

UK Freight Transport: setting a coherent strategy and direction for 2020 and beyond

A White Paper prepared to promote the debate on transport policy

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## Introduction

Secretary of State for Transport, Philip Hammond, is the sixth incumbent in the last eight years.<sup>1</sup> He and his ministerial team will be aware that since 2000 there have been five attempts to define an integrated national transport policy, the last of which went under the title: Delivering a Sustainable Transport System. Transport has indeed proved to be a most difficult area of policy making since that effort by the last government has been archived too.

In this Paper the focus is on the area of freight and logistics, delivering goods and services to the nation. This activity makes an essential contribution to our economic success but also imposes a heavy burden on the environment. It is a backbone of the economy and part of the Government's agenda for renewed growth. Freight and logistics interacts with passenger transport, sharing and competing for capacity, also it is a heterogeneous industry, very fragmented and a largely private sector activity. As such it is difficult to characterise and regulate with apparently many conflicting demands for policy attention.

However, the imperatives to define policy are more pressing than ever in the context of recent events, all of which have implications for transport policy:

First, the Comprehensive Spending Review<sup>2</sup> awarded the Department for Transport a steady c. £13billion for the next 5 years. This will impose a tight budgetary constraint on the priorities for transport over the next decade. While the previous government's published allocation of many £billions more was clearly unsustainable, some flagship projects have been protected. Looking ahead, it is clear that the available public funds will have to be used more effectively and supplemented by private finance if the UK transport system is to meet both the needs of the economy and the ambitious carbon reduction targets set for 2020 and 2050.

Second, the Localism Bill<sup>3</sup>, the abolition of the RDAs and the introduction of Local Economic Partnerships (LEPs) creates a completely new planning landscape through which transport policy must be delivered.

Third, the Government's paper, the Path to Strong Sustainable and Balanced Growth<sup>4</sup>, outlines a plan to invigorate the economy. This specifically focuses on business and professional services and recognises the importance of logistics.

Fourth, the publication of the National Infrastructure Plan<sup>5</sup> complements the CSR, emphasising that transport infrastructure has a critical role to play in supporting economic recovery and will require public and private sector investment. Freight and logistics already engages predominantly private sector investment, as for example in ports, distribution centres, road haulage and rail freight operations. However, the big

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<sup>1</sup> Adonis, Hoon, Kelly, Alexander, Darling.

<sup>2</sup> CSR – HM Treasury – Spending Review, October 2010

<sup>3</sup> The Localism Bill – Parliament, December 2010

<sup>4</sup> HM Treasury and BIS – the Path to Strong and Sustainable and Balanced Growth, November 2010

<sup>5</sup> HM Treasury and National Infrastructure UK – National Infrastructure Plan 2010, October 2010

exceptions are the road and rail networks where freight accounts for a significant part of the capacity requirement and interacts in complex ways with passenger traffic.

Finally, the Fourth Carbon Budget<sup>6</sup> projecting to 2030 has offered low, medium and high scenarios for improvement in freight and logistics carbon reduction from 8% to 36%. It has identified a mix of measures that will be needed to achieve CO<sub>2</sub> reductions and recognises the need for supply chain rationalisation as part of that process.

Recurring themes of the coalition Government's statements have been a desire to make policy making 'evidence-based' and actively encouraging contributions to its thinking. This Paper has been prepared in the spirit of responding to those themes.

The conclusion of this Paper is that there will need to be radical and difficult changes in freight transport policy and investment if it is to contribute fully to the twin national goals of economic prosperity and environmental sustainability. This will involve a combination of taxation to promote more efficient use of resources, regulation to ensure safe, clean and fair operation and planning processes that enable innovation and investment. Advice, guidance and communication will also be needed to disseminate the adoption of good practice within a wider supply chain context.

A further conclusion is that the statistical, research and modelling evidence base that is used to support policy determination is seriously deficient; it will need to be significantly upgraded to inform public debate on the difficult policy choices ahead. Furthermore, the regionally devolved planning process will not naturally lead to the optimisation of freight transport and logistics at a national level. Greater coordination will be required in the formulation of freight transport policy at different geographical scales.

Indeed, coordinating economic, environmental and social objectives will remain the central challenge for freight transport policy. This will require a combination of highly focused investment, and a mix of new regulatory and fiscal measures. For the private sector to bridge the widening gap in public sector funding, investors will require greater clarity than is presently available on the long-term vision for freight and logistics. Freight transport policy needs to define clearly the strategic priorities and provide guidance on future operating practices.

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<sup>6</sup> Committee on Climate Change – Fourth Carbon Budget, January 2011

## The contribution of freight transport and logistics to a prosperous economy

Freight and logistics has been an historic driver of economic prosperity. As economies have grown they have become more freight-transport intensive. This was recognised by Ralph Borsodi when he wrote in 1927 that *“in 50 years between 1870 and 1920 the cost of distributing necessities and luxuries has nearly trebled, while production costs have gone down by one-fifth.... What we are saving in production we are losing in distribution.”*<sup>7</sup>

Advances in the management of freight and logistics have challenged the validity of Mr Borsodi’s statement in the modern era. Over the last 25 years increasing logistical efficiency has reduced the real cost of delivering a shipment, making longer distance supply chains viable. This has been achieved through a combination of technical innovation, improved load factors, economies of scale, improved network design, modal shifts and greater energy efficiency.

Reductions in the real cost of freight transport has promoted the centralisation of manufacturing and distribution, supply side specialisation, wider sourcing of materials and a growth in consumer demand as prices have been lowered. It has been a virtuous circle.

No statistics are available in the UK to chart this downward trend in proportion of sales revenue spent on logistics, but it is clearly illustrated by studies conducted in the United States and at an EU level of the past 20 to 30 years. The trend, which for Europe suggested a 50% reduction from high to low between 1987 and 2000, has reversed a little in the last 8 to 10 years as the chart shows.<sup>8</sup>

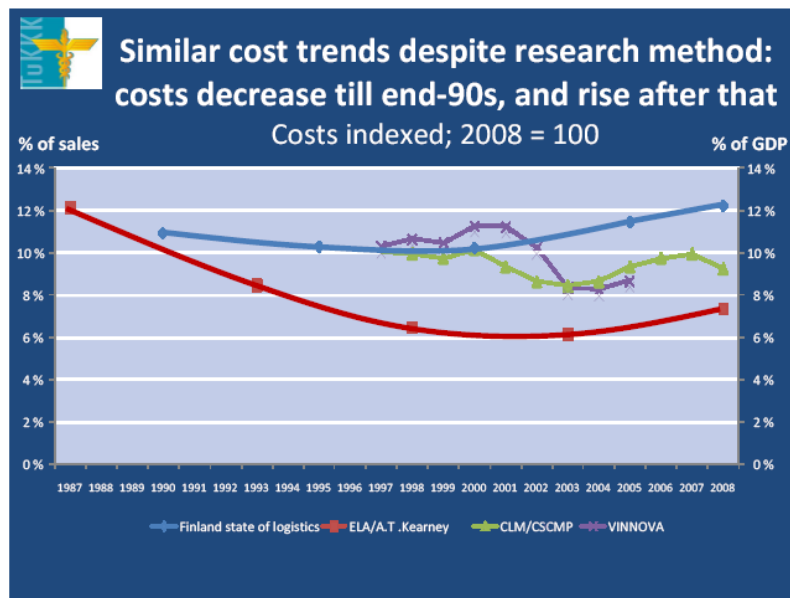


FIGURE 1 – CHART OF THE TREND IN DISTRIBUTION AND LOGISTICS COSTS 1987 - 2009

<sup>7</sup> Borsodi R, *The Distribution Age*, D Appleton & Co, New York, 1927

<sup>8</sup> Round Table on Supply Chain Challenges for National Competitiveness through Transport UNECE, Geneva, 2 December 2009, Professor Lauri Ojala, Turku School of Economics

So, more efficient logistics has been an enabler of economic success through industrial development in the UK. Between 1980 and 1998 tonne-kms rose broadly in line with GDP but, as shown in the graph <sup>9</sup>, this link has become decoupled over the last 12 years.

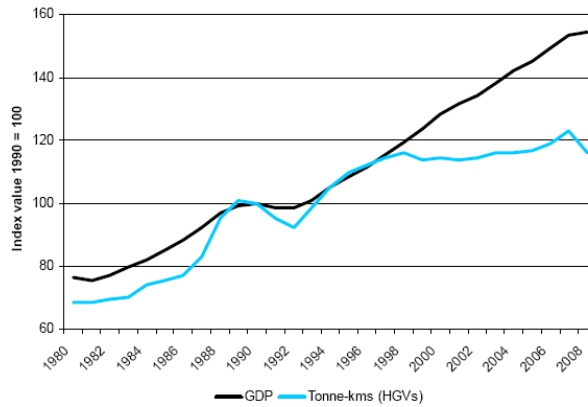


FIGURE 2 – SHOWING THE LONG-TERM TREND IN HGV TONNE-KMS AND GDP

The current data on road freight tonne-kms is subject to three significant omissions:

- Foreign-registered heavy goods vehicles (HGVs)<sup>10</sup> operating on British roads are not part of the statistics but are estimated to account for around 6% of the total distance travelled by lorries
- The off-shoring of UK manufacturing and the growth of global sourcing has displaced much freight movement from the UK to other parts of the world, so potentially distorting the statistics
- The fast growth in van traffic (in vehicles with gross weights below 3.5 tonnes) may be partly compensating for the decline in HGV tonne-kms though this sector of the logistics market is neither closely monitored nor adequately researched; the work of around 1 million vans goes unrecorded.

It is also important to note that the measurement of freight activity by tonne-kms provides only a partial view as it takes no account of the cubic volume of goods in the transport system. This is significant as a large proportion of freight movements (loads) do not reach the legal maximum weight limit and ‘cube out’ before they ‘weigh out’. For example, the average payload weight on a truck (i.e. with a gross weight above 3.5 tonnes) in the UK is only 9 tonnes, while only around 59% of the available weight-carrying capacity on laden trips is actually used.

Notwithstanding these qualifications, the available data suggests that the freight transport intensity (i.e. ratio of tonne-kms to GDP) of the UK economy has been declining, a positive development. This may possibly be because major trends causing

<sup>9</sup> McKinnon, A: Transport Challenges and Opportunities, prepared for the Commission of Integrated Transport, November 2009, citing the Department for Transport ‘Road Freight Statistics 2008’ London

<sup>10</sup> An HGV is defined as freight vehicle with a gross weight in excess of 3.5 tonnes. The terms lorry and truck will also be used as synonyms for HGVs.

the increases of the past, e.g. centralisation and wider sourcing in the domestic market, have now reached an advanced stage and are levelling off.

However, in most other EU countries, and at a continental level, freight intensity is either rising or is fairly stable, suggesting that centralisation and wider sourcing are still more active there.

As a result, the first key observation of this Paper is that:

- 1. The freight and logistics sector has made a substantial contribution to past UK economic success. Indeed, subject to concerns over the completeness and reliability of the data, freight and logistics has punched above its weight over the last 10 years, delivering economic growth with improving freight efficiency. As such it is an important national asset, whose contribution is often overlooked.***

## The implications of future growth and sustainability goals for freight transport and logistics

The two key economic and sustainability objectives of transport policy are officially stated as:

- Easing traffic congestion, which is the proxy for the economic 'opportunity cost' of transport policy
- Reducing CO<sub>2</sub> emissions which is the measure for countering climate change

In the case of **congestion**, we must recognise that HGV traffic is both a victim and a cause of traffic congestion. Consider the following facts:

- There are 420,000 UK-registered HGVs on the British roads which represent a very small share of the total vehicle population (<1.5%); HGV traffic is projected to grow at a much slower rate than car and van traffic.
- The negative public preoccupation with HGVs has deflected attention from vans which are by far the fastest growing category of traffic. It should be noted, however, that only around a third of their mileage involves the carriage of freight or related empty running. The available statistics suggest that vans are used as much for commuting as for moving freight.
- Assuming around 1 million vans (of the 3 million total) are used for freight then the total freight vehicle parc is less than 5% of the total UK vehicle population.
- However, this 5% of the vehicle population contributes a disproportionate 25% of UK transport emissions which suggests that freight and logistics also contributes disproportionately to congestion, especially when a truck can consume 3 car equivalents on the road.
- Congestion results in a significant loss of fuel efficiency and degradation of sustainability; vehicles run below their most fuel efficient speeds, drivers make longer trips to avoid traffic jams, operators put more vehicles on the road to compensate for working time constraints and poorer reliability.

Actions to ease congestion will therefore yield substantial economic and sustainability benefits for freight and logistics. Eddington<sup>11</sup>, and the DfT following his lead, have focused on the economic opportunity cost of congested road infrastructure. His report stated that:

*Delays and unreliability on the network have direct costs to people and businesses, increasing business costs and affecting productivity and innovation. Eliminating existing congestion on the road network would be worth some £7-8 billion of GDP per annum. It would never be economically rational to eliminate this completely but it does illustrate that the sums involved are far from trivial.*

Although car traffic accounts for a much larger proportion of total congestion than trucks and vans, the latter make a disproportionate contribution to congestion and

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<sup>11</sup> Eddington R, The Eddington Transport Study: The case for action: Sir Rod Eddington's advice to Government, December 2006, HMSO

freight transport strategy may contribute significantly to a general alleviation of the congestion problem. Improving the performance of freight vehicle capacity will increase the ratio of tonne-kms to vehicle-kms – taking trucks off the road, reducing congestion, improving operator economics and increasing carbon effectiveness. Notwithstanding the structurally declining tonne-km : GDP intensity, the potential for freight and logistics to contribute to the reduction in congestion is a much clearer target than passenger vehicles; improving on the current downward trend should allow the UK to enjoy substantial economic growth from reduced HGV traffic intensity.

In the case of **carbon emissions**, HGV and van traffic have a major role to play in national reduction goals. The recent Fourth Carbon Budget <sup>12</sup> estimated that freight and logistics contributes 5% to the national CO<sub>2</sub> emissions and went on to identify three improvement scenarios:

- *Emissions in the Low CO<sub>2</sub> Abatement scenario (i.e. the combination of Low scenarios for individual measures) result in surface transport emissions of 72 MtCO<sub>2</sub> in 2030, compared to emissions in the reference emissions projection of 79 MtCO<sub>2</sub> (i.e. a 8% reduction)*
- *Emissions in the Medium Abatement scenario are 67 MtCO<sub>2</sub> in 2030 (i.e. 15% lower than in the reference emissions projection)*
- *Emissions in the High Abatement scenario are 50 MtCO<sub>2</sub> in 2030 (i.e. 36% lower than in the reference emissions projection).*

In the context of the national commitment to a reduction to CO<sub>2</sub> emissions by 80% by 2050, the report goes on to say:

- *Given our assessment of what is possible in other sectors, it is likely that an emissions reduction of 90% or more will be required in surface transport to meet the economy-wide 80% target. The implication of this is that conventional cars and vans should be fully phased out by the mid-2030s, in order that the car and van fleet is zero- or low-carbon by 2050.*

From this, it is clear that the changes required for freight and logistics to meet its share of the commitment to carbon reduction will be especially challenging. The report argues that:

- *Abatement in freight can be achieved through reducing either distances travelled (measured in vehicle-km) or carbon intensity of travel (measured in gCO<sub>2</sub>/km). Evidence suggests that there are particular opportunities for abatement from modal shift, supply chain rationalisation and better vehicle utilisation.*

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<sup>12</sup> Committee on Climate Change – Fourth Carbon Budget, January 2011

This implies the need for a fundamental redesign of supply chains to address the related problems of congestion and carbon. As a result the second key observation of this Paper is that:

- 2. Freight and logistics will need to make a significant contribution to meeting longer term congestion and climate change goals. This will require a basket of radical measures incorporating technical, modal and supply chain structural dimensions.***

## Taking a supply chain viewpoint to address the economic and carbon challenges

Before national targets for emissions had been set, Eddington considered the implications of sustainability for transport, including freight and logistics. A key conclusion of his report was that Government needed to prioritise actions across the network. In his report, Eddington advocated an incremental, targeted approach to infrastructural improvement. He said:

*Because the UK is already well connected, the key economic challenge is therefore to improve the performance of the existing network. But there is little strategic case for action in all places. To meet its economic goals for transport, Government should prioritise action on those parts of the system where networks are critical in supporting economic growth, and there are clear signals that these networks are not performing.*

This approach was adopted by the DfT in its various policy documents under the titles of 'Towards a Sustainable Transport System' (TaSTS) and 'Delivering a Sustainable Transport System' (DaSTS). While these documents have now been withdrawn from the DfT website, and cannot be regarded as current 'policy', there is much in them that remains relevant including the identification of a core network of 'strategic national corridors', as shown in Figure 3 which also reflect the geography and population of the UK.

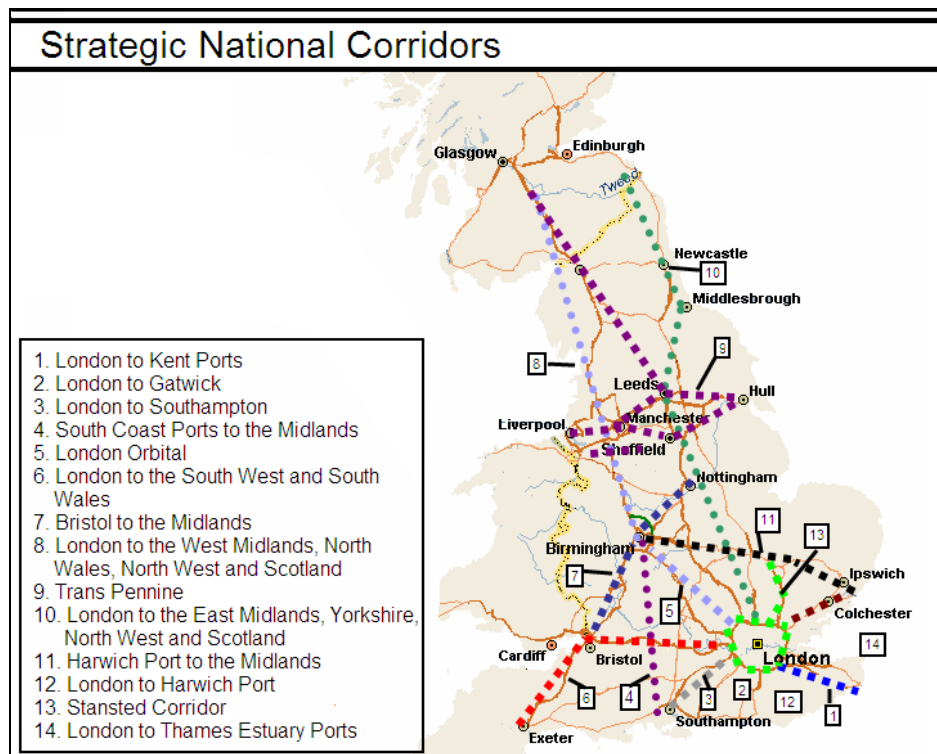


FIGURE 3 – THE KEY NATIONAL CORRIDORS – AFTER THE STYLE OF THE DFT

As observed in the previous section, this 'network' of core corridors is likely to be used disproportionately more by freight than its share of miles run or the vehicle parc. With well-targeted investment in key bottlenecks along these corridors it should be possible to accommodate logistics-related traffic and any growth in longer haul freight traffic.

The DfT's "corridor" approach to identifying these bottlenecks is therefore helpful as a starting point.

However, it is important to recognise that while freight and logistics uses these corridors, supply chain networks have a somewhat different configuration. Supply chains connect raw material sources with final points of consumption through a complex series of nodes and links; they pass through primary, secondary and, occasionally, tertiary journeys from source through any intermediate manufacturing and stocking locations to the final point of usage. The strategic corridors in Figure 3 are routes on which many companies' supply chain links coincide, but may represent only a small proportion of the total distance that the product travels through the systems of production and distribution.

As noted in the Fourth Carbon Budget report, cutting the carbon footprint of freight and logistics will require a reduction in the total amount of freight movement. This would also ease the congestion pressures. To achieve it, without adversely affecting future prospects for economic growth, it will be necessary to reshape supply chains, reducing the number of links and their overall length. Fundamental research is required to assess the effects of such supply chain restructuring on the demand for infrastructural capacity across the road and rail networks. In some cases, it may result in a consolidation of freight flows on the strategic corridors identified in Figure 3; in others it may result in greater dispersal of traffic onto secondary transport links. As an important proportion of supply chains originating or terminating in the UK now contain an international sea leg, the future development of ports and maritime related infrastructure, such as rail and roads, will strongly influence the freight transport intensity of the economy. Rationalising the overall pattern of freight movement may also require an overhaul of regional development priorities. All in all, there will be a need for a radical rethink of the inter-relationship between supply chain structure and transport infrastructure.

Creating a new vision for Britain's industrial and logistics landscape is currently difficult because much of the required data on freight flows and supply chain structures is lacking. Despite repeated Government advocacy of evidence-based policy making, much of the data is fragmented, inconsistent and incomplete. It needs to be supplemented with a full sectoral analysis of the structure of UK logistics systems and supply chains.

Developing a freight transport policy that is sensitive to the changing structure and management of supply chains requires a major integrated research effort since the technical and policy making challenges in achieving a greater level of integration are currently largely unsupported.

Examples of future analytical challenges include:

- *Developing CO<sub>2</sub>-reduction targets for freight and logistics:* The current national targets defined in the Climate Change Act will not be applied uniformly across all sectors. Each sector should be set a specific target reflecting its potential for decarbonisation and its marginal carbon abatement cost. As freight and logistics interfaces with virtually every other part of the economy, deriving realistic targets for this sector will prove difficult and require detailed modelling.
- *Defining the boundary for logistics for carbon auditing purposes:* Minimising freight transport does not necessarily minimise total carbon emissions. To understand the full supply chain impact it is necessary to extend the boundary of the analysis to the whole logistics and production system. There is a need for 'carbon trade-off analysis' embracing transport and other activities to determine the 'minimum carbon' network. This should also 'value' other externalities, including air pollution, accidents and congestion, thus adopting a broader definition of sustainability.
- *Allocating scarce resources:* Under current budget constraints, resources will need to be focused on key bottlenecks, ports, rail loading gauge, etc. Priority must be given to both maximising and relieving the use of existing infrastructure. This will require a focus on the future potential for a range of initiatives such as Advanced Traffic Management and consistent cross-modal and mode neutral cost-benefit appraisal. This will be crucial to identify conflicts and synergies with improvements to passenger-related transport infrastructure.
- *Optimising freight movement on the 'last mile':* The growth of online retailing and home delivery is transforming freight distribution at the local level. Van deliveries are steadily replacing the collection of shopping in private cars. The congestion pressures of multiple small high street deliveries are also increasing with more frequent replenishment. This is redefining the relationship between freight movement and personal travel by car and public transport. A fresh holistic analysis is needed to determine the optimum system of local distribution in an era of e-enabled retailing that minimises environmental impacts and traffic congestion while maintaining customer convenience.
- *Placing UK domestic freight transport trends in a global context:* The current focus on emissions from domestic transport within the UK (in line with Kyoto approach) fails to put UK logistics-related CO<sub>2</sub> trends into the wider context of global supply chains. For example, the government's GHG targets for 2050 include an allowance for international transport links by sea and air, but the interconnection between them and UK domestic freight transport has yet to be adequately defined and incorporated into planning.

These points illustrate some of the ways in which improved evidence is needed for policy making and investment appraisal. When set against this requirement for evidence, the available data is seriously lacking.

The major information gaps include the following:

- *CO<sub>2</sub> emissions*: within the UK, CO<sub>2</sub> emissions from freight and logistics are excluded from the climate change levy and CRC schemes. It is not mandatory therefore for companies to measure and report these emissions. In the case of the country's external transport links, no standard protocols yet exist for the allocation of emissions from international sea and air freight between countries. As a result much of the base data for transport emissions is weak and there are limited private or public incentives for improving it. Micro-level, company analysis of carbon trade-offs in logistics planning is largely absent apart from selected case studies.
- *Supply chain perspective on freight movement*: in official systems of freight data collection, the unit of measurement is the individual freight journey and no attempt is made to track consignments across supply chains comprising several journeys through the tiers in the supply chain.
- *Measurement of freight activity and vehicle loading*: as freight flows are invariably measured by weight (e.g. tonnes-lifted and tonne-kms), little is known about the cubic volume of freight being moved and space utilisation of vehicles. Very little data is available on the loading of rail and waterborne freight capacity by either weight or volume.
- *Estimates of the elasticity of demand for freight transport*: much of the analysis of freight transport policy requires estimates of the effects of government interventions on the demand for freight services. The pool of data currently available for this purpose is rather limited, however, and some of the available data sets are conflicting.
- *Monitoring of the impact of past policy decisions*: the effects of some policy initiatives in the freight and logistics sector, such as the freight facilities grant programme, have been regularly assessed, but further work needs to be done to isolate the effect of different policy measures over differing time-scales.

Overall the statistical and modelling bases on which climate change policy for freight and logistics is being developed are incomplete in their scope and insufficiently detailed to enable the required focus.<sup>13</sup>

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<sup>13</sup> McKinnon, A and Leonardi, J: The collection of long-distance road freight data in Europe: Transport Survey Methods, Emerald, (ed) Bonnel et al, 2009:  
Allen, J, Browne, M, Woodburn, A, London Freight Data Report,  
<http://www.tfl.gov.uk/microsites/freight/documents>

There is also a need to increase the transparency of the transport decision-making process especially as these decisions are likely to become more radical and likely to strike the delicate balance between local and national interests. There is an obligation to communicate a well-informed picture of cause and effect in the complex transport system.

This issue is revisited later; for this section the third key observation is:

- 3. *The network for freight and logistics that will enable it to contribute to reduced congestion and improve economic and environmental effectiveness is a much wider challenge than has been articulated involving complex interactions of capacity and flows and with passenger movements. This has yet to be adequately recognised in policy development partly because of deficiencies in the available data and modelling.***

## The change in public policy following the CSR in October 2010

The question hanging from the previous section of this Paper is “How do we, as a nation, define what is needed in the future to secure economic value and environmental sustainability from freight and logistics?”

This is the central question for this entire Paper and is especially important in the context of the nation’s constrained ability in current economic conditions to invest in the networks for carbon reduction and economic performance.

In this section, the implications of that constrained ability to invest are unpacked as evidenced by the CSR for transport in general and freight and logistics specifically.

The high-level outcome from the CSR for the Department for Transport is reproduced in the table below from the DfT press release dated 20 October 2010. It shows a steady trajectory of between £12bn and £13bn.

### Department for Transport

|                  | £ billion   |             |             |             |             |
|------------------|-------------|-------------|-------------|-------------|-------------|
|                  | 2010-11     | 2011-12     | 2012-13     | 2013-14     | 2014-15     |
| Resource DEL     | 5.1         | 5.3         | 5.0         | 5.0         | 4.4         |
| Capital DEL      | 7.7         | 7.7         | 8.1         | 7.5         | 7.5         |
| <b>Total DEL</b> | <b>12.8</b> | <b>13.0</b> | <b>13.1</b> | <b>12.5</b> | <b>12.0</b> |

This can be compared with the long-term funding projection from the previous government as shown in the graph redrawn below from their, now archived, transport policy development document titled: ‘Towards a Sustainable Transport System’. This graph relates to the capital line in the first table and suggests a higher starting point and a trajectory to £20bn by 2017-18.

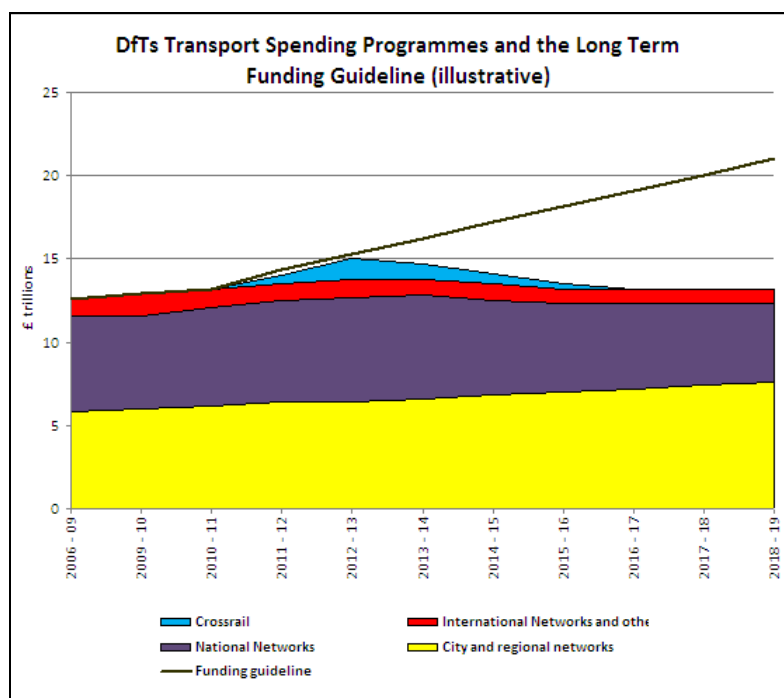


FIGURE 4 – THE SPENDING TRAJECTORY FOR TRANSPORT BEFORE THE CSR

These two projections are clearly not on a common base and it is apparent that the City and Regional Networks investment is not included in the DfT's CSR plan as that is devolved to local authorities.

While major projects such as Crossrail have been protected, the inference from these two points of evidence is that there has been a reduction of commitment by 2012/13 of between £2bn and £3bn increasing to £7bn to £8bn by 2018/19. Regardless of the approximation, it is a large number, albeit not a complete standstill.

This reduction clearly creates an urgent requirement to define national transport policy focus and priorities (overall and in relation to freight) in the light of the downgraded allocation of investment funding and the introduction of possible private investment. We can be in no doubt that investment can yield a high return in the context of both Eddington's estimate of the cost of congestion at £7billion or more and the implications of the carbon reduction goals from the Fourth Carbon Budget.

The CBI similarly asked for transport policy clarity in their paper, 'Time to Change Gear', published in February 2009<sup>14</sup>. This was in response to the Government Consultation and Policy development report which ran under the title "Delivering a Sustainable Transport System": (DaSTS): the output of the previous document referenced – "Towards a Sustainable Transport System", also now archived.

The CBI observed that:

*One of the most often repeated messages from business is that successive governments have consistently failed to deliver a long-term strategy for transport in the UK. There is clear evidence to support this, not least the many strategic transport documents government has published over the past eight years.*

*Business sees this as a complete lack of certainty about where future transport capacity might be built. Constant re-writing of strategies and changing objectives means key transport problems remain unsolved and business continues to suffer. For businesses looking to expand or new businesses looking to invest, it means uncertainty in the choice of locations as future transport provision for new sites remains unclear. Government must work to set a strategy whose aims and objectives are shared by business – and then deliver it.*

The fact that the previous government's policy documents (TaSTS and DaSTS) are now archived off the DfT website is a clear signal that it is no longer government policy. The implication is that, at some point, we will have to start the whole process yet again.

However, there are some pointers to policy relating to transport infrastructure as anticipated by the CBI; the private sector will have to take the strain and will welcome it if there is policy clarity.

An example of the private sector taking the strain is the new London Gateway Port development; it will take the world's largest container ships and provide as much as 9 million square feet of additional warehousing at a cost of £1.5bn. Reports estimate it will contribute £3bn to the UK economy. Vince Cable, Business Secretary, is quoted as

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<sup>14</sup> CBI, "Time to Change Gear? – Assessing the UK transport networks", 2009

saying that it will “fundamentally change the economic geography of Britain; the DP World development has the potential to completely realign the UK’s existing logistics patterns”.

The entire theme of this Paper is the need to transform British logistics in the context of the need to sustain economic growth and address climate change. However, the assertion that London Gateway will achieve that transformation is unsupported by any detail of the implications for:

- the wider road and rail network capacity which it will share with passenger movements, in which at present the government is almost the sole investor;
- how the Gateway development would interact with other regions, port developments and the rail freight network;
- and, indeed, the long-term sustainability of the emerging Port Centric Logistics model, as discussed at the recent Birmingham conference on the topic; the view from that event was that Port Centric is a desirable trend but that deficiencies in road and rail infrastructure are discouraging it.

The comment from Mr Cable also raises further key questions:

- Where and what the next transformational investments should be?
- Can we rely on the markets to determine and promote schemes that are in the national interest when all such investments rely on public infrastructure?
- In the light of the clear direction to localise decision making through the Localism Bill, how will the planning system be guided on the necessary investments when they are in conflict with local sentiment – sometimes termed NIMBY’ism?

The National Infrastructure Plan seems to both recognise this and promise action. In the Foreword, Lord Sassoon writes that investing in British infrastructure is 60% more expensive than in Germany. He says specifically that:

- *To address this issue, we will improve the UK planning system, bring down construction costs, improve the quality of data to inform decision taking, and initiate programmes to look at cross-sectoral inter-dependencies, resilience and engineering innovation.*

The main body of the report says on transport infrastructure:

- *Transport provides the crucial links that allow people and businesses to prosper. The Government is committed to delivering an effective, sustainable transport network for the UK. With the right transport infrastructure the Government can:*
  - *contribute to the fiscal consolidation whilst supporting a competitive economy – by effectively prioritising public spending and vigorously pursuing efficiency in the transport sector. This will ensure that the links that move goods and people around the economy can be improved;*

- *support sustainable economic growth and tackle climate change – by transforming the capacity and connectivity of key urban and inter-urban rail networks, and by implementing policies which deliver greener technology. In this way the urgent and unavoidable challenges of climate change can be addressed while maintaining long-term economic growth; and*
- *promote greater localism – by devolving power back to local people so that solutions to many challenges can be devised, developed, owned, promoted and implemented locally. This will ensure schemes are carefully thought-out and properly implemented and demonstrate high value for money.*

The emphasis on making proposals evidence-based and locally owned must be welcomed. However, given the inevitably conflicting interests of local and national agendas in a devolved environment, clear national transport policy will be essential to guide decision making in the wider interest. A combination of market forces and devolved planning policy cannot be relied on to naturally deliver the integrated investment policy needed, without the evidence that has been shown to be lacking and a level of central guidance in relation to transport policy.

The risk is that the situation will stagnate for lengthy periods. The certainty that the CBI asked for will be lacking and that will create a brake on the transformation that is needed.

As a result, the fourth key observation is:

- 4. Since the freight and logistics element of transport strategy will be fulfilled in future through a combination of private and public funding, it will be crucial that there is an integrated public-private vision and high-level plan within which competitive markets can operate.***

## **Freight transformation measures – meeting economic and climate change goals**

The previous sections concluded that freight and logistics ...

- has been a crucial economic driver for economic prosperity and must undergo another transformation to meet the challenges of the new millennium.
- is a disproportionate contributor to congestion and emissions
- will need special attention in planning for future capacity as current policy paradigms on networks do not represent the structure of supply chains
- will require private investment to realise transformation
- will need policy and planning clarity to release the flow of private funds.

This section looks at the research base on the scale of performance transformation that will be required from freight and logistics to secure the sort of transformation that is necessary.

It draws on research frameworks and conclusions prepared and published by Heriot Watt University, working alone and within the Green Logistics research consortium involving six UK Universities. Professor McKinnon of Heriot-Watt also prepared a briefing paper for the Commission for Integrated Transport in November 2009 which was partly based on this research<sup>15</sup>.

The analytical framework developed in the Green Logistics project identified eight key parameters that form the material outputs – policy outcomes that drive the bottom-line result of improved economic performance and reduced emissions. They are:

1. Modal Split – where the % movement to more energy efficient modes such as rail and water is the criteria of success
2. Average handling factor – where the aim is to reduce the number of handlings and journeys made by goods as they move through the nodes of the supply chain
3. Average length of haul – where the aim is to reduce the distance travelled for each link; combined with the average handling factor this represents the structure of the supply chain
4. Average payload – where the aim is to increase the loading of the goods on the truck
5. % of empty running – where the aim is to reduce the proportion of empty journeys
6. Energy efficiency – where the aim is to improve the distance travelled on a unit of energy
7. Emissions per unit of energy – where the aim is to enhance the 'burn' and reduce the emissions, particularly through technology of engine design

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<sup>15</sup> Transport Challenges and Opportunities, Briefing paper on the Freight Transport Sector, prepared for the Commission for Integrated Transport by Professor Alan McKinnon

8. Other externalities relating to vehicle movements – where the aim is to cost and design out a whole range of factors such as noise, vibration, accidents and interaction with other transport users.

In his paper for CfIT, Professor McKinnon argued that against each of these measures the progress towards sustainable distribution made in recent years had been disappointing.

The Green Logistics research also used the Delphi forecasting technique with a group of 100 freight industry specialists to predict the performance of freight by 2020. This suggested that against a forecast of growth in the total tonne-kms of 26% the benefits of changes in the key indicators would be:

- Modal split -6% from road
- Average load factor +12%
- Average empty running - 19%

Overall these measures would reduce the impact of the increase in tonne-kms on lorry traffic levels to just +2%. On top of that there was an expectation among the experts that fuel efficiency was expected to rise by around 5% by 2020 and carbon intensity per litre of fuel to drop by 5%.

The research concluded that:

*Factoring the forecast changes in key parameters together gave a mid-range projection that CO<sub>2</sub> emissions from road freight would drop by approximately 8% between 2006 – 7 and 2020 despite an underlying 24% growth of tonne-kms. While encouraging, this decline would fall well short of the government's target CO<sub>2</sub> reduction of 34% for the UK as a whole by 2020.*

The work then went on to estimate the impact of 'stretch' targets in six of the key target parameters up to 2050<sup>16</sup>. This excluded the handling factor and length of haul which are the function of supply chain design as described and discussed earlier in this Paper. The analysis is therefore a reflection of the 'stretched art of the possible' without major network change in terms of sources, destinations and intermediate points in the network.

The following chart shows one of seven scenarios that by 2050 would achieve a CO<sub>2</sub> saving in the road freight sector of 76% or more (against a 2007 base year) and hence meet the national carbon reduction set in the Climate Change Act.

It is important to note that these measures will be economically positive, subject to the levels of investment that are required to achieve them. Green logistics is generally better value for operators and shippers.

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<sup>16</sup> McKinnon, A.C. and Piecyk, M.I. (2009) 'Logistics 2050: Moving Freight by Road in a Very Low Carbon World' in Sweeney, E. (ed) 'Supply Chain Management and Logistics in a Volatile, Global Environment' Blackhall Publishing, Dublin

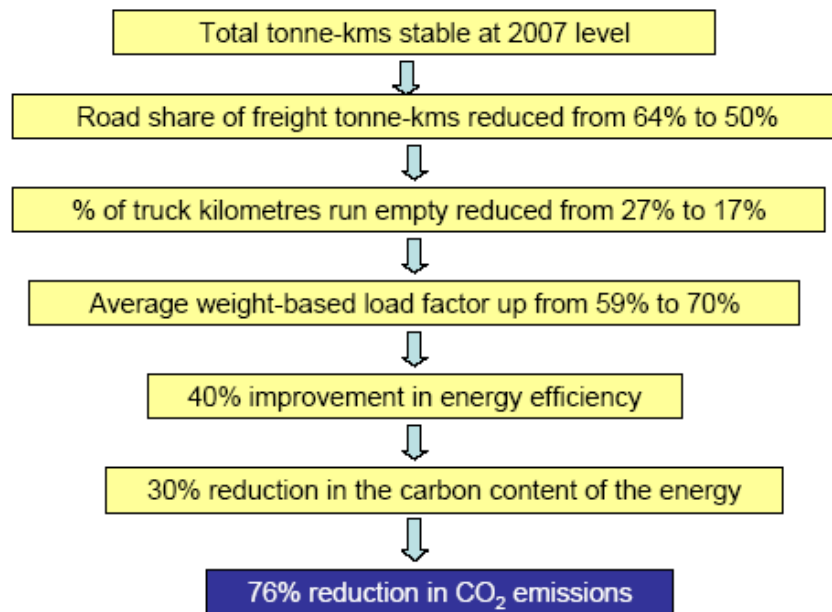


FIGURE 5 – DECARBONISATION SCENARIO FOR UK ROAD FREIGHT TRANSPORT IN 2050 AGAINST 2007 BASE YEAR (MCKINNON AND PIECYK, 2009)

However, the scale of change indicated to get to a 76% reduction by 2050 is unprecedented from recent experience and well beyond the industry experts' predictions for 2020.

The report concludes that:

- *Recent trends in a series of key freight transport parameters shows that pursuit of the government's sustainable logistics goals has been relatively slow with measures that had made progress stagnate since the early 2000s, while others, in road vehicle lading factor and empty running, have reversed.*
- *It would be unwise to build a sustainable logistics strategy on freight demand growing more slowly than the economy (as it has done) as this is partly achieved by the off-shoring of production and increased import penetration displacing freight transport activity associated with the goods we consume here in the UK to other countries.*
- *There is still a large amount of 'low hanging fruit' to be harvested in the freight transport sector yielding both economic and environmental benefits. The government's Freight Best Practice programme has been an excellent source of publicity and advice on these sustainable logistics measures.*
- *The results of the statistical analysis, however, suggest that, at a macro level, these public and private initiatives are not yet having the required effect. To get carbon emissions from the freight transport sector onto a trajectory that will meet economy-wide targets by 2020 and 2050, government and industry will have to intensify their efforts to decarbonise the movement of freight.*

- *If the series of public policy options which will assist this process in the short to medium term fail to induce the necessary technical and behaviour changes, more radical regulatory and tax policies may have to be implemented.*

On this basis we will be dependent on the restructuring of supply chains (measures 2 and 3 which were excluded from the analysis above) to reduce the emissions and improve the economic performance of UK freight and logistics.

This will require network restructuring to reduce the distance over which goods will be transported and the number of intermediate steps that are taken.

As a result, the fifth key observation is:

- 5. There is limited prospect of normal rates of freight and logistics development meeting the goals for carbon reduction and economic performance; positive policy actions will be needed to ensure the future contribution from freight and logistics.***

## Radical transport measures to secure economic and carbon goals

On the basis of statements reproduced in this Paper, it is fair to assume that Government has serious intent to realise carbon reduction and to use transport for economic development.

From that position, the clear conclusion from the last section is that radical policy measures will be needed to stimulate positive change. As observed earlier, this will be essential to give private sector investors the confidence to adopt schemes.

In this section the four major policy dimensions are described that are available to enable freight and logistics to contribute to national targets for Carbon Reduction: e.g. regulation, taxation and fiscal measures, planning in relation to private sector investment, and public investment.

The area of **regulation** can impact freight operations in a variety of ways from vehicle type approval through to preferential routes and road lanes, night delivery curfews, speed limits and drivers' hours. The bullets offer some explanation and commentary.

- Measures to approve longer vehicles have been assessed as offering both economic and environmental benefits. Even a marginal increase in the maximum length of a semi-trailer from 16.5 to 18.75 metres (the current limit for drawbar trailer combinations) could cut annual truck-kms by 57-85 million, transport costs by £23-37 million and CO<sub>2</sub> emissions by 45-66,000 tonnes<sup>17</sup>.
- Perversely, proposals from the EU to limit trailer height to 4 metres would reverse this benefit and drive up costs and carbon, increasing, on an annual basis, road transport costs by £300m, CO<sub>2</sub> emissions by 320,000 tonnes and lorry traffic levels by 350 million vehicle-kms<sup>18</sup>. The 4 metre height limit is common in most mainland European countries as against the UK where there is no legal restriction but 4.9 metres is the height accepted in custom and practice.
- The opportunity to adjust delivery and working times has the potential to provide significant benefits. In principle, it will enable a greater level of return loading, reducing empty running, take vehicles off the road in peak congested periods and enable the sort of supply chain redesign alluded to earlier.
- Clearly such regulation requires parallel measures like ensuring that vehicles and loading equipment are suitably 'hushed' to avoid night-time noise. This potential has not yet been researched, but combined with the planning measures described later would be a crucial part of reducing the freight transport intensity of the economy.

The area of **taxation and fiscal** measures is a particularly sensitive political issue for the road freight industry, especially with the fuel price escalator making the UK the most expensive country in Europe to run a truck. However, it is an established principle that change can be both driven and funded by fiscal measures and that the design

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<sup>17</sup> Knight, I. et al, 'Longer and / or Longer and Heavier Goods Vehicles (LHVs): a study of the likely effects if permitted in the UK – final report' TRL, Crowthorne, 2008

<sup>18</sup> McKinnon, A.C. 'Britain without Double Deck Lorries' Logistics Research Centre, Heriot-Watt University. 2010: [http://www.sml.hw.ac.uk/documents/BritainwithoutDouble-deckLorries\(finalreport\).pdf](http://www.sml.hw.ac.uk/documents/BritainwithoutDouble-deckLorries(finalreport).pdf)

principles should be that of fairness and a level playing field. In the light of earlier observations that road freight has not been set carbon reduction goals in the current fiscal regime of CRCs and that foreign lorries get a 'free ride' on our roads, there are big opportunities for reform.

Fiscal measures to promote structural change could include road user charging, more tax incentives for alternative fuels and the use of low-carbon vehicle technologies. Again, the bullets offer some explanation and commentary.

- Road user charging for lorries would bring fresh operator focus onto vehicle usage and environmental efficiency. It would need to replace VED and some level of fuel taxation and apply to foreign lorries. It might be used in conjunction with regulation to create different tariffs in high congestion areas at peak times. Both coalition parties are committed to a Lorry Road User Charging (LRUC) system as a low cost option but the significance of the potential shortfall observed in emissions performance could encourage a more radical approach.
- The provision of incentives for bio fuels and clean-burn fuels has been shown to have the potential to distort global commodity markets; nevertheless, with suitable caution and incentives the introduction of sustainable fuels should be an area for increased focus.
- The use of electric vehicles for freight is now a technical reality, especially for light van / trucks and low load specification HGVs. This type of technology should be especially attractive in city centres where air quality from traditional diesel vehicles is a concern. This vehicle technology could be highly incentivised through road user rebates. However, the challenge with such technology remains its range of operation with 70 to 80 miles being quoted as normal. This will require integration of more local depots and hubs than exist at present which is contrary to the long-term trend to fewer central facilities – the planning implications of this are covered later.

The area of **planning and private sector investment** measures is critically important and recognised by the policy statements of the coalition government. Transforming British logistics will require new port and rail terminal capacity with associated warehousing and distribution centre capacity to change the flows and transform the face of logistics. Mr. Cable's comments on London Gateway imply such a transformation and the need for it.

Clear planning guidance with a measure of central policy direction will be needed for port, rail freight terminal, warehousing and city hubs. In our crowded island with limited road, rail and port potential, location and capacity choices are constrained and require an integrated vision with clear guidance to investors and developers as well as the local planning authorities.

Looking beyond privately financed infrastructure, there will be a public sector financing need to fund motorway and rail infrastructure, including establishing more toll roads and making rail freight capacity investments.

Again, the bullets offer some explanation and commentary.

- Modal shift from road to rail or short sea will be a major component of carbon and congestion reduction and such a growth in rail freight has been a feature of successive governments' policies. The need for rail freight terminals is an essential part of such modal shift and yet two South-east Rail Freight terminals<sup>19</sup> have been refused planning in the last six months. That leaves one modern terminal operating and viable in Barking and another that has planning consent at Howbury Park; the latter is said to be subject to train operating constraints if it were ever to be built. For the South-east to take its share of rail freight will require substantial terminal capacity, beyond that embodied in the former SRA's policy documents calling for three or four around London.
- The need for City Hubs to support a switch to electric vehicles and to connect with changes in regulation on operating hours (as discussed earlier) will require that such facilities are built into planning guidelines, the need for capacity be understood and the implications embedded in the local plans.
- Developers and investors currently work on the basis of 'what they can get' rather than 'what is right'; they spend millions of pounds applying for and appealing decisions in a planning system which appears increasingly hostile to innovation or difficult national decisions where benefits extend beyond the locale.
- Capacity and investment opportunities are so limited that investment returns are very high, forcing up prices and creating barriers to restructuring
- On the potential to encourage private investment in core infrastructure, the private sector will require greater clarity of long-term policy vision than exists today as well as better forecasts than were made for the M6 toll road.

Finally we will need focused **public investment** where the private sector cannot take the strain. This will be related to specific bottlenecks and will generally have the dual role of serving both freight and passenger movements. It seems that such investments would benefit from a clear freight and logistics input, since the actions identified may reshape and reduce the requirement.

The sixth key observation is:

- 6. There is a credible bundle of fiscal, regulatory and planning measures that have the potential to deliver transformation of UK freight and logistics. Formalising this bundle will require an integrated vision and a quality evidence base that does not exist today because of the constraints of the data that is collected and the process that has been followed hitherto.***

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<sup>19</sup> Radlett and Kent International Gateway

## Lifting the barriers to transforming UK freight and logistics

The first barrier to progress will be the difficulty of creating an agreed integrated framework of the drivers for freight and logistics that recognises its economic and environmental contribution and impact – in simple terms, a clearly communicated and valued set of options.

Delivering a Sustainable Transport System: the Logistics Perspective' is the last policy document issued by the DfT under the previous government. While it is now archived, it is the only point of reference that we currently have. As a policy document it was strong on objectives but short on the measures to achieve them. However a core statement in relation to emissions was made as follows:

*It is likely that substantial savings in greenhouse gas emissions will need to be made across a wide range of transport activities in the period to 2050. There are three main ways in which reductions of CO2 in the supply chain can be delivered:*

- *reducing the need to transport goods;*
- *moving more goods by the modes with the lowest carbon dioxide emissions per tonne/km; and*
- *reducing emissions per tonne/km without changing the mode of transport.*

It went on to discuss the fact that the first of these bullets had not been recognised by participants in their industry consultation process, but that the department would have to understand supply networks better in the future. While that position is to be welcomed, there are no signals that progress has been made since 2008.

The statement that in future the Department would be taking a closer look at the freight needs of commodities is also welcome. However in the context of that focus, the paper continued to apply the measures of tonnes lifted and did not differentiate the commodities by their transport intensity; a truck load of toilet paper weighs just a few tonnes (even with a double deck movement) while a movement of salt for roads will be as much as 29 tonnes. Their contribution to congestion is therefore very similar but their statistical recording could be 66% less for the toilet paper.

The paper also did not provide an adequate definition of national and regional distribution models as they are operated by most businesses. The DaSTS Logistics Perspective used the term National Centre only once in the document as a passing reference, although it talked about Import Centres and Regional Centres. While it did provide a definition of primary, secondary and tertiary journeys it did not make it clear that different goods owners in the chain may both generate primary and secondary journeys.

The Continuous Survey of Road Goods Transport (CSRGT) monitors the activities and loading of trucks but does not distinguish between freight journeys at different levels in the supply chain. It sheds little light on the volumetric loading of lorries and excludes foreign-registered trucks operating on UK roads.

The seventh key observation is that:

**7. *Notwithstanding a commitment to evidence based policy, the data base for freight and logistics policy development is limited and will require a major remedial effort to provide a platform on which integrated policy for freight transport can be developed***

With an adequate statistical base, the second major obstacle will be defining and agreeing the process for developing a well-structured and objective vision: the radical measures indicated as potentially being needed to meet emissions targets. This will be a challenge for a number of reasons:

- There are now a number of stakeholders in Government who should be engaged in this process: HM Treasury on the Growth and UK Infrastructure Agenda, BIS for the Growth and Services Agenda, the Office for Climate Change for carbon reduction and the Department for Transport. Clearly over-arching programme integration will be important.
- Input from industry stakeholders will be equally important; there the experience is that their contribution is often quite focused on the specific issue that is in their mind rather than the wider viewpoint. As a result coaching and development will be required.
- The process will need to be carried out at pace and to industrial strength to provide the audit-ability that will be required and it will need to link with some other areas of transport and industrial policy.
- Formulating detailed policy arising from the vision will involve a translation into regulation and planning guidance. Such decisions have political and emotional content as they will interact both with the taxation of business and the local environment for people around the country.
- The guiding principle of localism that seems to prevail at present could be a huge barrier but the scale of that issue will not be clear until the work is attempted.

Notwithstanding these difficulties, it is clear that the formulation of a well-structured and objective vision based on hard evidence and presented in an integrated way will be more likely to succeed.

A project using agent-based modelling has been funded by the TSB that addresses the issues raised in this Paper; it has LCP Consulting and Cranfield University as consortium members. However the intensity of the investment and project timeline is insufficient for the urgency of the requirement.

The eighth key observation is therefore:

**8. *The creation of the transport strategy vision will require exceptional skills and tools to facilitate the adoption of key policy measures and win the buy-in of all the stakeholders including political representatives, operators and private investors (on whom we will depend to fund the change).***

## **In conclusion:**

The eight key points that form the conclusions of this White Paper are summarised:

- The freight and logistics sector has made a substantial contribution to past UK economic success. Indeed, subject to concerns over the completeness and reliability of the data, freight and logistics has punched above its weight over the last 10 years, delivering economic growth with improving freight efficiency. As such it is an important national asset, whose contribution is often overlooked.
- Freight and logistics will need to make a significant contribution to meeting longer-term congestion and climate change goals. This will require a basket of radical measures incorporating technical, modal and supply chain structural dimensions.
- The network for freight and logistics that will enable it to contribute to reduced congestion and improve economic and environmental effectiveness is a much wider challenge than has been articulated involving complex interactions of capacity and flows and with passenger movements. This has yet to be adequately recognised in policy development partly because of deficiencies in the available data and modelling.
- Since the freight and logistics element of transport strategy will be fulfilled in future through a combination of private and public funding, it will be crucial that there is an integrated public-private vision and high-level plan within which competitive markets can operate.
- There is limited prospect of normal rates of freight and logistics development meeting the goals for carbon reduction and economic performance; positive policy actions will be needed to ensure the future contribution from freight and logistics.
- There is a credible bundle of fiscal, regulatory and planning measures that have the potential to deliver transformation of UK freight and logistics. Formalising this bundle will require an integrated vision and a quality evidence base that does not exist today because of the constraints of the data that is collected and the process that has been followed hitherto.
- Notwithstanding a commitment to evidence based policy, the data base for freight and logistics policy development is limited and will require a major remedial effort to provide a platform on which integrated policy for freight transport can be developed.
- The creation of the transport strategy vision will require exceptional skills and tools to facilitate the adoption of key policy measures and win the buy-in of all the stakeholders including political representatives, operators and private investors (on whom we will depend to fund the change).

The hope is that Ministers and policy makers including the Secretary of State for Transport will reflect on this carefully considered White Paper and set out to create a national vision for freight, logistics and transport at pace. After 5 prior attempts in the last 10 years, there is no time to waste.

#### ACKNOWLEDGEMENTS

1. This Paper has relied significantly on the writings and research by Professor Alan McKinnon of Heriot Watt University. He has also contributed profoundly to my thinking through our discussions on the issues of determining freight transport policy. However, the opinions expressed in this White Paper are entirely my own.
2. The development of this Paper has also been influenced by the research work of the ABI<sup>3</sup>L consortium, which is a project, part funded by the Technology Strategy Board. The aim of ABI<sup>3</sup>L is to apply agent-based modelling to the complex systems problem of developing integrated freight strategy.