Visioning – how it can be a route to the future

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Vision 2030 was a project developed on behalf of the Highways Agency and was an investigation into the long-term challenges and opportunities for the UK's strategic highway network. This paper describes the approach adopted by the Vision 2030 project team and the methodology that was used. The project provided a fresh way of looking ahead and considering strategic options from differing viewpoints. A number of reports were produced as part of the Vision 2030 process and these can be downloaded from the transport visions website.

INTRODUCTION

All organisations, whether they are commercial businesses, not for profit or government based, have to plan for the future. If they do not then they will not be serving the best interests of their stakeholders. Unfortunately, the crystal gazing they need to do is particularly difficult due to the speculative and apparently random nature of the real world events that impact on them. There have been many attempts at futures methodologies to deal with this type of problem. The Local Government Association's 'Futures Toolkit'[1] is a useful primer that brings a number of these techniques together, with advice on their application, strengths and weaknesses. The EPSRC Transport Visions Network[2] is evidence of the growing interest in this way of working This paper is specifically about visioning, with reference to the Highways Agency's 'Vision 2030' project which the authors developed on behalf of the Agency.

Over the past few years the Highways Agency (HA) has acquired new responsibilities as the operator for motorways and other trunk roads in England, over and above the traditional activities of construction and maintenance. As the network operator, HA are in a position to influence and control how the strategic road network is used, so as to provide the best possible service for those who use it. In order to assist the Agency in planning for its long-term role, it commissioned the Vision 2030 work. The aim of this project was to identify and develop future visions for the mobility of people and goods over a 30-year horizon in order to influence the agenda for the strategic highways.

Vision 2030 was an investigation into the long-term challenges and opportunities for the UK s strategic highway network. A range of issues confront the HA, not least traffic congestion, global warming and environmental sustainability. These issues, and others like them, will impact on how the network's users react to travel opportunities. The HA need to recognise and appreciate such issues and respond accordingly.

The Agency's remit to the Vision 2030 team was to explore the future of the strategic road network and the Agency's role as a network operator. For Vision 2030 the general approach taken was to identify the key drivers and factors that will have an influence on mobility – specifically social issues, technology, political and regulatory aspects, and macro-economic drivers – all of which will influence our future travel.

The reason for choosing a 30-year framework was deliberately chosen to encourage forward thinking and to break away from the constraints of conventional forecasting methods. Twelve 'transport visions' of the possible future of inter-urban transport emerged from this process, which now provide a constructive basis for long-term strategy development within HA.

The project made use of various corporate planning tools and techniques including visioning, scenario planning, SWOT analyses and 'backcasting'. It was achieved by engaging with staff in the Agency, with other government departments (especially the predecessor to the Department for Transport) and with professional experts. The team also consulted with European organisations such as the European Directorates for Energy and Transport (DG TREN) and for Information Society (DG INFOSOC) in Brussels.

WHAT IS 'VISIONING?'

Visioning encourages re-evaluation of traditional approaches to business planning by examining:

- Where are we now?
- Where are we heading?
- Where do we want to be? And
- What are the steps to take in order to get there?

In the corporate world, forward thinking is essential for long term planning. It allows managers to assess those internal and external factors that could change a business environment or, to meet customer requirements better. Developing visions of the future, by looking at possible future needs, opportunities and threats and deciding what should be done now to ensure that we are ready for these challenges, is part of that process.

Visioning is a leap into the unknown. The ideas and perspectives it produces are limited only by the applied imagination. The visions are not predictions of what the future holds, they are simply snapshots of what could be: a collection of images, perhaps even seeming surreal by today's standards, of a future that we cannot really know until it happens. Visioning is far removed from the scientific method that underlies much of our engineering learning, and our first thoughts might be that it cannot contribute much in the way of serious decision making. Yet we need to plan for the

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A VISION . . .

. . . is something you want to happen: eg Sweden's 'Vision Zero' zero tolerance of accidents.
. . . has to be attainable.
. . . can never claim to be accurate due to the uncertainty of the future.
. . . may require a process of working backwards in order to decide how to go forwards.

future – unless we are going to be content to sit back and let events overtake us. The challenge then, was to turn visioning from something akin to daydreaming, into a discipline that can help us to identify future problems and to create new opportunities. We might then be better placed to manage our future world when it most matters.

Much of what we do in planning and design is predictive. The fact that we are using established principles and properties tends to ensure a high success rate when we design with physical materials, such that we almost take the results for granted. Other problems such as traffic predictions are rather less certain, particularly as the time horizon gets longer. Nevertheless, modelling methods have been developed and accepted as best means for predicting travel demand for the next 10 or 20 years into the future.

Most of us would not expect too much in the way of accuracy over such a long time. Departure from predictions, especially over a long period of time, can often be explained away by unforeseen changes due to the economy, world events, etc. Considering the difficulty we have in making longer term predictions, then any thought that we might try to look 30 years or more into the future would seem to be rather futile. But many organisations have a need for long range forward thinking.

Visioning provides an alternative approach. It is a way to think about the possible occurrence of future events in terms of what 'could happen' rather than making accurate predictions about what will happen. This allows us to 'think the unthinkable' and to be more prepared for what might lie ahead. Also, it means that we can consider many possible options and not be stuck with a single line of inquiry.

When we talk of a 'vision' we are referring to something that we want to happen. Taking a transportation theme, the things that we would want to happen might be, for example, the UK Foresight Vehicle Initiative, the HA's Vision 2030, or Sweden's 'Vision Zero' etc.

METHODOLOGY

Much emphasis is placed on making wide use of the imagination in visioning. However, it is important to recognise that in the final analysis the visions themselves must be attainable. This is not the contradiction in terms that it might at first seem to be. As will be seen later, the process is self checking through an activity called 'backcasting'. The methods used for the Vision 2030 project can be broken down into five distinct stages: Initiation; Information gathering; Visioning and future scenarios; Evaluation; Deliverables and conclusions

Different practitioners may have slightly different approaches with variations in the way that the stages are labelled up and undertaken. The process tends to be iterative so that the stages will be cycled through several times during the course of the study as the project team's body of learning evolves.

Initiation

The initiation stage brings the project team together to discuss the project objectives and the visioning process. This provides an opportunity to consider representation on the project team, expertise available and perhaps who might be brought in to supplement their knowledge. Member selection is important and the team needs people who can go with the idea. It is better to recognise that for some, visioning is a bridge too far. They will not enjoy the activity and could hold back the team from producing their best work.

This stage requires the team to do some groundwork reviewing present state of knowledge, topics relevant to the proposed study, etc. The team should also take this opportunity to reconsider the case for undertaking the study in the light of what has been learned during the initiation stage.

Information gathering

A natural follow on from the initial stage is to gather more thorough information that is considered relevant to the study. There are no great revelations here, it just a matter of doing what one normally does, or should do, when researching material for any project. Everyone in the team should be encouraged to contribute to this activity. A series of workshops may be undertaken as these are very productive environments for the material that will be needed. The workshops should also be a benefit in terms of team building that will in turn improve the probability of a successful outcome.

There are a multitude of factors that can influence forward thinking and likely outcomes and it is possible to provide only a snapshot of future possibilities. The approach taken in Vision 2030 has been to identify the key drivers and forces, both within and outside the control of the Highways Agency, which will influence the mobility needs of commerce, and the public, and which will shape the HA's future business strategy and scope of service.

Demographics are important in shaping travel patterns. The number of households in England is forecast to grow faster than the population with a projected 19% increase by 2021(1996 base). Due to increasing life expectancy, almost one third of the population will be over 60 by 2031.

Our lifestyles are also expected to change as more land comes under pressure for house building and people have more leisure time.

Environmental issues are now high on the agenda, signified by the Kyoto agreement and a growing recognition that we have to find a more sustainable development path. Transport produces 25% of CO_2 emissions and is growing.

Our source of energy – the transport sector is heavily dependent on crude oil, a finite resource. Energy consumption in transport is growing at a faster rate than for other sectors.

The growing demand for transport – between 1996 and 2031 car traffic could grow by more than half again according to the central estimate of the National Road Traffic Forecasts. Van and lorry traffic is forecast to grow even faster. Air travel is forecast to double both globally and in the UK in 15 years and the demand for rail travel has been steadily increasing over the past five years.

VISIONING AND FUTURE SCENARIOS

Visioning is not a 'one shot' look at the future, it draws on different future scenarios. This is one of the strengths of the method as it allows widely contrasting future situations to be tested. Clearly, the choice of scenarios for the study is potentially quite formative to the eventual results of the study and the prospect of having to create diverse meaningful scenarios from scratch is quite daunting. Fortunately, much good work has been done on this subject and there is a methodology immediately available that yields what is required. These are known as the Foresight Futures, and the paper Foresight Futures Scenarios[3] by Berkhout and Hertin sets out in detail how to use them. Whilst there is no obligation to use these

scenarios, their value is widely recognised and they are used extensively in visioning.

In the Foresight Futures (see Figure 1) the horizontal axis represents the full range of core values from a society that is dominated by a drive to private consumption and personal freedom, through to a society that has 'community' values shaped by concern for the common good. The vertical axis is intended to reflect variation in governance ranging from autonomy and retained sovereignty through to state-like interdependence. Clearly, different areas of the diagram represent different measures of these attributes and therefore are potentially different scenarios.

For the Vision 2030 project three alternative socio-economic scenarios were developed each associated with a future of the transport network. They are:

- **Global Economy** – a market-driven approach;
- **Sustainable Lifestyle** – a community based way of living; and
- **Control and Plan** based on greater regulation of movement.

Each of the scenarios was elaborated through the use of the PESTLE tool which is a framework for examining external market forces (Policy, Economic, Societal, Technological, Legal and Environmental). By experiencing these factors, an organisation can consider how it may change, how that change would impact on the business, and how it could respond. The PESTLE analysis considered implications not only for the HA but also for its customers, the motor industry, intermediaries, and other stakeholders.

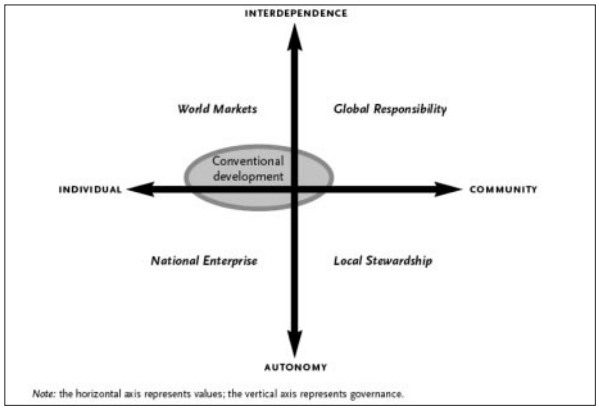

Figure1: Four UK Future Scenarios. Source: adapted from OST 1999

Transport Visions

A range of ideas, thoughts and issues regarding the future of inter-urban transport were distilled from the three scenarios. The focus was 'future transport concepts' and 'issues' which offer starting points for activity and business development for the HA. Interestingly, although there are big differences between the three visions, there was also a degree of convergence for some aspects. Twelve future propositions about transport emerged from the process. Each paints a future of inter-urban travel, whether by road or other modes, and can be mapped on to the Agency's current business plans. Each may be considered in isolation to provide a focus for a specific strategy, or combined to a greater or lesser degree with other visions to provide a wider and more comprehensive strategy. These propositions are intended to be illustrative rather than definitive.

1. The Green Highway

'Green Highways' will blend sensitively into both the natural and built environments, sustainable road building and maintenance operations – more efficient use of resources, greater application of 'green' materials, more recycled and industrial waste products.

Highway design codes will have to be re-assessed to accommodate global warming

Lightweight materials, greater use of recycling, improved construction and tunnelling methods will all have major impacts on transport infrastructure.

Quieter road surfaces and solar noise barriers will reduce noise nuisance; biodiversity will be conserved and enhanced by providing water features such as drainage ponds, and 'green bridges' and wildlife tunnels will reduce severance.

2. Zero Accidents

The Network Operator will be required to achieve unprecedented standards of safety for road users, and those who operate the network. Crashes and multiple collisions will be virtually eliminated.

Improvements in highway design will incorporate 'state of the art' road features such as electronic signs, active speed control, better physical barriers, crash cushions, and breakaway devices.

'Smart highways' and 'smart cars' to increase safety and reduce the dangers of motoring. New vehicles will incorporate intelligent speed adaptation; collision warning systems; breath alcohol 'sniffer' system; intelligent seatbelt reminder; emergency 'may day' system; and route navigation systems. Automatic enforcement techniques will permit better enforcement of road safety laws, particularly speeding, thereby reducing crashes.

Security threats will lead to greater levels of surveillance and other defensive measures.

3. The Connected Customer

The connected customer will have access to necessary information at all times, irrespective of mode, in order to provide informed travel choice before and during their journey. Advances in digital and communications technologies will deliver personalised travel information anywhere and everywhere.

Road users' expectations about information delivery will become more sophisticated. This will be combined with other digital services: on-line booking and payment, parking, pick-up, business services, timetables, late-running, forecast travel times, travel costs, interchange options, directions, yellow pages.

4. Freight Foremost

Highways of the future will prioritise freight on the network and guarantee safe, secure, timely, cost-effective and reliable distribution of goods and services in the interests of sustaining Britain's competitive economic position. International markets will put a premium on seamless integration of end-to-end logistic services and efficient operation of the inter-urban transport network.

Increases in point-of-sale and just-in time inventory systems, express package delivery and e-commerce will prompt rapid growth in van and truck movements.

Increasing volumes of trade with Europe will require efficient port and Channel Tunnel operations integrated with ground transport operations. Larger ferries and container ships, bigger cargo aircraft and 24 hour just-in time operations will add disproportionately to freight traffic around ports, the Channel Tunnel and airports.

In response, the advances in freight logistics will provide opportunities for the Network Operator to influence the supply chain to maximize efficient trunk road use. Active traffic management and development of inter-modal corridor and route management concepts will support this opportunity.

5. Favouring Public Transport

Reliable, integrated transit services that can compete with

the comfort and convenience of the car will be integral to the most heavily trafficked transport corridors.

Technology offers the prospect of more efficient and flexible, inter-connected transit and vehicle – highway systems (eg the door-to-door seamless journey, a personalised journey, more favourable overall travel costs).

There will be widespread use of guided busways and/or dedicated transit lanes, plus queue management to favour transit vehicles. Modal interchange facilities to long-distance and local collective transport will go ahead on a grand scale, eg 'Transferiums', or multi-modal travel centres, offering large-scale park and ride facilities, integrated payment, pre-booking and ticketing arrangements.

This package can only go ahead with the active cooperation of the highway Network Operator. They will work closely with the vehicle operators to achieve flexible and reliable transit operations, including demand responsive features.

6. Understanding the Customer

The highway will provide a responsive service and travel experience to match the needs of a diverse and dynamic customer base. The needs of highway users will be greatly elevated.

Better understanding about user priorities and their trade-offs will enable optimisation of demand for road space and customer 'buy-in'. Market segmentation may be crucial. The retired will have more time for leisure activities. Travel in non-peak hours may increase at a greater rate, relative to commuting travel. People will drive longer distances for both leisure and work. Regional migration will have significant implications for traffic flows on the trunk road network.

Through more sophisticated matching of customer needs with the allocation of roadspace, the concept of 'peak' will decline. Changes in the use of time and mobility will result in leisure becoming the dominant industry, with local, regional, national and worldwide implications. The modal mix will also differ by time and area.

Understanding and predicting these patterns is a prerequisite for planning infrastructure, manpower and pro-active traffic management.

7. Easy Interchange

An efficient and attractive network of strategic interchanges for people and goods will optimise links to congested centres and provide safe, secure efficient transfer.

The role of transport nodes as interchange points, holding areas and transhipment centres will become more significant. Their functioning as activity centres in their own right, providing entertainment, retail and business services. (like airports and railway termini) will grow.

There will be intense pressure to find ways to alleviate local access problems. Access schemes based on high-capacity park and ride will be seen as an attractive alternative – and possibly a necessary complement – to road pricing and congestion charges and other methods of traffic restraint. Existing commercial and shopping centres, airports, sports and entertainment centres, touristic attractions and other major destinations are all potential candidates.

8. Institutional change

Pressure will grow to get best value from highways as a national asset and to operate the network in response to society's mobility needs. Innovation and flexibility over financial, contractual and organisational arrangements will follow.

The roles and responsibilities of the network owner, operator and regulator will be more sharply defined. Institutional re-alignment of enterprises will force horizontal and vertical integration, with European and even global reach.

The network operator will be required to achieve high levels of performance. Operating the highway network safely and efficiently on a 24/7 basis will grow in complexity and importance, with the added dimension of dynamic controls to meet a diversity of demand patterns.

Work is needed on methods of long-term investment appraisal, innovative finance, risk assessment, value management and whole life costing. New contractual and organisational arrangements will flow from the need to secure efficient, integrated transport operations, probably extending across regional and national boundaries.

9. Managing Supply

Traffic Growth and personal travel will continue unabated leading to greater congestion and more extensive and frequent standstills. Active and dynamic traffic management - 'Sweating the Corridor' – will be vital to counter long-term regular gridlock.

Future network operating strategies will routinely provide for a dynamic allocation of roadspace serving optional and non-essential movements, as well as high-value journeys and priority movements of freight.

The management of the highway transportation system in its totality will become highly automated and increasingly real-time. Fast intercity travel by new technology will need to be integrated with existing road, air and rail infrastructure. Dual use of highway corridors may be an option.

New technologies will allow for real-time pricing of transportation facilities to increase efficiency, make better use of spare capacity, and reducing congestion delays. This will be supported by systems that dynamically control and advise traffic on the network to maintain traffic flow without adversely affecting the local environment.

10. Managing Demand

Space on the highway will be at a premium. Managing demand will be essential for efficient and reliable operation of the network.

Strenuous efforts will promote travel substitution to reduce the demand for transportation through telecommuting, electronic communications, and alternative work schedules.

Marketing to suppress travel may be inevitable. Rationing of mobility between people and goods, and between competing demands for access to the network, will require instruments to achieve mobility changes without social exclusion.

Introduction of slot allocation and journey booking systems, extensive queue management and rationing of roadspace through dynamic use of priority lanes, as well as mode switching and the use of road pricing (congestion charges) will all be deployed to prevent widespread gridlock.

Enforcement will be an essential tool of network management – effective, easy, respectful of human rights and perceived as fair and reasonable.

11. Co-operative Driving on the Automated Highway

Highways of the future will utilise intelligent infrastructure which interacts with the vehicles and people using it.

Cooperative driving and greater automation of the highway (Cooperative Vehicle-Highway Systems - CVHS) will deliver predictable and reliable journey times and greater safety in adverse weather conditions. However, the public may be resistant. Reassurance on safety, reliability, practicality and sustainability in all circumstances will be required.

A backbone of inter-regional automated highway lanes will be established, segregated for freight and car traffic. The lanes will provide safe, fast and predictable journey times for those willing to pay the price.

Analysis sheets for each of the 12 transport propositons described here can be accessed and downloaded at www.transportvisions.org

CVHS will bring other innovations which help focus on a favoured traffic mix, such as freight convoys. CVHS will make it easier to minimise the disruptive effect of road works, maintenance programmes, and will increase the life of the highway.

12. Land Use Planning

An active involvement in planning and development control will be essential to achieving the vision of integrated transport and sustainable use of the Highway network.

This will include making best use of existing corridors and land use patterns. Sustainable, integrated land use and transport solutions will be the result of close involvement by the Network Operator in influencing the pattern of development over a long period of time.

Growing concerns about environmental impacts, congestion and accidents will encourage planners to find better ways of utilising the existing highway corridors. 'Green Corridors', multimodal 'inter-city' and 'community' corridors which give priority to smarter 'cleaner' vehicles, collective and automated forms of transport, cyclists and pedestrians.

By being pro-active, the Network Operator can influence on future patterns of transport supply

These 12 transport visions, or future propositions, are a starting point for further development. An analysis sheet has been prepared for each one, giving the case for Network Operator action, and illustrating the long-term goals and short-term actions that the HA might adopt. These propositions need to be tested and refined through the Agency's own business planning process to identify those subjects and issues which the HA should be most pro-active in pursuing.

The concept behind each of the 12 '2030 visions' was encapsulated in a headline statement which provides the focus. The Project Team analysed the Case for Network Operator Action and identified a range of long term and short term goals which the Highways Agency may wish to take forward to meet the potential threats and seek opportunities for the future.

Each vision is based on supporting information from an array of forecasts and trends gathered from available sources during 2000, which the Project Team considered might have a significant influence on each vision.

The visions form a comprehensive and forward looking input for the development of a longer-term strategic plan. Over time, forecasts will vary according to changing scenarios (eg an oil crisis), however, visioning is an iterative process which can take into account these changes as well as the impact of developing strategies and the changing business environment.

Back-Casting

Further analysis will enable the identification of attainable and credible goals for inclusion in the HA business plan. Through a process of 'back-casting', stepping stones or milestones can be identified in the migration process of reaching the long-term aims which are implicit in the visions.

From experience within the Vision 2030 project, the key criteria to be applied are: Credibility; Relevance to inter-urban travel; Potential for opportunities; Potential threats.

CONCLUSIONS

Vision 2030 has provided a fresh way of looking ahead and considering strategic options from differing viewpoints, providing a 'breath of fresh air'. Problems of traffic congestion and pollution are unlikely to disappear without radical and forward thinking solutions and many of the ideas and actions presented here would require significant changes on a number of levels. The lead times for changes to take place are considerable for many aspects of the transport system.

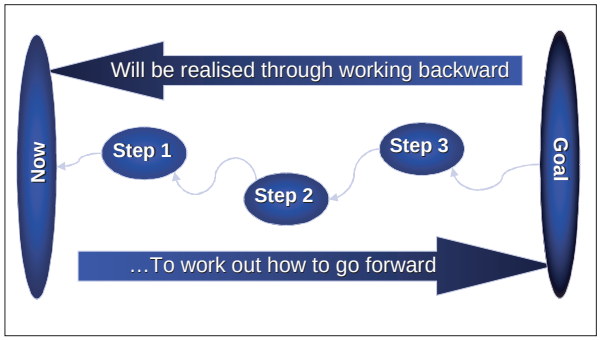

Figure 2: The 'back casting' process

The Transport Visions emerging from Vision 2030 provide a consistent platform for implementation of the HA's future vision in the strategic planning process. The project also provided an opportunity for the HA to link with present and future stakeholders. This might encourage stakeholder buy-in to a vision or new initiative and is especially valuable in encouraging cross government collaboration and forging partnerships with a raft of other critical bodies.

As the Highways Agency strengthen as a network operator, it will have a demanding customer base. Expectations for service levels will be high and this can only be achieved by developing the network to meet and stay ahead of these expectations.

PROJECT REPORTS

The following Reports have been produced as part of the Vision 2030 process and can be downloaded from the web site at www.tranportvisons.org.

- Vision 2030 Final Report
- A Portfolio of Transport Visions
- Overview of Future Trends
- Socio-Economic Scenarios
- Side-by-Side Comparison (as Annex to above)
- Project Methodology
- Groundwork Report
- Freight: A Discussion Paper
- Moving People Between Cities: A Discussion Paper

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The views contained in this report are those of the authors and not necessarily those of the Department for Transport, nor of the Highways Agency.

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