

LOGISTICS AND TRANSPORT

VISION 2035



A report on the future of logistics and transport in the UK



FOREWORD



Peter Hendy CBE FCILT
President, CILT (UK)

The Chartered Institute of Logistics & Transport – CILT (UK) - is uniquely placed as the only organisation able to examine the future of all modes of transport, from freight and waterways to aviation and transport planning. CILT's Public Policies Committee, under the expert guidance of Vision 2035 Project Leader Michael Woods, has taken on the challenge of predicting how the UK's transport scene will evolve in the next quarter of a century. Will there be a high speed rail line heading north? Should we all be paying tolls for road access?

This is a substantial report, with contributions from leading professionals from the disciplines of passenger transport, supply chain and transport planning. Experts from across the Institute's Professional Sectors, Forums, Nations and Regions have all taken part to produce what is the latest and most comprehensive prediction of the UK's future transport infrastructure available currently.

I commend this report and congratulate Michael and everyone who has been involved; and I hope there are some young managers reading this today who, in 25 years' time, will have become one of my successors as President of this Institute. I trust that, whoever he or she may be, they will be re-reading this with interest; and I am confident that a large measure of the thinking in Vision 2035 will have made a valuable contribution to the logistics and transport world of tomorrow. After all, it is the people now shaping that future that have written this report.



Peter Hendy CBE FCILT
President, CILT (UK)

CONTENTS

Executive Summary	5
Introduction	5
The forces	6
Implications for the logistics and transport sector	6
And finally	8
Findings and recommendations	9
Introduction	11
Twenty-five years ago	12
Forces for change over the next 25 years	14
Demographic forces	14
Transport forces	15
Economic forces	17
Environmental forces	18
Political forces	19
Technological forces	20
Implications for the logistics and transport sector	22
Freight transport	22
National passenger networks	26
Environmental performance	28
Organisational arrangements	29
Customer information and payment technology	30
Collective mobility	31
Advanced and novel technology	35
Training and professional development	36
Conclusion	38
Acknowledgements	38

EXECUTIVE SUMMARY



What will the next 25 years hold, and what challenges and pressures will emerge to shape the way transport systems evolve? Pictured is Mercury, a recent high speed train design from Priestmangoode.

Introduction

The past 25 years have seen some huge changes, brought on by many forces including political, environmental, technological, social and demographic. These forces are continual and will shape the next 25 years, with considerable impact on the way we travel and transport goods.

The Chartered Institute of Logistics and Transport in the UK (CILT) has attempted to examine the forces of change and develop a vision for 2035. The aim is to understand the impacts that wider societal progress will have on transport (and vice versa), to set a context for how industry will operate in the future and to identify the policy instruments that will be required to serve society as effectively as possible. The key output of the work is a set of findings and recommendations, addressed to decision makers and their advisors nationwide. They will help steer our vision towards a future that is better not just for transport and logistics but also for society too.

To understand the scale of change that could take place by 2035, just look back at what has changed over the past 25 years. In those days there was no internet, we were road building (completing the M25), almost nobody had a mobile phone and environmental concerns were not widespread. Transport facilities such as journey planning and ticketing were nowhere near as sophisticated as they are today. What will the next 25 years hold, and what challenges and pressures will emerge to shape the way transport systems evolve? CILT has identified drivers of change and other factors that will need to be taken into account.

The forces

There are strong **demographic** forces, such as a rising and ageing population and persisting inequality. There will be a large shortfall of homes in the UK by 2035 and concerns as to where this housing will be located. The impact of **transport** forces is uncertain. Is demand stabilising or will it still be increasing in the future? Public transport travel is certainly rising although today we are seeing only a minimal rise in car travel. The cost of travel is generally increasing in real terms. Prospects vary for domestic and international air travel.

Economic forces are significant, with the performance of the economy key to future activity. There is likely to be slow growth in the short term but stronger growth by 2035. Environmental costs will be increasingly reflected in the costs of goods and services. Road congestion costs are high and may become severe. We are increasingly aware of **environmental** forces such as climate change and other transport emissions.

Political forces suggest the likelihood of a changing role for government as it emerges in new regional bodies. There is a changing balance of power, with the private sector providing increasing levels of funding and multinational corporations becoming more influential in terms of both investment and policy. New partnership models are emerging and the voluntary sector is being called upon increasingly. The 'user pays' principle is becoming enshrined in government thinking, which could steer the government towards road user charging in time. There is an international context here whereby supply chains will potentially be impacted by factors in the developing world, including the expansion of Chinese influence, conflict zones and natural disasters.

Finally there are **technological** forces that have taken off in the last few decades, and look set to continue in such a fashion. Electric cars, alternative fuels, information technology and ticketing provision are likely to push forward rapidly in the next 25 years.

These changes all have implications for the logistics and transport sector. Together the forces show some clear directions in which transport and logistics policy and service provision should evolve. Not just in national freight and passenger networks, but in the environmental arena too, in organisational arrangements, information provision, collective mobility, advanced technology and in training.

Implications for the logistics and transport sector

In freight transport we will see increasing agility and flexibility in the supply chain by 2035. But domestic pressures, not least growing levels of congestion, and international forces will have a direct influence on tomorrow's answers. These include sharing data, standardising business processes, pooling vehicle and warehouse capacity, automated warehousing, and collaborative partnerships. Freight will use new technologies to supply customers. It will also need an improved partnership with government.

The implications for national passenger networks include making provision for the rising - and ageing - population, by increasing capacity via projects such as High Speed 2 (HS2) between

London, Birmingham and the north as well as other committed schemes such as Crossrail. This is not restricted to rail. Bus and coach networks will also need to expand. Integration between operators and modes must be fostered by adopting approaches based on collective mobility (which includes local rail, bus and tram services, community transport, taxis, lift-sharing and car clubs). The challenge will be to integrate services that are in separate ownership and without restricting competition. The financial burdens on the UK limit its ability to fund new infrastructure over the next decade, and behaviour change that encourages the use of more sustainable modes could help fill the gap. Road user charging is another possible tool.

Environmentally, the government's policy to reduce transport emissions depends heavily on the introduction of more efficient petrol car engines, followed by the decarbonisation of electricity supply and the universal adoption of electric vehicles. As this happens, road taxes will become inadequate as a means for charging for road use and any incentives that government provides to encourage the take up of electric vehicles would be most effective if combined with road pricing.

Despite the recent abolition of the regional tier in England, momentum may well develop in due course for new regional or city governance structures. Experience suggests this will lead to greater priority given to investment in public transport. It may also encourage denser urban development, which is better for walking, cycling and public transport. The devolved governments are already showing a lead in some of these areas.

The potential of information technology is burgeoning with mobile and smart ticketing now widely available and constantly improving. 'Mobility management' packages may develop that combine all aspects of existing information and retailing systems to create bespoke itineraries for users. Smartphones (or their successors) and contactless bankcards will be used increasingly for payment. They will make it easier to vary prices at different times of the day and in real time to reflect available capacity and so manage congestion in a more optimum way.

New and emerging information and payment systems form part of a vision for 'collective mobility' integrating local rail, bus and tram services with community transport, taxis, lift-sharing and car clubs. It includes principles of partnerships, customer focus, innovative and integrated services, greener mobility and catering for all sections of society. It is a vision that will become increasingly important in the future.

Exciting potential technological developments over the next 25 years could include smart grids, intelligent highways, freight pods and larger freight vessels. They are explored in more detail later in the report.

By 2035, professional education in transport and logistics will be networked and mobile. Virtual learning will be fast, flexible and interactive. Learning will be delivered in small chunks to people wherever they are, and qualifications will be harmonised with agreed international standards of competence. With people living longer, employers will have to change their attitudes towards older workers, with more training and career development opportunities for older people.

FINDINGS AND RECOMMENDATIONS

And finally

CILT's logistics and transport vision for 2035 considers innovative and perhaps courageous changes, taking account of opportunities created by technology. There are some contradictions in our findings but these just reflect future uncertainties. It does not invalidate the need to think about what may be possible and what may need to be done to get there. There are tough challenges ahead and we may not find all of the options palatable.

The findings of this work have been distilled into a list of key pieces of advice and recommendations, detailed overleaf. These are our fundamental messages to readers, especially to government advisors and politicians, if the transport and logistics sector is to develop in the most efficient and effective way possible.

This report is not the last word on the subject. It is part of a process in which we would expect our views to be challenged and that we hope will encourage debate.



Even doubling the capacity of public transport would do little more than maintain its current market share. Next generation trams and light-rail vehicles such as Bombardier's eco Flexity 2 tram show recent developments in technology.

As the world recovers from recession and adjusts to the realities of highly priced fuels and climate change, logistics and transport will need to develop to serve society more effectively and efficiently. In this look-ahead to 2035 we have considered creative and bold changes, taking account of opportunities created by technology and expected societal developments. The fact that there may be inherent contradictions between some of our findings does not invalidate the need to think about what is necessary and what is possible. There are tough decisions ahead and we may not all find some of these options palatable. That is the challenge for the Institute and this is why it is launching this first contribution to open a great logistics and transport debate.

- The UK will never have sufficient capacity to meet all potential demands for transport services;
- Even doubling the capacity of public transport would do little more than maintain its current market share;
- Transport must be planned and administered together with economic and spatial planning regionally and in the devolved nations;
- Information technology (IT) has the potential to revolutionise the way we use and manage transport and logistics services;
- IT will help make better use of capacity at a time when spending on infrastructure will be hard to justify and fund and environmental pressures will continue to grow;
- Provision of effective freight transport capacity and reliable journey times must be key priorities to support recovery and growth;

INTRODUCTION

- In passenger transport, decisions should be based on peoples' mobility and access requirements rather than focusing on separate modes;
- Indicators based on economic and social performance rather than crude cost per passenger should be used to justify both investment and operating subsidies;
- Aspirational (but achievable) targets should be set and promoted to assist with achieving transport policy objectives and national carbon-reduction obligations;
- The UK's contribution to reducing CO₂ via the transport sector should be a high priority objective;
- Walking and cycling should be encouraged to help reduce carbon use, and provide health benefits;
- More use should be made of pricing mechanisms to achieve transport policy objectives. In particular road user charging should be used to expose the external as well as internal costs of vehicle use;
- Government must recognise that economic recovery can only be achieved if sufficient capacity can be released or created in transport networks. This needs behavioural change as well as additional infrastructure;
- Investment in ports, waterways and rail should be considered in order to transport freight more sustainably as part of an integrated network complemented by road haulage activities;
- In the same way meeting necessary passenger requirements will need investment in roads, rail infrastructure and airport capacity;
- More imaginative solutions need to be found for rural transport, to enable it to be managed effectively and efficiently. Discontinuities between spatial policies to regenerate and sustain rural economies and transport policies must be resolved;
- Similarly there are growing problems with serving outer suburban and extra-urban areas that require similar consideration to rural areas;
- Long supply chains that are liable to disruption and high cost increases need to be reconsidered, moving production and distribution, where practical, nearer to the point of consumption;
- The logistics and transport sectors should take the lead in promoting a reduction in both freight and passenger traffic by supporting alternatives to travel, reduced commuting distances and shorter, more localised supply chains.

1. In the years to come, the early part of the 21st Century is likely to be seen as a transformational period. Political, economic, environmental, social, demographic and technological forces are developing in a way that can be expected to bring about deep-rooted and complex changes in the way we live and work over the next 25 years and beyond. For the transport and logistics industry, the implications are far-reaching. The sector exists to serve society, and will need to adapt with it.
2. This is why the Chartered Institute of Logistics and Transport is developing its vision for 2035. The aim is to understand the impacts that wider societal change will have on transport (and vice versa), to set a context for how the industry will operate in the future and to identify the policy instruments that will be required for transport to serve society as effectively as possible. **CILT recognises that this is not an exact science and requires the exercise of judgement, which is open to different opinions and interpretation. We expect our views to be challenged and we welcome and wish to encourage this debate. This paper is part of the process, not the last word on the subject.**
3. CILT is able to give a unique perspective on how the country's transport system is developing and is likely to do so in the future. Its membership embraces senior professionals involved in the management of all modes of passenger and freight transport, the management of logistics and the supply chain, and infrastructure and transport planning. The Institute has no political affiliations and does not support any particular vested interests. Its principal concerns are that transport and logistics policies and procedures should be effective, efficient and based, as far as possible, on practical experience and objective analysis of the issues. In addition, it acts as a forum for disseminating good practice.
4. In drawing up Vision 2035, CILT has made full use of its expert resources, putting together background papers on the forces and trends that will affect society and transport over the next 25 years, and asking its specialist forums, national and regional groups to comment on the likely impact. In addition to a wide spectrum of CILT's membership, panels of young professionals, industry experts and leading academics have also been asked for their views and involved in the review process. However, we do not claim to have had access to the resources available to, for example, a large consultancy group or a leading university, nor indeed a lengthy timeframe to obtain and collate the views of our members. We hope CILT's vision for the future will stimulate decision makers, leaders of business and the community, the public and the Institute's membership at large to consider how logistics and transport can better serve sustainable development of a strong and prosperous United Kingdom.
5. This is a short report and therefore much of the detail, statistical evidence and references have been omitted. They are available in a background paper.

TWENTY-FIVE YEARS AGO

6. To understand the scale of the change that could take place by 2035, it is worth looking back over the past 25 years to 1986. Whatever vision is proposed, one thing is certain – reality will turn out to be different, and in all likelihood, more radical than anything we can imagine at present.
7. This is brought home by reflecting on some major differences in transport and society 25 years ago. For example, the internet had yet to be created and the first generation of 'brick' mobile phones was being tested. The vehicle tracking systems that enable real time information were in their infancy and the ability to plan journeys in advance by checking on live travel conditions and buying tickets via a mobile phone would have appeared far-fetched. Smartcard ticketing was nearly two decades away in the UK, and cars were largely without the in-vehicle entertainment and guidance systems that are a feature of road travel today. Transport policy was radically different too. In 1986, challenges to predict and provide were only just starting to gather momentum and large road building programmes were still seen by government as the way to cater for travel demand.
8. Organisationally, the state still operated almost all passenger transport services in 1986. The bus industry was just being privatised, and deregulated outside London. Rail privatisation was nearly a decade away, as was the creation of the Highways Agency. Fourteen years after the abolition of the Greater London Council, the Greater London Authority was created with significant devolved powers. This led in 2003 to the introduction of the UK's first major congestion charging scheme.
9. It has not been all about linear progress though. Nineteen eighty-six was a significant year in itself for the completion of major infrastructure projects – both the final section of the M25 and Heathrow Terminal 4 opened in that year. Since then, the M6 toll road represents the only significant new motorway to have been built and no major national rail links have been constructed, although Crossrail is now under construction. Where expansion of networks has taken place, it has often been based largely on expanded air and international travel infrastructure as in the case of Heathrow Terminal 5, Manchester's second runway, the opening of a modern airport at Stansted, and the Channel Tunnel Rail Link (now known as High Speed 1: HS1). Furthermore, opposition to major infrastructure projects has intensified, as witnessed during the famous demonstrations against the Newbury bypass, the campaign against the Heathrow third runway, and current opposition to HS2.
10. In the logistics and freight transport industry, a period of technical and management innovation began in the 1980s, and has been built on ever since. As a result supply chain costs and inventories have more than halved over the last 25 years. The inter-corporation product rivalry was also just as intense as today. However, product standards, packaging rationalisation and industry-wide product coding were very different, as were technological systems in the absence of the internet and wifi. Local area networks were hard wired through switching systems to mainframe computers, and there were no laptop computers. Business was slower, particularly purchasing systems without bank automation. In addition supply

chains have adapted over the past 25 years to changing sources of goods and materials. In 1986 equipment manufacturers and suppliers were far more likely to be UK-based than now, and the idea that nearly all airports and ports would be foreign owned would have seemed unlikely at that time, to put it mildly.

HOW THINGS HAVE CHANGED IN THE UK SINCE 1986: IMAGINE A TIME WHEN...

- Mobile phones could not be used for journey planning (and virtually nobody had one) and the internet did not exist
- Low cost scheduled airlines did not exist and international air travel, except by inclusive tour charters, was largely a luxury item
- Flights across the Atlantic were hours quicker than today (if you went by Concorde)
- No public transport operator had introduced smart ticketing
- Internet ticketing and information services did not exist
- Vehicle tracking was in its infancy and there was no real time journey information or satnav
- Almost all public transport was operated by the public sector
- The rail industry was perceived as a no growth or low growth set of businesses
- Road building was at the heart of transport policy
- Predict and provide was at the heart of transport planning (although some local authorities were beginning to look at demand management)
- Environmental concerns were just beginning to enter public consciousness
- Transport companies made no reference to their environmental performance
- Car ownership was seen as a status symbol (today it is no longer considered an essential sign of social standing)
- The European Union (EU) did not set the legislative framework for public transport and working conditions
- Supply chains were starting to adapt to new service concepts such as out of town shopping centres and the growing number of superstores
- Supply chain costs and inventories were more than double the norms of today
- No one had heard of 'travel plans'
- There was no primary legislation on disabled access and inclusion

11. What will the next 25 years hold, and what challenges and pressures will emerge to shape the way transport systems evolve? CILT has identified key drivers of change and other factors that will need to be taken into account.

FORCES FOR CHANGE OVER THE NEXT 25 YEARS



Will legacy projects such as the London Olympics help ease the strain on urban transport provision?

Demographic forces

12. **Rising population:** The UK (England in particular) is already one of the most densely populated countries in the world. By 2035, this situation will have been exacerbated by a large rise in population, which is forecast by the Office of National Statistics to increase by 14% to 72 million between 2008 and 2033. An extra 10 million people will be resident in the UK, equivalent to the entire current population of Belgium or Portugal. At the same time, the Department of Communities and Local Government forecasts that the number of residents per household will continue to fall creating an even greater demand for additional housing.
13. **Ageing population:** Projections also indicate that in 25 years' time, nearly a quarter of the population will be over 65 (a proxy for 'retired people' although statutory retirement ages are progressively increasing), compared to around 17% at present, and that youth migration to the cities will continue.
14. **Inequality...** Poverty continues to exist and inequalities are also growing – between north and south, rural and urban communities, and indeed within many towns and cities across the land, although there will always be exceptions.
15. **...But incompatible planning policies:** Research by the Institute for Public Policy Research has concluded that by 2025 there will be a shortfall of 750,000 homes across England. With planning policies shifting towards a 'presumption to approve' development at this time of financial austerity, it is hard to forecast where the additional housing will be located, with market preferences strongly tilted towards the south east. In addition, land use patterns reflect car availability and aspirations for mobility although there are mixed views about how far current levels of car dependency are sustainable.

Transport forces

16. **Is demand stabilising?** In the decade prior to the recession, the number of miles travelled by the UK population continued to rise, although both freight and passenger transport grew at less than half the rate of GDP, whereas in earlier years growth was almost proportionate. During this time, the average number of trips per person fell from 1071 to 992 per year (although rail and public transport in London in particular grew strongly). The reasons are not clear and experts disagree. One cause may be road congestion, which has increased appreciably over the past two decades. However, other factors also appear to be at work, including the ageing population, high car insurance premiums for young drivers and a cultural change with many under 25 year olds, particularly in urban areas, no longer seeing the need for or attraction of owning their own car. In addition, teleworking and internet shopping will have had an impact.
17. Structurally, in first the freight sector, and then the passenger sector, travel patterns have become more mature. In the freight sector, the major restructuring of supply chains and distribution systems that followed the establishment of the motorway network have been completed. In the passenger sector, it is possible that the huge changes in trip patterns that accompanied the rise of car ownership may also be approaching completion. In addition, the long standing trend towards lower fuel prices and faster journey times has been reversed, as rising traffic with lower investment has meant that road speeds have been falling rather than rising. Not only is there low investment, but also the belated realisation that pedestrians, bus users and cyclists and local residents all have a stake in the management of road-space has led to a progressive reduction in road network capacity for general traffic.
18. **Or will demand increase in the future?** While new forces have emerged that may impact on travel demand in the future, the Department for Transport (DfT) forecasts continue to predict that transport growth can be expected to resume as the economy recovers and that road travel will increase – by approximately 33% from 2011 to 2035. The extent to which these forecasts are accurate, given current travel trends, will clearly have crucial implications for the level of road congestion and transport policy. It should also be noted that commuter journeys are getting longer reflecting a mix of social and economic trends, in addition to rises in inner suburban house prices.
19. In terms of vehicle kilometres, heavy goods vehicle (HGV) traffic was broadly stable over the decade prior to the recession, although there was an increase in tonne km, accommodated by a switch to larger vehicles. To an extent recent falls in the number of vehicle movements during 2009 and 2010 were due to the recession. Light van traffic has been growing strongly with an increase of approximately 25% in the past 10 years. Demand forecasts produced for the Freight Transport Association (FTA) predict that by 2020 HGV traffic will increase by 9%. Deep-sea container traffic is forecast to rise by 180% by 2030. The DfT forecasts that by 2035, HGV traffic will have grown 20% and LGV traffic doubled. Rail freight traffic has grown by 50% over the past decade and is forecast to grow 84% by 2020 according to the FTA.

20. **Public transport on the up:** Rail travel has boomed since privatisation with journeys increasing 61% to record post war levels, due to rising road congestion, better train performance and competitiveness against both cars and domestic air services. Government has outlined an aspiration to double rail travel by 2035. The historic trend of falling bus patronage has ceased in many areas in recent years, partly as a result of the introduction of the free national concessionary fares policy for the over-60s in England in April 2006 (the devolved administrations had introduced national schemes earlier). Since 2004/05, bus travel has increased by approximately 15% in England, with patronage rising over 20% in London, and by approximately 15% in the English shire counties. However, the loss of bus passengers as a result of reductions in services in rural areas (leading to increased car use) and reduced subsidies in many conurbations is a contributory factor to increasing congestion in towns and cities and the arterial routes leading to them. Whether the concessionary fares policy will remain affordable, especially with a very quickly growing population segment over statutory retirement age, is questionable.

21. **Minimal rise in car travel:** The total distance travelled by car rose 8% in the decade prior to the economic downturn, but only 2% between 2002 and 2009, before falling 2% following the onset of the recession.

22. **Price of travel rising in real terms:** Bus fares and the cost of driving (excluding car purchase price) have both increased at a similar rate and faster than rail fares over the past decade. All have increased substantially in real terms. However, when car purchase prices are taken into account, the real costs of motoring have actually fallen significantly. How far these trends and relationships continue will depend on a range of factors including the extent to which new vehicle efficiency offsets rising oil prices and future taxation and subsidy regimes.

23. **Varying prospects for domestic and international air transport:** Domestic air transport has been declining over recent years partly because of a switch to rail, although the low-cost carriers have developed domestic routes based on Gatwick, Luton and Stansted to serve principal regional airports including Ireland. Further routes opened up by lower-cost domestic carriers serve niche markets between other regional centres within both Great Britain and Ireland. International air transport has generally continued on an upward, albeit less steep, trend, and is now recovering from a dip during the recession and the major carriers have reallocated their valuable slots at Heathrow to expand international services at the expense of their regional and short-haul European networks where high speed rail using the Channel Tunnel is more competitive. In future years, the impact of air travel generated by the BRICS (Brazil, Russia, India, China and South Africa) bloc, especially India and China, is likely to be fully felt.



The Committee on Climate Change states conventional cars and vans will need to be fully phased out by the mid-2030s in favour of electric or hybrid vehicles. Vauxhall's Ampera represents one of the first wave of such vehicles.

Economic forces

24. **How the economy performs:** The banking crisis, large public sector debt levels, the need to tackle the budget deficit and high levels of household debt mean there is little short term optimism about the UK's economic prospects, at least for the next decade. The Office of Budget Responsibility expects GDP to grow 1.7% in 2011, then 2.5% in 2012, 2.9% in 2013 and 2014, falling to 2.8% in 2015. The government's economic forecasts for the next 25 years indicate that GDP will remain, on average, below 2.5%/year from 2017 onwards. The government's economic forecasts for the next 25 years indicate that GDP will remain, on average, below 2.5%/year from 2017 onwards. During this time, the ageing population and other factors will increase demand for resources across many government departments, which may impact the funding available for transport. The service sector is expected to grow more rapidly than the rest of the economy, leading to higher growth in cities such as London, Manchester, Birmingham, Bristol, Cardiff and Edinburgh. UK employment is forecast to increase from 29 million in 2009 to 30 million in 2015. Over the longer term, slower growth in employment is expected because of the ageing population, although this will be partly offset by higher retirement ages. Whether such forecasts are accurate is clearly uncertain. Trading with other countries, particularly those with faster growth, becomes an even more important way of ensuring that the UK economy remains healthy.

25. **Environmental costs not reflected in cost of goods and services:** Currently, the market price of commodities does not reflect their true cost to the environment. However, that is starting to change as global resources become more stretched and the environment more stressed, driving up prices in food, energy and rare metals.

26. **More demand for 24-hour services:** A recent paper by the Independent Transport Commission suggests that there will be a marked rise in demand for 24-hour services, which will have an impact on demand for transport. It quotes research showing that by 2020, the number of people shopping, visiting restaurants, going to the cinema and theatres or carrying out household business via the internet between 6pm and 9am the following morning is forecast to have almost doubled to 13 million – a quarter of the adult population. 24-hour living reflects the increase in global commerce – agile businesses work night and day according to the time zones of key partners. However, many cities outside London and the major university centres still close down by 10pm.

27. **Costs of energy:** Globally, Shell and BP forecast that energy demand will increase by approximately 30-40% by 2030, with non-OECD countries accounting for the entire rise. Oil and gas prices are expected to continue increasing substantially, although it is generally considered that sufficient resources will still be available. The UK government's programme to build a new generation of nuclear power supply and windfarms etc, could lead to considerable decarbonisation of the electricity supply and a major increase in energy costs.

28. **Road congestion costs are high and will increase:** Road congestion is already costing the economy dearly. In 2006, the Eddington report estimated that the congestion related costs in the UK are about £7-8 billion/year. It forecasts that if congestion were left unchecked, by 2025 the costs would rise by an extra £22 billion/year in England alone

Environmental forces

29. **High probability of climate change:** Climate change science shows that by 2035 there is a 77-99% probability of global temperatures rising by at least 2°C, which will have significant implications for the UK. Increases in extreme weather events including drought, flooding and storms are likely. A second, much bigger Thames barrier will have become necessary, with rising sea levels.

30. **Transport emissions will come under scrutiny:** Transport is the only sector of the UK economy whose GHG emissions have not declined since 1990 – they actually increased up to 2007 but fell back as a result of the economic crisis so they hardly changed between 1990 and 2009. Domestic transport accounts for 22% of UK GHG emissions. As a result, reducing transport emissions should be given higher priority.

31. **Emissions reduction targets already under pressure:** In 2010, UK greenhouse gas emissions rose by approximately 3% - the first rise since 2003, primarily as a result of the cold winter and a change in mix of energy use away from nuclear. Cambridge Econometrics forecasts that, despite the recession producing a sharp fall in emissions in 2009, the government's current policies will result in its carbon budget targets being missed narrowly in the first two budget periods (2008-12 and 2013-17), but by a wider margin in the third (2018-22). These figures relate to the whole economy and not just transport.

32. **Ambitious aims for car fleet replacement:** Universal replacement of the conventional car and van fleet with electric and hybrid vehicles is central to the government's policy to reduce transport emissions. The question is when this will need to be achieved. The target for the

UK as a whole is to reduce emissions by 80% compared to 1990 levels by 2050. Applying this scenario to surface transport, the Committee on Climate Change (CCC) forecasts that 31-37% of the nation's car fleet will need to be electric or hybrid by 2030 and that all new cars will need to be powered by these sources from 2035. New initiatives and developments will need to be put in place for the required changes to take place. Further subsidies could be necessary to reduce the cost of purchasing electric cars and vans, their range will need to rise, an extensive recharging infrastructure will need to be provided and the capacity of the nation's electricity supply will need to be increased. Together, these represent considerable challenges. It is also possible that the target for fleet replacement could need to be accelerated. The CCC believes that, given what is possible in other sectors, it is likely that surface transport will need to reduce its emissions by at least 90% by 2050. The implication is that conventional cars and vans would need to be phased out by the mid-2030s, given timescales for stock replacement. The CCC also forecasts that air passenger growth of 60% between 2005 and 2050 would be compatible with the government's climate change targets, despite the fact that there is no real alternative fuel for aviation, other than a small contribution from biofuels. There are however, significant opportunities for technological and procedural improvements to enable the industry to meet its environmental targets.

Political forces

33. **Changing role of government could lead to new regional bodies:** All the main UK political parties now appear to accept that the role of government is to create the conditions for economically successful and stable communities with regulatory intervention in the private sector focusing on protection of safety, consumer rights and the environment. The current trend of government thinking is very much towards localism and devolution of responsibility. Although the current coalition government has made a considerable show of abolishing regional government offices and regional development agencies (RDAs), a new form of regionalism is already beginning to emerge, with councils being encouraged to share services across boundaries and a number of Local Economic Partnerships being set up with a regional scope. Perhaps significantly, the conurbation Integrated Transport Authorities have been retained by the government with strategic highways powers recently added. The McNulty review of the rail industry proposes that they be given increased powers over local rail services in their areas. The influence of London's devolved administration in the capital's economic success is also self-evident. Given these factors, it should not be long before a new tier of regional government emerges.

34. **Balance of power is changing:** The availability of global capital to multinational corporations and public funding pressure is increasing the private sector's economic power and ability to influence policy, leading to responsibilities shifting from the public sector. New partnership models are developing and the private sector (and to an extent the voluntary sector) is increasingly becoming involved in the detail of planning public services and determining outputs, as well as their delivery.

35. **'User pays' becoming enshrined in government thinking:** The principle of shifting the burden of funding public services progressively to the user is enshrined in government thinking - from university education to rail travel. This trend can be expected to continue for any service for which a charge can realistically be levied, but there is no current consensus in favour of road charging, locally and nationally, outside central London and no appetite to end rail subsidies. This raises serious questions about equality of opportunity that are particularly critical in the transport sector as an important 'enabler' – providing access to jobs, education and healthcare etc. Higher charges for using transport, at the point of consumption rather than through taxpayer subsidies, could be seen as socially divisive. It is therefore important that road charging should incorporate measures to help poorer people dependent on the use of the car. These could include offsetting reductions in VED and fuel duty and measures to encourage flexible working hours to avoid peak charges.

36. **International context:** Internationally, a number of factors will have an impact on UK transport in the future, including moves to open long distance railways to competition, and legislation setting out a framework for heavy goods vehicle tolls. Supply chains will potentially be impacted by factors in the developing world, including the expansion of Chinese (and Indian) influence in Asia, Africa and Australia, conflict zones, which may affect water, oil, gas and food supplies, and the expected increasing numbers of natural disasters such as floods and droughts and their consequences. Migration of rural populations to cities will have a significant impact on agriculture. Rural and urban populations are approximately equal at present, but by 2050 the United Nations (UN) forecasts that 70% of people will live in urban areas. UN forecasts suggest that this urbanisation of the global population coupled with the impact of global warming will also result in higher levels of immigration from poorer countries into the UK and other wealthy nations.

Technological forces

Vehicle power sources

37. **Price and range limits appeal of electric cars:** Trials of new battery and charging technologies are advancing with solutions being devised to extend the range of cars and accessibility of charging points, through solutions such as smart grids and inductive charging. However, at present cars in commercial production typically have a range of up to 100 miles and need to be charged overnight. In its December 2010 report, CCC forecast that the price of batteries and current purchase costs would not make electric cars competitive with conventional ones until the 2020s. It remains the case, however, that efficient small diesel powered cars have lower life-cycle carbon cost than electric cars at this stage of development, and the Society of Motor Manufacturers and Traders (SMMT) expects electric vehicles to remain a small part of the market for new vehicles for many years to come. The limitations of battery technology on freight are considerable – the battery for a 38t HGV would need to weigh about 50t assuming current and expected technological constraints.

38. **Viable case for alternative fuels not proven:** Alternative fuels such as Liquid Petroleum Gas (LPG) and Compressed Natural Gas (CNG) may be viable if diesel and petrol prices move beyond a sustainable commercial price, but the investment in vehicle conversion, as well as fuel distribution and storage, would be significant as would the lead time in moving from oil dependency. In addition, most analysts predict that due to the concentration of gas resources in limited hands (notably Russia) and reflecting current market behaviour that, as demand rises and other fuels become more expensive, gas prices will rise accordingly. This would rapidly wipe out much of these solutions' advantage, apart from lower relative CO₂ emissions. Biofuels from plant production are no longer considered to be a viable solution for widespread use due to concerns over agricultural land resources and economic impact on food production, although production of biofuels from other feedstocks including waste products may have a contribution to make. Hydrogen powered electric vehicles emit zero CO₂ at the point of use, but hydrogen production consumes a very large amount of electricity, and hydrogen can be difficult to distribute for individual consumption.

Information technology

39. **Communicating with vehicles:** With their sophisticated electronic control and amenity systems, new cars, buses, trains, vans and trucks are in effect mobile computing platforms. This allows vehicles to communicate with remote monitoring and advice systems, with each other and with smart infrastructure in any location where strong network communications are available either through GPS or beacons. Potentially, making use of this connectivity in conjunction with cloud computing or other networks will open up a new world of possibilities to reduce traffic congestion and provide in-vehicle facilities.

40. **Information and ticketing:** Although internet and mobile provision of transport information and ticketing have been available for some years, their potential has yet to be fully exploited. Developments in this area can be expected to have a significant impact on the efficient use of transport infrastructure, promote modal shift and should radically improve service quality. Just as few would plausibly have foreseen the latest developments in mobile phone applications, the services that will ultimately be provided through these technologies may be significantly more advanced than anything we can imagine today.

IMPLICATIONS FOR THE LOGISTICS AND TRANSPORT SECTOR



Government plans to double rail patronage by 2035 will require HS2 to be delivered. Domestic high speed services already operate on HS1.

41. This review of the forces that will impact on transport over the next 25 years is not meant to be exhaustive, and there will inevitably be debate and uncertainty over their likely implications. For example, DfT travel demand forecasts do not necessarily correlate with the experience of recent years prior to the recession – ie little growth in car and HGV traffic. There are also alternative views on, for example, the future costs of car travel as vehicles become yet more fuel efficient. Nonetheless, CILT's discussion of current trends among expert members, forums, devolved nations and regions suggests that there are some clear directions in which transport policy and service provision should evolve in order to ensure the transport and logistics sector deals effectively with the issues discussed above.

Freight transport

42. Over the next 25 years, societal, economic and environmental pressures can be expected to create increasing demand for agility and flexibility in the supply chain. This will provide businesses and consumers with the service quality they require. All sectors of the economy and society will be impacted by the success of government and the logistics sector in rising to this challenge. The ability to do so will affect local prosperity, national environmental performance and the business results of retailers, manufacturers and food producers, as well as other, perhaps less obvious, sectors such as defence, banking and health.

43. Domestic pressures, such as infrastructure capabilities, the likelihood of increasing time-sensitive demand for goods (fuelled by population growth and consumer tastes), and congestion levels will have a direct influence on the solutions required. So will international pressures including aspiration in the Far Eastern economies and political reaction to Chinese economic influence in Africa and South America to secure raw materials. Such global factors

may raise factory gate prices and compromise predictable deliveries to the extent that some manufacturing returns to the EU and the UK.

44. *Industry organisation:* In response to changing societal, political and economic demands, the logistics sector can be expected to adopt a range of initiatives, some of which are already being considered. The aims should be to minimise the impact of road congestion on supply chains, reduce costs, minimise CO₂ emissions and improve service to customers. Solutions could involve stepping up the creation of collaborative supply chains through sharing data, standardising business processes, and pooling vehicle fleets and warehousing capacity. One ambitious objective should be to eliminate empty running as far as possible.

45. New possibilities in automated warehousing could also become available to speed up order processing, and new market matching mechanisms could be developed, such as web freight exchanges, where shippers and enablers match routing and capacities so that small and large companies can arrange consolidation. Major corporations in a number of different industries (for example automotive and consumer goods) could use third party logistics companies as the enablers to make the new arrangements work.

46. Differentiation in the supply chain, channel management (where supply chains are segmented according to the service and cost requirements of the customer), and collaborative partnerships between logistics operators would increase the opportunities for multi-modal transportation. These would include short sea and barge freight to reduce emissions and congestions further. In the future, distributors and manufacturers of all sizes will also be encouraged to form partnerships to provide education and employment.

47. Efforts to conserve existing operational and mothballed and redundant wharves on inland waterways should be made a priority, as few sites are suitable or viable in other places. Recent sales of such sites for development have created a significant barrier to future recovery, redevelopment and use. The management of coastal access points and inland waterways will need to be significantly strengthened, and funding made available for their ongoing development.

48. Urban freight quality partnerships incorporating amenity and citizen groups could be further developed to balance energy-efficient night time deliveries with their impact on society. Noise reduction could be achieved through use of electric vans and improved handling equipment and techniques designed to minimise the noise from transhipment. Hierarchies of rings of regional distribution centres radially linked with inner-city consolidation centres would increase the efficiency of urban re-supply, combining energy efficiency and low emissions whilst maintaining low operating costs: these systems are already being trialled.

49. *Making use of new technology to supply consumers:* The roll-out of social networking to drive more efficient and effective supply chains is expected to gather pace and will allow consumers much greater product and price selectivity. On-line choices could include taking account of the end-to-end carbon footprint of the supply chain when making purchasing decisions, which could potentially be reflected in price including carbon offsets. CAD-CAM technologies linked with the social communications network could enable consumers to select the final product specification and the delivery medium to match their financial position and environmental

The logistics sector can be expected to adopt a range of initiatives in response to economic and political demands. Truck manufacturer Volvo envisages long rigs driven nose to tail along green corridors as one solution.



There is a move to larger and larger container ships.
(Courtesy Hapag-Lloyd)

priorities. Services to residents and efficient delivery could also be enhanced by applying social media and cloud computing technology to rationalise the 'last 500 metres' of distribution, to cater for customer choice and operational performance relating to home shopping.

50. Such choices and changes would involve a range of technologies incorporating individual orders from sophisticated cottage industry to batch manufacture by local urban or rural subcontracting service providers. Sustainable delivery choices would be selected by the consumer. They could include powered cycle, electric vehicle, community bus or tram or, out of peak hours, autonomous automated taxi. Products would be distributed to a local collection centre with a bare minimum of outer packaging for pick-up at digitally accessible secure lockers (these are already in place for the maintenance trades). Consignment track and trace would be as accessible to the public as it is to the freight 'integrators', such as DHL, now.

51. **Partnership with government:** All parties will need to act in order to form a more productive relationship between public and private sector. The industry will need to develop a coherent, collective approach to planning and strategy development with government - at present, policy advice and lobbying is too frequently driven by modal interests and industrial sector demands. Government has recognised that it needs to take a new perspective on freight policy. Change will need to deliver a supply chain that can sustain economic competitiveness and the service standards society demands in the future.

52. Government clarification of competition law, which remains a considerable impediment to the development of shared networks, would assist in maximising the effectiveness of 'horizontal collaboration' between logistics operators. Restrictive planning rules need to be re-examined also. For example, new collaborative ventures such as regional distribution centres and city hubs require changes to the planning regime, as recent attempts to create

such a network have been unsuccessful. There should also be explicit government recognition that effective freight transport capacity and reliable journey times must be key priorities to support recovery and growth. Segregating passenger and freight traffic as far as possible, whilst ensuring the right pricing signals are in place on road and rail, could be the key to making most efficient use of the nation's transport network.

53. Given constraints on funding, there could be potential to use hybrid financial models such as PFIs and similar instruments to finance infrastructure. On the rail network, longstanding aspirations for the completion of a strategic inter-modal freight network connecting the nation's ports and linking with road freight distribution centres should be one of the premier priorities, building on rail enhancement schemes currently under development. Towards the end of the next decade, it may also be clearer whether additional capacity will be available to move some freight to existing passenger routes as a result of the construction of HS2.

54. If the balance of manufacturing remains in the Far East as expected, UK port capacity will also need to be addressed. Ongoing programmes to reduce shipping costs have seen moves to larger and larger container ships with increasingly short turnarounds. However, at present, few major UK ports can accommodate these new ships. Examining the feasibility of expanding regional port capacity to exploit short sea services would overcome this issue and enable shipping companies to unload cargo as close as possible to its destination.

55. Although logistics has now been recognised by government as a central pillar for promoting business expansion and efficiency, building a sustainable freight transport policy will still need co-operation between the private sector and a wide range of government departments and public sector bodies. These include: departments and agencies responsible for competition, trade, business and employment; maritime and port authorities; local enterprise partnerships; and those involved in foreign aid.

National passenger networks

56. One of the crucial issues where a view needs to be taken when setting out a vision for transport in 2035 is the underlying demand for travel. Changes in travel behaviour are likely to have a lasting impact on limiting trip length and growth in journeys made. However, in CILT's view, the evidence suggests that the overall demand for mobility over the next 25 years will continue to rise, as the economy grows and population increases. Without appropriate policy intervention road congestion and journey times can be expected to increase with subsequent impacts on economic competitiveness and quality of life.

57. On the rail network, the government's plans to double patronage by 2035 will require at least the additional and released capacity forecast for HS2 to be delivered as well as other committed schemes. New investment in both south east and regional networks that are either heavily congested or provide inadequate interurban links (eg TransPennine and Northern's urban networks) will also be required. The potential of scheduled coach networks to increase their contribution for inter-urban movement is considerable, particularly if measures are developed to reduce congestion on motorways and trunk roads.

58. However, central government funding for new transport infrastructure to cater for any growth over and above currently committed schemes (largely those on the passenger rail network) is likely to be severely limited during the next decade, at least, by economic conditions.

59. Therefore adoption of policies to change behaviour, and/or raise revenue may become increasingly important. Road user charging is the most obvious instrument available and it is likely that the case for a scheme will be given new life by several factors, including the need to reduce congestion, raise revenue for transport investment, reduce emissions and compensate for tax losses. As and when electric and hybrid cars and vans become more common and petrol and diesel engines more fuel-efficient, government will lose a major part of the revenue from vehicle fuel duty, which could well amount to 50% of the present take or some £15 billion/year – more than the entire public expenditure on transport infrastructure. The level at which the charges would be set would have a direct bearing on future infrastructure requirements, the potential for modal shift, environmental performance and the level of funding available for investment. Ideally, charges should be set at a level that reflects the marginal social costs of road transport comprising:

- Congestion inflicted on other vehicles, which varies with vehicle type and traffic volume;
- Road damage, which is sensitive to axle load and road quality;
- Environmental and accident costs, which vary widely with vehicle type and geographical location.

60. The government of the day would certainly face opposition to the proposals for road user charging, although several factors mean opposition may be less strident than can be expected at present. These include the extension of 'user pays' principles in other public services, greater public awareness of the adverse impacts of climate change and potential complaints about it being unfair for electric cars to pay little or no duty while fossil fuel vehicles are heavily taxed. But these influences might be offset by equity issues if the current high levels of taxpayer subsidies for rail users continue.



Demand for international air capacity will grow. Larger planes such as the Airbus A380 partially reduce the impact of increasing passenger numbers by reducing the number of further flights needed.

61. If road charging becomes reality, then the pricing of other modes should also be amended as far as possible to become consistent with the rationale for road pricing. This could have a significant effect on demand for rail and coach travel and also the infrastructure requirements. Substantial additional rail capacity would be required to accommodate a small shift from road to rail; however, there would be a reduction in rail demand if rail subsidies were reduced to reflect the 'user pays' philosophy. On the motorway network, additional capacity could be provided for coaches and high occupancy vehicles by enabling hard shoulder running as or before road pricing is introduced.

62. The introduction of road pricing would also be consistent with a recast of the Highways Agency (HA) as a regulated utility either in public or private sector hands (although this is not a necessity). This could lead to higher quality service levels through enforceable, independently determined targets to improve user experience. A degree of competition could also be introduced by franchising comparator routes through which to measure efficiency. The government may decide that for political reasons the HA should remain a public sector body, or alternatively, full privatisation could raise considerable sums. Whatever course is taken, road user charging and/or sale of the road network should be accompanied by guarantees that revenues will be hypothecated for necessary transport projects.

63. Meanwhile, by 2035 domestic air travel (which is at most 20% of the UK civil aviation scene) can be expected to have declined further where there is improved rail competition, including high speed. Routes with high transfer loads to long-haul services will continue to move to overseas hubs, a trend that will not be reversed by a HS2 link to Heathrow. Fuel price rises may have an impact, though the industry has survived major increases in the past. Demand for international capacity will grow and, although current policy means that there will be no near term solution to runway shortages in the south east and therefore a constraint on the ability

of UK business to trade, a wise government would ensure that nothing is irreversibly ruled in or out in the longer term. Market oriented road, rail and air inter-modal transport hubs should be created at the busiest airports to encourage greater use of public transport, following the models developed at Heathrow and Manchester. There will of course continue to be opportunities for cross country domestic services meeting the needs of important niche markets.

Environmental performance

64. Environmentally, the government's policy to reduce transport emissions depends heavily on the introduction of more efficient petrol and diesel engines, followed by decarbonisation of electricity supply and almost universal adoption of electric cars and vans. This may well turn out to be an overoptimistic scenario and place too much emphasis on conversion of the car and van fleet. A fundamental issue is investment to provide the infrastructure to support widespread use of electric vehicles. But assuming that funding is forthcoming and that electric vehicle use does become common, a number of factors could potentially prove problematic to delivering the levels of ownership required to achieve government environmental targets.
65. An electric road fleet would increase the national electric power output requirement by approximately 20%. This is a major challenge in its own right, when the power generation industry is facing its de-carbonisation. Before that stage was reached, more efficient petrol and diesel engines and lower taxes on electric car use could offset, to a greater or lesser degree, increases in fuel prices. This, in turn, could lead to additional distances being travelled, limiting reductions in emissions from petrol and diesel engines and subsequently placing additional pressure on decarbonised power generation capacity. It could also lead to road congestion rising faster than it would otherwise have done.
66. As noted above, as more vehicles switched to electric power, taxes on petrol and diesel would become increasingly inadequate as a means of charging for road usage. Therefore regulatory measures requiring improvements to the fuel efficiency of new petrol cars and any incentives the government introduces for consumers to purchase electric cars would be most effective in reducing carbon emissions and congestion when combined with road pricing. Further policies that could be considered to meet reduction targets for emissions might include additional measures to encourage modal shift to public transport, measures to reduce demand for travel and potentially the introduction of personal carbon budgeting.

Organisational arrangements

67. Momentum may develop in due course for new regional or city governance structures, despite the recent abolition of government offices and Regional Development Agencies (RDAs) in England. One benefit that could be expected from devolved responsibility and funding is the closer integration of land use planning controls and policies with transport strategies, as in London. These include greater tax raising and/or borrowing powers for the devolved governments and city or regional authorities, reinforced by greater use of 'user pays', enabling significant investment in transport infrastructure to be funded locally. The experience of the devolved governments and London suggests that this could be expected to lead to greater priority being given to investment in public transport. It may also encourage denser urban development, which is more favourable for walking, cycling and public transport and also reduces average trip lengths. Local policy initiatives that regional or city authorities could examine independently or in conjunction with central government include:
 - Large single level station car parks being converted to multi-storey and developments being constructed on the land freed up or above the tracks;
 - Encouraging employer-led local partnerships to ensure that workforce supply meets demand for employment, avoiding the need for long distance commuting;
 - Use growth in one person households as an opportunity to increase density from town centres outwards so pedestrian desire lines correspond with shortest distance to facilities (the Almere model);
 - Develop easily accessible software to enable people to share cars and make instant multi-modal journeys as environmentally friendly as possible;
 - Tax incentives to ensure that empty and under-occupied premises are utilised consistently in line with the aspiration to reduce need to travel (especially in town centre settings).
68. Major changes may also be brought about by the next generation of rail franchises. It is difficult to predict exactly what they will be, but potentially, over the next 25 years, vertical integration models could lead to engineering firms becoming significant partners in bids and even dominant partners if new specifications include a requirement to integrate transport use with new housing and or commercial development. This could have a profound impact on the ownership of public transport companies and the integration of transport into urban fabric. This is consistent with trends to Transit Oriented Development (TOD) evident in rapid transit development in the Americas and Asian economies such as Hong Kong and Singapore.

Customer information and payment technology

69. At present the true potential of information technology to manage demand through informing customers of alternative travel options at various times of day is just beginning to be explored. Real time generally mode-specific information is now widely available, as are text or e-mail alerts on service arrival times and disruptions. Mobile and smart ticketing is becoming more common as is the ability to purchase on the move through mobile devices. The concept of mobility management packages combines all aspects of existing information and retailing systems. This involves integrating databases containing available transport resources, pricing and real time travel information for all modes with multi-modal journey planning engines to create bespoke itineraries for users. Experts' views differ about what these systems may include and how quickly they might become widely available, but they will have a radical impact on people's travel choices and help maximise efficient use of existing transport resources. In homes served by Fastrack BRT services in Kent Thameside people already have the ability to call up the times of next buses at the nearest bus stops on a display that can also monitor household systems; it is a small step to link such systems wirelessly to internet connected devices (desktop or mobile) to journey planning capabilities.

70. Developed mobility management systems would mean that before leaving home, people could be presented with a variety of options, including, the quickest way of travelling to their end destination, the cheapest way of doing so and the most accessible. In addition, a range of alternative options could be presented incorporating fees for car parking, availability of lift-sharing within the locality, car hire, all modes of public transport and taxis, enabling informed choices to be made on how to travel, taking into account both price and convenience of making journeys at different times of day. In this context flexible road user charging, including congestion charging when appropriate, would enable most efficient use of transport capacity, as well as raising funds for incremental improvements to the system - a further argument in favour of charging in urban areas alongside the environmental, economic and taxation considerations discussed above.

71. Future payment options would include smartphones (or their successors) enabling users to be tracked and billed automatically or through contactless bankcards at gate lines and card readers during various journey stages. The new payment technologies would facilitate pricing which further optimises the efficiency of public transport and road systems by enabling charging for each mode to be adjusted dynamically according to real time capacity availability. However users should know and fix on departure the costs for them. For those without bankcards or smartphones, other solutions such as smartcards and more traditional information sources will need to be enhanced.

72. The case for providing mobility management packages in the future could be made by local authorities tendering services to specialist providers in order to maximise the efficiency of transport networks and reduce investment requirements. An alternative scenario is that the government's current open data programme and current EU moves to promote competition in ticket retailing markets could lead to new services being developed commercially on the back of revenue generated from commission and value added services.



Denser urban development will require improved transport infrastructure.
(Courtesy Nissan GB)

Collective mobility

73. New and emerging information and payment systems form part of a vision for 'collective mobility' (including local rail, bus and tram services, community transport, taxis, lift-sharing and car clubs). This could become increasingly important in the future for a number of reasons, including:

- A need to maximise the value provided by transport systems given scarcer investment resource;
- The need to limit the impacts of congestion;
- The trends towards younger people opting not to obtain a driving licence and for older people to cease driving whether by choice or for medical reasons;
- The likelihood of alternative options being required to reduce emissions;
- The ageing population increasing the number of people reliant on public transport;
- Moves to a 24-hour society reflecting changing life patterns in a global economy.

74. Internationally, the vision for collective mobility is being promoted by the International Association of Public Transport (UITP) with the stated aim of doubling the market share of public transport worldwide by 2025. This ambition is named 'PTx2' and many cities are already working towards this goal. UITP's view is that strong political will, intelligent urban planning, the right balance between private cars, public transport, walking and cycling, good operating conditions and a dynamic public transport sector are some of the essential ingredients needed to keep cities moving. Successfully implementing the concept can be achieved by following the agenda set out below in paragraphs 75/81 below. CILT thinks that this or something similar is a useful mechanism for promoting the necessary behavioural changes in the UK as well. Similar principles can be applied to other areas of transport and logistics.

Some radical advances in transport could take place over the next 25 years. The innovative bus design pictured can also carry freight.



75. **Integrating collective mobility into society:** Both national and local policies should recognise the need for mobility and effective means of providing it. For example, spatial and transport plans should ensure that collective mobility services are designed into existing communities, regenerated areas and new development, and can be provided efficiently. Transport infrastructure is an important part of the public realm - standards of design should enhance the look and feel of the locality and can set the tone for surrounding developments, and collective mobility services should improve quality of life and help protect the environment. Price mechanisms, including modal charging, may have a role here too, to optimise demand patterns and create investment funding.

76. **Partnerships:** Collective transport should involve partnership between all stakeholders: operators, transport authorities, business and community representatives. The fruits of such partnership might include appropriate priority for public transport vehicles (delivered either physically as priority lanes or virtually through advanced traffic control systems), new business opportunities (eg tourist use of services) or joint promotion and marketing.

77. **Customer focus:** Every customer is an individual and collective mobility businesses should recognise that many customers have the choice of using personal transport and, for some of them, business competitors. Staff should be trained to provide high standards of customer service taking account when necessary of disabilities and communications barriers. Personal safety and security is a key concern of travellers and both staff and equipment such as CCTV should be deployed to deter threats and reassure customers. High standards of information should be available to assist customers in planning their trips, at stops and termini and in the course of their trips, particularly at interchanges or in case of disruption.

78. **Innovative and integrated services:** An integrated service hierarchy spans all modes of collective mobility from taxis and shared cars through buses and coaches to suburban rail systems. All should be integrated into a single system regardless of ownership and information and ticketing services should be designed to achieve seamless travel. Levels of service provision should be appropriate to specific communities, ranging from demand responsive services in areas of low demand, such as rural hinterlands, through to rail or bus rapid transit corridors linking key urban and suburban centres. Innovative services should take advantage of high standards of vehicles together with communication and control facilitated by advanced IT systems for a variety of purposes including personal travel planning, responsive scheduling, customer information and payment.

79. **Greener mobility:** Intrinsically successful collective mobility systems should lead to a greener society by reducing traffic levels but changes in the fuel mix can both accelerate positive change (where electric vehicles and fuel cells are used) or restrict it (where oil-fuelled vehicles with particulate filters increase fuel consumption). Fleet operators need to consider the environmental impacts of their vehicles and take action to minimise emissions subject to any constraints imposed by the need for particular type of vehicle (eg diesel inter-urban buses and coaches) in their fleets. Transport authorities should play their part by adopting traffic management regimes and traffic signal control plans that aim to optimise environmental performance of the highway network.

80. **Sustainable finance:** Current transport networks have a mix of funding streams including fares paid by travellers, nationally funded grants for infrastructure and for operators, concessionary travel reimbursement and local service subsidies. Ideally a national compact should be agreed for public funding, preferably based on no more than two streams, one for infrastructure and one for service support, available to support collective mobility at appropriate local or regional levels. Other revenue streams may be agreed locally from sources such as business or consumer levies (similar to the Versement Transports for businesses in France) on the principle of obtaining fair contributions from beneficiaries of transport services.

81. **Developing people and sharing best practice:** Successful organisations develop their staff through training and supported learning – customer care has already been instanced – to appreciate the values of their business and continuously improve performance. Through professional organisations and vocational training courses best practice is transferred between all industry players.

Catering for all sections of society

82. **Ageing population:** By 2035, a quarter of the population will be aged over 65 and this age group can be expected to become increasingly vociferous and powerful. There will be a need for businesses to recognise this segment of the market in a way that they do not today. For example, although many basic health needs may be dealt with at arm's length by using ICT reducing the requirement for many GP visits, there will be a counterbalance of older people wanting to make use of leisure facilities. Seamless travel and interchange will be high on the list of requirements of this demographic. As the current increasingly ICT aware population ages the requirement to ensure that low-tech solutions for public transport information and

retailing are retained and enhanced alongside new solutions will reduce although some time-lags are inevitable as technology advances. It is also possible that transport services may be rethought and integrated with other requirements to cater efficiently for the wider social needs of older people. One possibility is that as internet shopping becomes more and more embedded in consumers' lifestyles, a new role for delivery drivers could emerge in checking the welfare and wider needs of elderly customers. Other innovative ideas will no doubt emerge as this vision is debated more widely.

83. **Equality of access and social inclusion:** These issues are embedded in today's society and will be even more prevalent in tomorrow's world. Coupled with the provisions of key primary legislation such as the Equality Act 2010 and its raft of duties and requirements, it is vital that any strategic vision such as this document keeps in step with an inclusive and integrated society. The next 25 years sees a major opportunity not only to 'think access' but to ensure that the way in which we as a profession 'do' transport is truly accessible in terms of participation and engagement processes - adopting new and innovative ways of engaging the public and hard to reach groups, including harnessing of technology to aid the consultation process.

84. **Rural transport:** Providing financially sustainable mobility in rural areas has been a difficult problem. At present, cuts in government spending are putting new pressure on existing rural public transport, prompting a diminished service, which in turn encourages even higher car ownership, creating a vicious circle of public transport decline. In the recent recession the impact of higher motoring costs, especially insurance for younger drivers, and increasing fuel costs, have seen the first significant reduction in car ownership for decades and thus reduced mobility for some.

85. In many rural areas, solutions developed over the next 25 years are likely to involve constructive use of the private car, enhanced by more car-sharing in the form of organised lift-sharing or community car clubs facilitated by the internet communication revolution and local social networks. One impact of a national congestion charge could mean that on lightly used rural roads there would be no charge or even a negative payment or implied subsidy to reduce the cost of rural motoring. There could be complaints from town-dwellers that they were subsidising comfortable rural lives, but overall this might be a cheaper option than maintaining public bus services beyond meeting school transport needs. The costs of motoring, however, would probably still be an issue depending on the availability and price of fuel.

86. Rural rail accounts for a very small proportion of journeys, but unless a future government were prepared to face the unpopularity of closing branch lines, services may need to be optimised, by applying light rapid transit techniques to reduce costs and improve frequency. There is also considerable potential on many such lines to promote sustainable tourism using rail and local bus services as well as cycling and walking. These networks could potentially be brought under greater local influence. Where frequency is sufficient, park and ride opportunities can be promoted to reduce the car journey element of commuting from the urban halos created by affluent urban workers and retired people relocating to the less crowded countryside. The rejuvenated Settle-Carlisle and recently electrified Leeds/Bradford-Skipton lines provide excellent examples of such integration of journey purposes supported by good marketing.

87. Communication pathways can help reduce dependence on transport so could be a solution as well as a threat to viable local rural transport networks. Education can be delivered on line; shopping via the internet is an option when delivery vehicles are prepared to penetrate rural areas; medical consultation can be remotely delivered up to a point. But these may be regarded as palliatives, rather than solutions. Rather more radically, the communication networks and IT that support demand responsive transport could themselves be shared to improve access to the internet and the e-society in the remoter areas where high speed broadband is otherwise unlikely to be provided commercially.

Advanced and novel technology

88. There are many potential developments in technology over the next 25 years. The four listed below give a flavour of some developments that could take place.

89. **Smart grid:** A concept of smart grids and e-mobility is being developed by global IT suppliers with the aim of optimising energy supply to cities and transport networks. The vision is for these grids to be capable of managing the flow of electricity - much of which would be generated locally through low carbon sources - between buildings and the transport network using digital technology. For example, at peak times the grid would be able to tap into the energy supply of cars and buildings that are not being used to replenish supplies. A new smart battery recharging infrastructure would be part of this vision, enabling cars to be charged automatically from roadside cables via electromagnetic fields when parked above a charging plate. Potentially, the same technology could allow cars to be charged while in motion, via cables buried in the road. An integrated approach for the entire e-car infrastructure would include various charging solutions, information and communication technologies, and billing solutions that make possible the seamless interaction of e-cars, operation centres, and power grid.

90. **Intelligent highways:** An intelligent infrastructure programme could deliver a spine of inter-regional automated highway lanes, segregated for freight and car traffic. Effectively vehicles would drive themselves before reverting to manual control for the last leg of the journey. Related innovations would facilitate a favoured traffic mix, such as freight or coach convoys, minimise the disruptive effect of road works and maintenance programmes, maximise road capacity and increase the life of the highway. The system would be enabled by the deployment of next generation wireless broadband infrastructure, and the parallel integration of software platforms into commercial and private vehicles. Telematics systems would include cruise control and lane departure warning.

91. **Underground freight pods:** These have been suggested as a way of removing freight from roads by developing dedicated underground freight pipelines. Cargo would be moved in lightweight pods. Powered by electric linear induction motors, these pods could run at up to 50km/h and carry up to 8/10t. A number of potential schemes are currently being researched. While many are based around urban environments, some see nationwide networks. The most advanced schemes have working half size models that allow the technology to be fully tested.

With a 25 year horizon, it is conceivable that limited, small scale schemes could be in use by 2035. Existing infrastructure, such as the disused MailRail system in London, could reduce the capital cost of implementation.

92. **Larger freight vessels:** Container ships continue to grow in size, and Maersk will take delivery of 18,000TEU vessels from 2013 yet, at the turn of the century, even the very largest vessels were under 10,000TEU. Therefore, it would not be implausible for 25,000TEU vessels to be sailing in 2035, making a very small number of calls at major port hubs in Asia and Europe. Alternatively, technology may exist for vessels to be tethered together, in the same way barges on inland waterways are now. This would offer even greater efficiency on long distance journeys yet allowing the vessels to serve a greater range of port calls at either end of the journey.

Training and professional development

93. In 2035 professional education in transport and logistics will be networked and mobile. Mobile learning (M-learning), is transforming the way that learning is delivered with 'just in time learning' offering real solutions to a people working in logistics and transport, and this trend will accelerate.

94. As technology develops with devices becoming smaller yet more powerful, so the opportunities for mobile learning solutions grow. Virtual learning will be fast, flexible and interactive. Learning will be delivered via different media in small chunks to people wherever they are – in an office, in the cab of a lorry, in an airplane or at home. For a driver it could be simply checking to ensure compliance with legislation, and for a supply chain manager it could provide a trouble shooting solution to a problem on the other side of the world. These are examples of 'just in time learning'.

95. Harmonisation of qualifications across the world will mean that transport and logistics courses will be based on agreed international standards of competence and shared learning outcomes. These shared standards will enable logistics and transport professionals to become more mobile to meet the needs of employers in a global market place.

96. Individual professional qualifications will be cover fewer topics, focusing on core competencies. CILT will provide units in its areas of specialism - transport, logistics and supply chain - and will adopt a partnership approach with other related professional bodies to share generic units such as finance, customer service, and leadership.

97. The move to credit based units of learning, which started at the beginning of the 21st Century, will have become embedded in the way that qualifications in transport and logistics are developed and delivered. Qualifications will be modular (individual units) and students will 'own' and manage their own learning from school onwards with the responsibility for individual learner records and e-portfolios managed by the learners themselves. Successful learners will therefore enter the workforce able to manage their professional career paths from an early stage.

98. Many employers will have created their own branded universities and academies to meet their organisational needs more quickly and cost effectively. This process has already started with employers seeking accreditation of work based specific learning.

99. Universities will offer more interdisciplinary subjects. A student wanting to study for a degree in logistics and transport in 2035 will have to take generic core units with logistics, supply chain and transport only available as pathways. There will be networks of universities working together, with students transferring between different universities and different countries to complete a full qualification.

100. With the reduction of opportunities for face to face learning, social networks will be used to enhance students' learning experience and allow them to feel part of a peer group with which they can exchange ideas and experiences. For the Facebook generation and its successors this will be the norm and not as alien a concept as it is for the X and Y generations.

101. Finally with people living longer and with an ageing population, employers will have to change their attitudes to training older workers. Equally older workers will have to accept that it is not only possible to continue to refresh their knowledge and skills but also desirable to keep the world of work fresh and attractive. Currently employees in their late 50s may not be considered a priority for training, but with new pension legislation requiring people to work into their late 60s and possibly even early 70s a positive attitude to lifelong learning will be important for individual and organisational success.

CONCLUSION

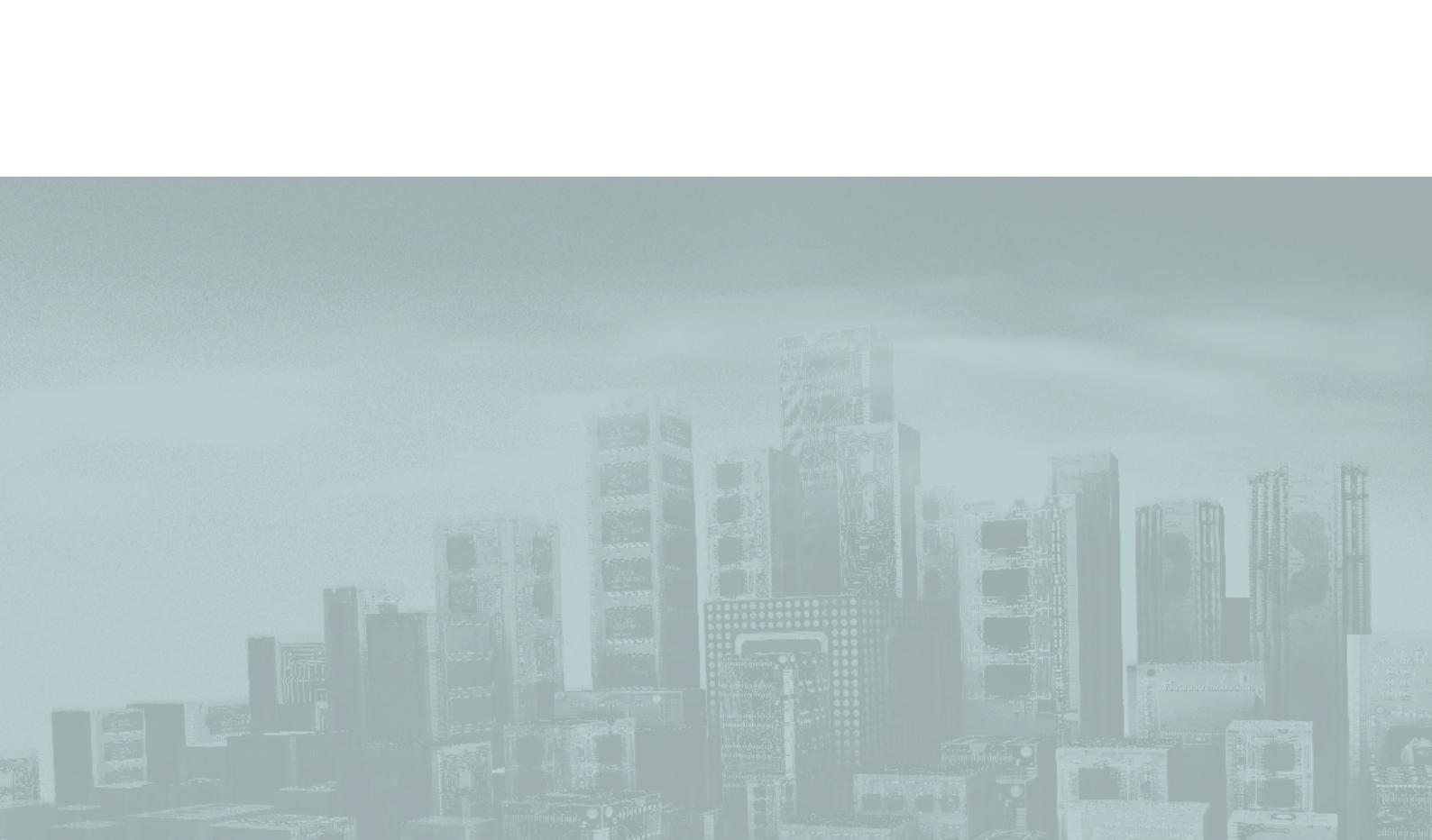
The car still figures strongly in this view of the future from Siemens. The only certain thing about the future is uncertainty.



102. The only certain thing about the future is its uncertainty. But this is no excuse for not trying to anticipate what may happen or for not trying to shape developments for the better. CILT believes passionately that this country needs a constructive debate about where we want to be heading over the next 25 years and what should be the respective roles of the private sector and government whether national, regional or local. Blind faith, whether it be in the power of the market, in centralised planning and targets or in localism, is not enough. This is our contribution to the debate about how we navigate to 2035 and how we deliver for our children the transport and logistics services they will need.

ACKNOWLEDGEMENTS

CILT wishes to thank Project Director, Michael Woods FCILT; Project Co-ordinator, Lucy Hayward CMILT, Steer Davies Gleave; CILT Public Policies Committee Chairman, Jolyon Drury FCILT and the entire Public Policies Committee membership; Project Writer, James Dark; CILT Vice President, Sir David Rowlands CB FCILT; CILT Immediate Past President, Sir Moir Lockhead OBE FCILT; CILT Vice President Jim Steer FCILT; and all those members of CILT's Nations, Regions and Forums who contributed to this paper.



The Chartered Institute of Logistics and Transport (UK),
Earlstrees Court, Earlstrees Road, Corby, Northamptonshire NN17 4AX

Tel: 01536 740166 Fax: 01536 740103 www.ciltuk.org.uk