 24 of the 28 trains a day to/from London Gateway could be electrically hauled over long distances immediately with no further expenditure. Around half of the 72 trains a day to/from Felixstowe could be electrically hauled if the 12 miles from Ipswich to the port was electrified.

    The benefits of such investments (about £5m and £30m respectively) would be further leveraged by modal shift of containers from road to rail. The rail market share at London Gateway is believed to be about 20% and at Felixstowe it is just under 30%. With modal shift, it is highly likely that both ports could see a rail market share around 50%, albeit this would require some capacity enhancements on the Felixstowe route. This would save very substantial amounts of HGV carbon emissions, which could be secured within a few years.

11. Uncertainty about future investment strategy. The current freight diesel loco fleet starts to reach life expiry in 2030 and it will take time to design and build around 500 new electric locos. In the meantime, operators who need more locomotives to cater for increased demand can no longer purchase straight diesel locos, but nor - in the absence of a clear Government commitment to a freight electrification strategy - can they invest in powerful new electric locos (with battery last 5/10-mile capability). Instead, they are forced to buy extremely expensive bi-mode locos that have both electric and diesel capability. At close to £5m per loco, these are at least 50% more expensive than a straight electric loco, which does nothing to boost rail competitiveness and encourage modal shift.

12. Very positive - as mentioned in 8 above, major British companies are switching much of their trunk hauls to rail and others in the logistics and property sectors are investing heavily in support of this. The green credentials of rail and the ability to decarbonise the most intractable part of their supply chains (long distance transport) is a clear advantage that such companies are seizing.

13. Largely very positive in the market, as outlined above, but the absence of Government commitment to infrastructure enhancement creates considerable uncertainty for private sector investors. This frustrates the very investment that Government wishes - and needs - to see.

14. Eliminate strategic uncertainty and commit to key infrastructure enhancements. This will provide the confidence the private sector needs to authorise substantial investment in rolling stock and terminals, which will allow the decarbonisation of the current rail freight business and, through modal shift, the decarbonisation of long-distance trunking currently undertaken by HGVs, generating very high carbon emission savings in the process.

15. A substantial role for clean power and electric vehicles (both road and rail) but little or no use of hydrogen, as the relative fuel cost and operational difficulties make it an unattractive option compared with electric vehicles. Energy efficiency is what rail is all about so is fundamental. Heat pumps may have a small role with buildings and depots but it is not expected to be large.

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