

Foresight brings clarity to the future

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Transport is integral to many of the things we do as a society. It affects practically every aspect of modern life whether it's getting a child to a doctor's surgery for an inoculation, or developing inter-modal transport hubs to oil the wheels of industry and drive economic growth.

So in my job as Chief Scientific Adviser to the Department for Transport (DfT), I am involved in tackling a tremendously broad spectrum of issues.

Since October 2006 when I took up the part-time post (in addition to my responsibilities at Cranfield University), I have really enjoyed the sheer scope of the work. Indeed, this is one of the highlights of my career and a great opportunity to get involved in a host of fascinating new technology and policy developments.

My key responsibility is making sure that the DfT's work in science, engineering and technology is well directed and that policy is based on good science.

Within that, there are a lot of issues that are relevant to what we are trying to do across the department. Part of it is to make sure that the passenger gets the best travel experience possible, no matter whether it's for business or pleasure, short hop or long haul. Part of it is making sure that we reduce the environmental impact of transport in the future.

At the same time, we have to make sure that transport does not present a barrier to economic growth. And we also have to ensure that transportation is safe and secure.

That last point on its own covers a whole range of issues ranging from countering terrorism on the one hand to addressing privacy concerns on the other.

This is an area I've been involved with extensively anyway as a member of the working group on the Royal Academy of Engineering's report on privacy and surveillance and the challenges of technological change.

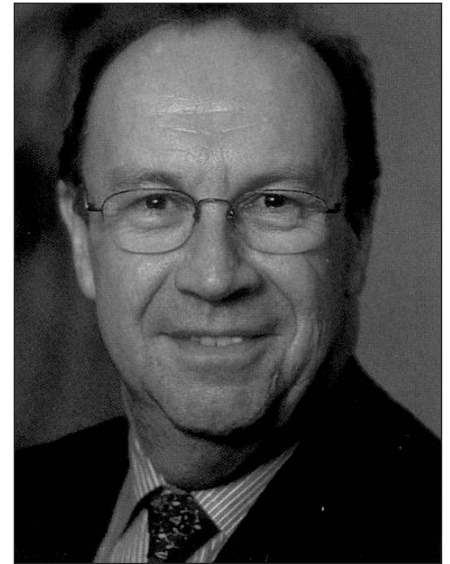
Clearly, all these issues represent significant policy challenges. At the same time though, it means that there are lots of "big issue" concepts to get involved in.

For example, we've recently seen the publication of the Stern Review on the impact of climate change and we've had the Eddington Report looking at the long-term links between transport and the wider economy.

On top of that we have had the Foresight Project on Intelligent Infrastructure Systems (IIS), which ties a lot of these complex issues and challenges together and that makes it particularly interesting from my point of view.

The IIS initiative was originally sponsored by the DfT, but in practice it was an inter-departmental programme aimed at co-ordinating government planning while thinking about how we might live 50 years from now.

The idea is really to push the boundaries of our long-term, strategic thinking across all the policy areas. By focusing on that long-term perspective along with DEFRA, DCLG, DoH and the other departments, we can see



more clearly how we can make intelligent decisions on infrastructure planning and the exploitation of technology.

A lot of it is really about joined-up government. For example, if we want to get people from their houses to hospitals or schools, then co-ordinating our plans with DCLG on planning developments, the DoH on hospitals and DfES on schools, obviously makes complete sense.

The Foresight Project built on existing collaboration and my job now is about trying to identify how science and technology can help meet society's demands in the future – no matter how the world develops between now and the 2050s.

Of course, when you're looking that far ahead, absolutely no-one can say for sure how the world will look in 50 years. But we do have a lot of information available and we can set out scenarios for a number of different futures.

For instance, using the data we have on trends and technology, we can overlay other models such as traffic growth, freight volumes, air passenger numbers and get some really good insights into some of the challenges that lie ahead. That way, we can start thinking now about what we need to do to be prepared.

The findings of the original Foresight Project on IIS were unveiled in January 2006 by Dr Stephen Ladyman, Minister of State for Transport.

The Intelligent Infrastructure Futures (IIF) report provided a vision of the transport challenges that the UK could face over the next 50 years to help stakeholders develop long-term policies and strategies.

The aim was to ensure that decisions made in the near term would maximise the benefits of future opportunities, while offering those involved the chance to manage future risks more effectively.

The one-year review of the IIS will be released shortly via the DTI and the preliminary results show that there have been some very positive outcomes from the project, reaching across Government, academia and the private sector.

Of course, the project has already met one key objective by bringing some of the most important issues about the long-term development of transport into the public arena. So the benefits will continue to accrue as this level of strategic thinking is built into new policy planning.

The Foresight project produced four contexts that helped define areas of uncertainty surrounding the future of intelligent infrastructure systems:

- future scientific capabilities
- technological developments
- the role of business and Government
- social attitudes.

These contexts and the scenarios derived from them were not an attempt to predict what would happen or suggest a preferred future. Rather, they were “stories” with their own internal logic suggesting various possible – even extreme – outcomes.

As such, the scenarios could be used to judge the risks and opportunities of policy relating to the future

management of intelligent infrastructure, as well as providing a context to support the decision-making process.

As a follow-up to this work, the DfT commissioned the development of a scenarios “toolkit”¹ to support future thinking. The concept is aimed at providing policymakers and other stakeholders with the resources needed to explore the various scenarios and use them to support their own decision making processes.

What all the scenarios point to, though, is that transport policies do not exist in isolation. They have to work within the context of the policy goals of other government departments and they have to be coherent in the context of the DfT’s own strategic objectives.

That is why, for example, I am co-ordinating the convergence of existing DfT workstreams and research on intelligent transport systems (ITS) into one consolidated programme with intelligent infrastructure systems.

This will allow the DfT to take a cross-modal and cross-disciplinary approach in supporting the development of innovative technologies, paving the way towards capturing many of the benefits highlighted in the IIF report.

I think, in the past, we’ve been very good at modelling individual networks. For example, we have extremely sophisticated models for analysing the potential growth of road congestion and we’ve used that in the design of arterial routes.

Now, though, I believe that we can develop better ways to model, for instance, how the inter-modal hubs will impact the wider transport network as they grow. For example, how the growth of freight traffic at a port will interact with the traffic on the rail and road elements of the hub.

The project has also influenced the DfT’s input on the Future Intelligent Transport Systems (FITS) initiative. The scheme was formally launched at the ITS World Congress in London in

October 2006 by the Minister of State for Transport, Dr Stephen Ladyman.

The project is basically targeted at nurturing projects on “next generation” transport technology. That means projects aimed at improving road safety by reducing collisions, casualties and deaths; creating more reliable, accessible and safer public transport services; boosting the efficiency of the road freight industry; improving the road network; and providing better travel information to allow travellers to make informed choices about how and when to travel.

The project is being funded jointly by DTI, DfT, the Engineering and Physical Sciences Research Council (EPSRC) and business. The idea is to bring UK industry and universities together to address key research issues for the longer-term development of the UK transport system and to work in collaboration to tackle some of the major transport challenges we face over the next decades.

On the basis of this and other initiatives, I think it’s fairly clear that thinking on intelligent infrastructure systems is likely to play a key part in policy developments across Government for some time to come.

I believe that the concepts and approaches embodied in the intelligent infrastructure approach will help benefit all stakeholders as they prepare to meet the challenges of social, economic and technological change over the decades to come.

For me personally, that means that this is probably one of the most complex briefs of any Chief Scientific Adviser in a government department. But that makes it one of the most interesting as well.

We’re planning ahead, but making the transport experience better is a long-term undertaking, so we really need to get on with it. That’s the challenge and it’s one that I will enjoy helping to drive forward.

¹ The toolkit is available from the DfT website: <http://www.dft.gov.uk>