

Timber Transport Forum response to the Infrastructure Commission for Scotland - call for evidence.

Timber Transport Forum April 2019

The Forum welcomes the establishment of an Infrastructure Commission for Scotland and the opportunity to provide evidence. The [Forum](#) recognises a strong need for a long term national overview of infrastructure to ensure that opportunity for economic growth and community development is spread across Scotland.

This paper sets out the experience of the Timber Transport Forum's 20 years of dealing with the infrastructure gap relating to the demands of a growing forestry and timber industry on Scotland's rural road network. We believe there is evidence available to support the need for a deliberate programme of significant and ongoing investment in the modernisation of Scotland's rural transport infrastructure – particularly local roads – to support 21st century businesses and land uses, such as forestry and timber processing. The forestry and timber industries are a growth sector delivering on inclusive economic growth, the low carbon agenda and climate change targets. Infrastructure improvements for the timber industry can be a spearhead for wider infrastructure-led rural development.

There is currently a lack of any ambition or indeed any real expectation for the modernisation of Scotland's minor rural road network and this is seen as an obstacle to developing and revitalising our rural economy and sustaining and growing rural communities.

The Timber Transport Forum is happy for this submission to be made public.

The Timber Transport Forum

The Timber Transport Forum is a voluntary partnership that supports forestry by ensuring that the timber industry can access our forests and take timber to market in a sustainable way. At the same time, we seek to minimise the impact of timber transport on the public road network, on local communities and on the environment.

The Forum is made up of representatives from eleven regional timber transport groups from across Scotland and the North of England, as well as the Convention of Scottish Local Authorities, the Confederation of Forest Industries, the Forestry Contracting Association, Scottish Forest & Timber Technologies, Forestry Commission England, Scottish Forestry (until recently known as Forestry Commission Scotland), Rail Freight Group, the Road Haulage Association and the Society for Chief Officers of Transportation in Scotland.

The Forum works through regional timber transport groups which are themselves partnerships of industry, local authorities and public agencies.

The Timber Transport Forum's response

The Timber Transport Forum's response to the call for evidence is set out in full with references below but first we have highlighted briefly the consultation questions to which our response is most relevant.

1. The remit and in particular the Commission objectives provide an illustration of some key strategic drivers to an inclusive growth and low carbon economy:

- Securing Scotland's international competitiveness
- The markets and connections Scotland requires for goods, services and people
- How to prioritise investment to deliver inclusive economic growth and low carbon objectives
- Demographic and other social change factors
- Place-making
- Technological change and innovation
- Considerations around development, ownership and financing of infrastructure, including Fair Work

a. What are your views on these drivers and are there any others that should be considered by the Commission?

The Forum's primary interests is in

- the markets and connections Scotland requires for goods, services and people. In this case it is the lack of modern freight transport infrastructure serving much of rural Scotland. This is an ever-present constraint on the efficiency of forestry and the many other rural freight-intensive industries. In turn this impacts on the viability of rural communities making it difficult to attract and maintain investment and skills. Rural Scotland relies on the 30,000km of minor rural road, much of it single tracked and largely unchanged since the middle of last century. The rail and coastal shipping freight infrastructure serving rural Scotland is, arguably, far less available and efficient than it was during the Second World War, which limits scope for significant modal shift of freight off the aged road network.
- prioritising investment to deliver inclusive economic growth and low carbon objectives. The forest and timber industries are delivering on economic growth across rural Scotland. Forestry is a sustainable land use covering 19% of the land area and over 30% in some parts such as Dumfries and Galloway and Ayrshire. Our forests are the only carbon sink in the country's carbon budget. A modern processing industry of sawmills and board mills has grown up alongside the resource and continues to attract multi million pound investment. Forestry and timber deliver rural jobs, state of the art manufacturing, value adding, carbon sequestering construction material (wood), biomass fuel, recreation and biodiversity as set out in the Scottish Government's Forestry Strategy 2019. Infrastructure modernisation to support forestry and timber has the potential to spearhead wider economic development across rural Scotland supporting rural populations.
- In terms of financing of infrastructure, it is clear from the National Audit Office's regular assessments of the condition of roads that the current mechanisms for local authority funding of rural local roads are simply not going to provide the substantial modernisation programme

required to bring Scotland's rural economy into the 21st century. Indeed as things stand they do not even sufficient to sustain the existing network.

2. Infrastructure has a key role in relation to an Inclusive Growth and Low Carbon

Economy:

a. What are your views on Scottish Government's definition of infrastructure as provided in the Commission remit, and are there any additional elements that should be considered, or areas that could be omitted?

The Forum is clear that the modernisation of 30,000km of rural local roads (half the total network length) is a challenge of such a scale and importance as to be a national issue that requires recognition within a long- term infrastructure framework.

b. What contribution does each of the infrastructure categories identified make to achieving an inclusive growth and low carbon economy?

The rural road network (including the rural trunk roads) are dated and inefficient in terms of energy efficiency of transport and unless there is a concerted programme of modernisation there is a risk that rural Scotland will be left behind in the shift towards the low carbon economy. The coastal shipping infrastructure does play a part in moving timber but there are many possible rural ports that have not been modernised. The flow of timber by coastal shipping is not effectively supported by revenue freight grants to encourage the shift from road. Access to rail freight infrastructure in rural Scotland is so limited and poor as to make it virtually unusable by the timber industry.

c. What role and impact does each of the infrastructure categories identified have on the drivers identified in the Commission remit and objectives?

d. What are your views on the relative importance and impact of optimising whole life asset capacity through investment in enhanced renewals and maintenance compared to investing in and developing new infrastructure?

We currently have no effective strategy for the modernisation of minor rural roads.

e. To what extent and in what way can infrastructure act as a catalyst for change in a place; be that at a community, local, strategic or national level?

Rural Scotland is now at a stage where only infrastructure-led development will work. We do need to stop viewing rural Scotland as a periphery to be endlessly serviced from the centre and instead invest in the potential for rural economic growth and development. We need to support low carbon growth sectors such as forestry and timber in rural Scotland by modernising transport infrastructure – which in turn can support and encourage local rural development.

f. To what extent and in what way can infrastructure act as a catalyst for:

i. increased economic investment and growth?

More generally, we need to address and reduce remoteness – which is effectively a function of (lack of) infrastructure. Much of mainland Scotland is remote - at the end of a transport network that becomes consistently poorer the further you go. Those furthest away with the longest distances to skills and markets have the poorest infrastructure!

ii. improved service delivery?

Remoteness and poor infrastructure and their impact on the rural economy make service provision inefficient and costly and sometimes simply not possible to deliver. This is a negative spiral that needs reversed.

iii. improved community cohesion?

Without an active functioning economy rural Scotland reverts to seasonal, low paid tourism-driven service sector with temporary low-skilled work force, hollowed out communities, empty houses, closed schools and hospitals, poor bus services, etc. Infrastructure, particularly modern efficient transport infrastructure, is an absolute pre-requisite to turn this around.

The growing infrastructure divide between the 'centre' and rural Scotland contributes to a growing urban rural divide with metropolitan perspectives often inappropriately driving rural agendas. This makes it difficult to attract skills and investment into rural Scotland.

3. The demand and need for the infrastructure assets included in the Commission remit

is considerable and wide ranging. Across all the infrastructure assets identified:

a. What is your assessment of the current infrastructure stock in terms of quality of provision?

Scotland's rural and minor rural road network is in very poor condition, has limited capacity for modern freight haulage and desperately needs modernising for the 21st Century. The National Audit Office reports on road condition are evidence of this.

b. What is your assessment of the current infrastructure stock in terms of its capacity and fitness for purpose to meet current demand and needs?

Scotland's aged rural and minor rural road network cannot efficiently carry modern HGV freight haulage. The fuel efficiency of such roads is very poor and the impact of heavy freight on un-engineered roads results in frequent costly and disruptive maintenance. The limited road capacity means that freight haulage such as timber transport impacts unduly on the local residents and is seen as a negative impact rather than evidence of a functioning rural industry.

A modern land-based or manufacturing rural economy cannot deliver on its potential without modern roads (and rail and ports).

c. What is your assessment of forecast future needs and demand for infrastructure and the key areas of change and development over a five and 30-year horizon?

Currently we are moving 8.55M tonnes of round timber per year in 25 t loads on 44 tonne GVW lorries from forests to mills. Forestry output is forecast to continue to grow over the next 20 years and there are Scottish Government targets to further grow Scotland's productive forest cover.

d. What do you see as the priority areas for investment in order to enable these future needs and demands to be met?

Scotland's minor rural road network requires extensive modernisation to support and develop the rural economy. Forestry and timber can help spearhead the demand for infrastructure improvement and support wider economic development goals.

e. Where do you see future convergence of need and demand having an impact across infrastructure classes?

Forestry Commission Scotland (now Scottish Forestry) has recently completed an exercise of collating information on where transport infrastructure is constraining the efficiency of the timber supply chain from Scottish forests. Over 140 substantial infrastructure projects were identified and this does not include the need for ongoing maintenance of aged, crumbling infrastructure.

4. In relation to approaches to infrastructure assessment and prioritisation and across all the infrastructure assets identified:

a. What is your view on existing approaches to evaluation and assessment of infrastructure in Scotland?

It would appear that current high-level approaches such as STPR repeatedly fall into the trap of justifying investment in the marginal improvement of the centre not recognising or valuing the need for dramatic improvement over the rest of the country. Rural Scotland is simply not served by current assessment methods. We need infrastructure that will draw the country together and provide opportunity throughout.

b. What is your view of good practise approaches to evaluation and assessment of infrastructure internationally?

c. What is your view of existing approaches to the criteria and principles for investment prioritisation in Scotland?

The general processes at a national and local level simply do not recognise the current economic contribution of rural Scotland or the potential for growth.

The Scottish Government's [Strategic Timber Transport Fund](#) has been in place since 2005 to invest in improvements that mitigate the impact of timber transport on communities and the environment. It has served to help the industry keep pace with the growth in timber volumes, addressing some of the hot spots where timber transport demands on the network are impacting significantly on communities and on the fabric of the road. It is however a challenge fund and currently limited to a 1 year budget. While the STTF and the scheme it supports is very helpful in managing timber transport impacts there remains a role for the Infrastructure Commission to set out a longer term strategic approach to the modernisation of the minor rural road network and look for the opportunities to support wider rural economy.

d. What is your view of good practise approaches to the criteria and principles for investment prioritisation internationally?

e. What is your view on existing approaches and methodologies that enable cross infrastructure sector evaluation and assessment to be undertaken, and also the potential for further development of such approaches and methodologies?

A rural sub-group of Transport Scotland's Freight Logistics Advisory Group ScotFLAG sought to develop information on the freight demand on the rural roads and relate this to the freight capacity but Transport Scotland was unable to contribute any resources to support data collection and analysis.

f. What is your view on existing approaches and methodologies that assess impact at different spatial levels, and also the potential for further development of such approaches and methodologies?

g. What is your view on good practice approaches to assessing and establishing the post implementation impact on the desired outcomes from infrastructure investment?

More detail on the rural infrastructure issues relating to forestry and timber industries is given below.

Rural Scotland's contribution to Economic Growth and Inclusive Growth

Rural Scotland hosts 40% of all enterprises (43,000), and remote rural Scotland 16% (28,000 enterprises)ⁱ; this includes finance, services and professional industries. But, more than half of the enterprises are freight-demanding and freight intensive industries such as agriculture, forestry, fishing, mining and quarrying, manufacturing, construction, wholesale and retail, transport and storage. Rural tourism also puts substantial demands on transport infrastructure and must share the road space with rural freight and local communities.

Forestry and timber

This response from the Timber Transport Forum will concentrate on the forestry and timber industries and offer evidence where it can.

The UK is the 2nd largest importer of timber in the world, importing three quarters of what it consumes. Scotland produces 75% of the UK's home-grown timber

Scottish forestry and the processing of Scottish grown timber is a major contributor to the nation's economy with a GVA of £771m and employing 19,555 peopleⁱⁱ. The forest resource also provides the only carbon sink for Scotland's carbon budget.

The industry relies on the local public road network for haulage of roundwood from forests to processors (sawmills, board mills etc).

The network of public roads that serves the timber industry can be viewed [here](#)ⁱⁱⁱ. It covers approximately a third of the local rural roads in Scotland. Timber is brought onto the public road network at around 3000 places across Scotland and uses approximately 10,000km of road (within 12 rural local authorities) in reaching the trunk roads or destination. Most of the roads (65%) are minor roads – B, C and unclassified roads as well as a few ‘minor’ A roads (sometimes single-track A roads like the A897) reaching into the most remote areas. Most were constructed to their current form in the 1920s and 30s and they have limited sustainable load bearing capacity and challenging geometry for modern lorries.

Productive forestry is a relatively new land-use. Most of the forests have been planted since the 1950s with timber volumes from Scottish forests increasing from 1m tonnes/year in the 1970s to 8.55m tonnes/yr today. Substantial areas of private forestry were planted in the 1970s, 80s and 90s and much of the timber coming on stream now is from these newer areas of forestry. Harvested forests are replanted. Volumes are predicted to continue to rise for the next two decades to stabilise at around 9-10m tonnes/yr.^{iv}

Rural Local Roads

Most single tracked roads were not deliberately engineered. They are barely wider than the timber lorries and the road verges and road edges are often the first elements to suffer damage. Where a road crosses sections of fill or soft peaty ground (common in the well-forested regions), the road itself flexes considerably and repeated lorry traffic can cause damage to the structure of the road requiring expensive re-construction. Road drainage needs improved, corners need widening and passing places are few and far between (and generally of a size suitable for cars, not lorries).

The condition of the minor roads is poor and declining with typically only 60% of the length of minor road used for timber transport in acceptable condition^v. In some local authorities the road condition is much worse.

The timber industry voluntarily manages and controls timber traffic on weak roads by limiting the number and frequency of lorry trips, avoiding particular times and seasons and investing in lower impact vehicle technologies. Our good practice documents can be found [here](#)^{vi}. This adds cost and limits the efficiency of the timber supply chain. It also creates a practical, costly and bureaucratic obstacle to timber haulage and, despite these measures, timber traffic impacts on road condition and on other road users.

Timber harvesting employs significant numbers of people but largely takes place in remote sites using contractors from across the region. The more recognisable employment benefits of the timber processing sector in rural towns may be relatively distant from the forests. The impact of lorries on minor roads around the forests can therefore be seen by local communities as a cost, rather than part of a wider economically-beneficial supply chain. As a result, both forest harvesting and the Scottish Government targets to expand the forest resource by 10-15,000ha per year can be perceived unfavourably by local communities and local councillors.

It is uncommon for infrastructure constraints to completely prevent timber getting to market. However poor access increases marketing costs and reduces management options and this may have multiple negative impacts and outcomes.

The costs of poor infrastructure are reflected in higher haulage costs and higher management costs. Buyers (and hauliers) will prioritise sites with easier access.

Timber sales in remote rural areas are often of marginal viability and higher costs may result in timber being delayed in coming to market in the hope that demand and timber prices allow for a reasonable return. Poor access may make thinning the crop un-viable. Timber left standing beyond the optimum age for harvest, reduces yields and crop value and increases the risk of the large areas of trees being blown over before they are harvested - greatly reducing their value.

Access costs are reflected in capital values of plantations. Distance to markets as well as relative supply and demand also play a part. This is reflected in regional variations.

Rural Trunk Roads

The infrastructure problem is not limited to the 30,000km of rural local roads. The 3500km of trunk roads are the 'strategic' 5% of our road network and their quality and condition impact substantially on the efficiency of processing Scottish timber and marketing it to the rest of the UK.

The dualling of the intercity A9 and improvements to the A96 are very welcome but will take decades in delivery and are already decades overdue. The trunk road network serving rural Scotland remains poor. The A82,83,84,85,86,87, the A828,893, A68, A7, A701, A702, A881 A889, the A9 north of Inverness and the A95 are all inefficient for modern freight particularly when these rural roads are also the main routes for cars, caravans, motorhomes, motorbikes and cyclists. HGV speeds are restricted to 40mph whereas in England the speed limit was recently raised to 50mph. These are long stretches of road where passing opportunities, lorry parking and laybys are limited or non-existent. Many roads are barely wide enough for two lorries or a lorry and coach to pass in opposite directions. (statistics for lost lorry wing mirrors should be a basic statistic collected by the trunk road authority.) Journey times are long, so driver costs are high and journey conditions poor, so it becomes increasingly difficult to retain drivers in rural Scotland. Fuel efficiency on these roads is significantly worse than on dual carriageways. Road and verge condition are often poor.

Accidents, floods, snow and landslides all cause long delays. Diversions, when required, are unrealistic for HGVs or very long.

All of this adds huge costs and challenges to businesses trying to work, manage land, attract investment and staff and create jobs in rural Scotland.

The Benefits of Modernising Rural Roads for Forestry

Modernisation of the road network used for timber transport would:

- maintain the benefits of the timber industry into the future by
 - ensuring full and unobstructed access to the available resource
 - allowing prompt marketing at age of maximum production
 - encouraging regular thinning operations to maximise yield and quality
 - reducing marketing risks where road damage halts or delays haulage
 - reducing haulage costs by
 - removing the need for more expensive lower impact lorries with reduced loads
 - removing frequency constraints to lorry movements
 - improving journey time
 - improving fuel efficiency
 - reducing lorry maintenance cost
 - reducing driver whole body vibration and fatigue
- reduce the impact of the future timber resource deficit by
 - encouraging restocking of harvested areas with commercial crops
 - encouraging expansion of the timber **resource through new planting**
- reduce public road maintenance costs
- provide benefits to other rural land use businesses such as farming, whisky, fish farming, aggregates, wholesale, recreation, tourism
- better serve rural housing
- reduce costs of freight haulage
- reduce cost of public servicing of remote communities
- improve the resilience of the road network.
- improve the visitor experience
- improve road safety
- create rural employment through the upgrading programme

A full upgrade of an un-engineered single track road to suit forecast volumes of timber traffic would typically cost around £150,000/km, as was spent upgrading the B836 in Cowal in 2015.



This involves strengthening edges, constructing or enlarging passing places and resurfacing (incorporating grid reinforcement where appropriate). This level of investment would be warranted on a proportion of the 10,000km network. Less intensive solutions for roads with more occasional timber traffic would be appropriate for much of the remaining

network. Installing passing places costs between £5000 for a simple car-sized passing place and £20000 for a longer passing place allowing two lorries to pass). Work to (minor) A & B roads – dual tracking, strengthening etc. can be far more expensive.

Transport mode choice and demand

Forestry and timber processing are carbon positive industries sequestering more carbon than they produce and displacing emissions from alternative processes, fuels and materials. The Timber Transport Forum produced a carbon footprint of the supply chain which can be found [here](#)^{vii}.

The timber industry would like to make more use of coastal domestic shipping and rail haulage both to further improve the carbon credentials of the industry and to avoid, where possible, the use of minor rural roads.

Coastal shipping

The Timberlink service, described [here](#)^{viii}, takes advantage of an EU derogation for peninsulas to offer revenue support for shipping of around 100,000 tonnes of timber/yr from Argyll forests to Ayrshire timber processors across the Firth of Clyde, taking a proportion (15%?) of the timber freight traffic off the rural trunk roads from Argyll. A recent economic and environmental valuation provided justification for the continuation of the service^{ix}.

The industry could use an extension of support for coastal shipping - beyond Timberlink - to serve the Highlands and the south of Scotland outwith the Firth of Clyde. Currently road haulage remains more cost competitive but shipping from coastal forests, where feasible, would avoid long road hauls on minor roads around sea lochs and peninsulas on often very minor roads. Shipping would improve emissions and reduce the impact on the fabric of minor roads and the disruption to other local road users and tourists.

The barriers to making more use of coastal shipping are manifold. Many of our rural ports are Victorian, have poor landward access and storage capacity. Multiple handling is required with transfers from forest to lorry to boat to lorry to processor; all require facilities and add cost.

The Scottish Government offers EC state aid approved Freight Facilities Grants, waterborne freight grants and mode shift revenue support (MSRS).

The Freight Facilities Grant is massively under used. Although there is opportunity for substantial infrastructure upgrade to promote modal shift, individual private operators are reluctant take on the risk of investment (even with support) and commit to the future freight movements to meet the conditions of the support.

Waterborne Freight Grant, offers grant support towards the difference in operating costs between road and sea – where the movement of freight by water is more expensive. WFG support is limited to 3 years, after which the service is expected to be economically viable

without grant support. While this may (or may not) be the case the service may not be financially competitive against road without the support.

The Modal Shift Revenue Support grant (Bulk and inland waterway) offers grant support towards operating costs based on the level of environmental benefits achieved by removing traffic from roads. It uses a definition of inland waterways based on the smooth waterline and at least 50% of the journey must be within the smooth waterline. For the west coast of Scotland, typified by long sea lochs and coastal channels this is limiting. On leaving a sea loch you leave the 'inland waterways'; - the coastal channels within the Inner Hebrides and around the mainland peninsulas do not count, despite being the traditional domestic waterways of the west coast.

Coastal shipping (and rail where available) was the primary mechanism for domestic freight serving these areas until the later decades of the 20th Century, when the shift to road freight coincided with a period of decline in rural freight-intensive industries. Industries like timber are expanding rural freight demand, and, given the limitations of the road network for modern road haulage, a review of coastal shipping support mechanisms could encourage further shift from road freight for localised domestic haulage.

Rail

Mode shift to rail is similarly challenging and no roundwood timber has moved by rail in Scotland since the last timber trains from Crianlarich/Arrochar in 2009. The Victorian infrastructure and the lack of rail freight access on the rural periphery of the rail network means that any attempt to use rail to take traffic off local roads and peripheral trunk roads faces a considerable challenge. In practice it may involve creating the totality of modern rail infrastructure (sidings, connections, signalling, rail crossings, staff facilities, storage capacity, loading facilities, lighting, etc.) – all at hugely inflated, 'rail industry' prices - in order to put rail wagons onto a dated peripheral rail network with limited gauge and limited passing loops. Often more infrastructure improvements are also required at the destination. Road haulage, on the other hand, requires - a phone call. Years of effort to put timber on rail in Ayrshire, Sutherland and Rannoch have all failed to overcome these barriers to more sustainable haulage.

Again, the level of support does not outweigh the challenges, cost and risk to individual private prospective users of rail outwith the main intercity lines. A modernisation of elements of the peripheral rail network for 21st Century freight would be required before it will attract significant interest from what is a relatively fragmented private demand.

The Office of Rail Regulation in Scotland does not (as in England) consider the implications for road transport of rail investment (or in this case, lack of investment).

Active travel

Most rural roads have no cycle path or sidewalk. Rural roads designed for modern freight should improve the road space so it can be shared safely with cyclists and pedestrians.

Safe and resilient transport

The resilience of our rural transport infrastructure is poor, primarily because it has not been sufficiently modernised to suit modern traffic and to support economic investment. Accidents, floods, snow, landslides all cause long delays. Diversions on the rural road network either don't exist or are very long.

Years of under-investment contribute to the poor condition noted by the National Audit Office. A lack of ambition for rural Scotland's infrastructure pervades.

While we are upgrading passenger ferries and promoting tourism with national agencies and funding, the road infrastructure to serve both the tourists and a local, resilient, diverse rural economy is left to local authorities with constrained resources.

The ferries themselves create periodic slugs of traffic with cars caught up in lorry traffic at 40mph with very few overtaking opportunities. Vehicles heading for ferries inevitably want to overtake slower lorries with impacts on safety.

Transport Governance

There are several issues surrounding governance.

Transport Scotland focuses on the 5% of the road network which is trunk road ignoring 95% of our road network? There needs to be more coherence between the National, Regional and Local Transport Strategies.

The Land Use Strategy takes no account of transport infrastructure despite the fact that the potential of any land use is dependent on its transport infrastructure.

Forestry and agriculture strategies are set nationally but rely on local roads which are the responsibility of local government. There is no formal mechanism to relate the two. We have a scenario now where proposals for forestry planting schemes to meet national targets are being turned down because the local road infrastructure required to harvest those forests in (say) 2055 is currently inadequate.

The Strategic Transport Appraisal Guidance simply does not support rural infrastructure modernisation and therefore will not deliver an inclusive Scottish economy. Similarly, for the Strategic Transport Projects Review.

There is limited strategic infrastructure planning capacity (and resources) in rural local authorities and in regional transport partnerships.

There is no useful data on rural freight.

Innovation and new technology

There is scope for substantial modernisation of the timber supply chain in the fields of robotics, automation, telematics and decarbonisation.

Timber transport vehicles are already state of the art machines, now with remotely controlled cranes, telematics and road friendly technologies. Freight haulage will start to move (perhaps quickly) towards decarbonisation and to the various stages of autonomous ‘driverless’ vehicles. There is a risk that the mainstream de-carbonisation processes could leave rural Scotland behind with old technology and out of date infrastructure.

Timber transport has several features which provide a neat opportunity to turn this around and enable rural Scotland to lead the field. Timber road hauliers, by necessity, maintain a relatively modern fleet. Much haulage is relatively short distance, <100km, on known routes, visiting timber processors that are often biomass fed electricity generators. Timber transport occurs in areas that are rich in renewable energy capacity but constrained in grid capacity offering the scope for lower-cost local consumption of electricity and hydrogen – for lorries, boats and trains.

Timber transport should be a focus for the development of electric, hydrogen and hybrid HGVs, trains and boats. On-road electrification should be trialled on regular timber haul routes and charging points and servicing resources developed.

ⁱ Rural Focus SRUC 2016

ⁱⁱ CJC Consulting (2015). [The economic contribution of the forestry sector in Scotland.](http://scotland.forestry.gov.uk/images/corporate/pdf/economic-contribution-forestry-2015.pdf)
<http://scotland.forestry.gov.uk/images/corporate/pdf/economic-contribution-forestry-2015.pdf>

ⁱⁱⁱ <https://timbertf.maps.arcgis.com/apps/webappviewer/index.html?id=cd6737077f1044728a121c8e311d781f>

^{iv} [https://www.forestry.gov.uk/pdf/Ch2_Timber_FS2016.pdf/\\$FILE/Ch2_Timber_FS2016.pdf](https://www.forestry.gov.uk/pdf/Ch2_Timber_FS2016.pdf/$FILE/Ch2_Timber_FS2016.pdf)

^v Audit Scotland: [Maintaining Scotland’s Roads A follow up report 2016](#)

^{vi} <http://timbertransportforum.org.uk/work/good-practice>

^{vii}

<http://timbertransportforum.org.uk/attachments/article/117/TTF%20Publications%202010%20Understanding%20the%20Carbon%20Footprint%20of%20Timber%20Transport%20in%20the%20UK.pdf>

^{viii} <http://scotland.forestry.gov.uk/supporting/forest-industries/timber-transport/timberlink>

^{ix} <http://scotland.forestry.gov.uk/images/corporate/pdf/timberlink-evaluation-report.pdf>