

## ITS (UK) strategy to support carbon reduction and to address climate change issues

### Executive summary

The summit in Copenhagen in December 2009 focussed the world's attention on climate change and greenhouse gas reduction. The Copenhagen accord set an objective of limiting warming to no more than 2°C.

Transport is a significant emitter of CO<sub>2</sub>, nationally and internationally. ITS can be used in a number of ways to reduce the CO<sub>2</sub> emissions from transport. Climate change may result in a significant increase in weather events that disrupt transport networks. ITS can assist with adaptation to the effects of climate change by reducing the disruptions to travel as a result of weather events. This paper sets out a draft strategy on how ITS (UK) might address the issues related to climate change and greenhouse gas emissions reduction.

The paper reviews the outcome of the Copenhagen summit. It highlights the key issues from a UK perspective, with particular emphasis on the first annual report from the committee on climate change.

The paper then highlights a number of opportunities that exist for the industry and ITS (UK) in four main areas:

- Policy support . opportunities that centre on the key elements of the greenhouse gas reduction policy
- Step changes . opportunities that arise from potential step changes in policy (i.e. reducing and enforcing speed limits, road user charging etc)
- Changes to business as usual . how business practices may need to be addressed in a new way to meet the challenge of greenhouse gas reduction
- Related opportunities . other areas that need to be considered as part of a strategy to understand the wider aspects of the climate change challenge

Climate change and carbon reduction represent a significant challenge for the UK as a whole. The ambitious targets for carbon reduction in the short term (up to 2022) present a significant challenge to the transport sector. For ITS technology and the ITS industry there is a significant opportunity to assist and support the transport sector in reducing carbon emissions. This paper should be seen as a step in the journey to reducing carbon emissions from the transport sector.

The next step is to engage the industry in a dialogue around the opportunities outlined in this document. There is a workshop organised by the ITS (UK) Carbon Working Group on the 1<sup>st</sup> July 2010 at Newcastle University to help facilitate the process of engagement. The views of the ITS (UK) Interest Groups and other interested parties will be sought in the run up to the workshop. After the workshop it is anticipated that this strategy will be expanded and updated.

## Copenhagen summit

The Copenhagen summit was a coming together of nations from across the World to formulate a treaty / accord to succeed the Kyoto treaty which expires in 2012. In advance of the summit there were wide-ranging discussions in the media about the significance and potential outcome of the summit.



**Figure 1 - Maldives underwater cabinet meeting**

On 2<sup>nd</sup> December 2009 The Independent published a climate change special feature entitled 'Twelve days to save the world'. In the special the President of the Maldives, Mohammed Nasheed, was quoted as saying, 'Copenhagen can be one of two things. It can be an historic event where the world unites against carbon pollution in a collective spirit of co-operation and collaboration, or Copenhagen can be a suicide pact. The choice is stark.'

The outcome of the summit was the Copenhagen accord which was drafted by Brazil, India, South Africa, China and the United States of America. US President, Barack Obama, was quoted on the BBC on 19<sup>th</sup> December 2009<sup>2</sup>

as saying the accord had 'agreed to set a mitigation target to limit warming to no more than 2°C and, importantly, to take action to meet this objective'. He added, 'We are confident that we are moving in the direction of a significant accord'. The head of the Chinese delegation, Xie Zhenhua, added, 'the meeting has had a positive result, everyone should be happy'

Prime Minister, Gordon Brown, in his podcast<sup>3</sup> on 21<sup>st</sup> December 2009 about the Copenhagen summit, said 'This weekend the world came together in the first step towards a new alliance to overcome the enormous challenges of climate change'. He also said 'I am convinced that Britain's long term prosperity lies in leading the necessary transformation to a low carbon, greener future. We must become a global leader not just in financing greener technologies but in the development and manufacture of wind, tidal, nuclear and other low-carbon energy. And as we look towards a new decade, be assured that your government will play its part in supporting the ambitions of our entrepreneurs and leading businesses and the expertise of our scientists and engineers in making this transformation'

The verdict on the summit, it seems, is that it was neither a world uniting against carbon pollution nor a suicide pact. Instead it was perceived as a starting point to overcome the challenge of climate change. The key is to find and produce technological solutions to reduce carbon emissions. The opportunity for ITS (UK) is to find the appropriate solutions to meet the climate change challenges of the new decade and beyond.

## Transport and climate change

In October 2009 the committee on climate change produced its progress report to Parliament entitled 'Meeting carbon budgets - a need for a step change'. The report describes the challenges that need to be addressed to meet the carbon budgets for the UK which have been set for three periods from 2008 to 2022 as shown in the table below (table 1.1 from report). Traded emissions are emissions that are traded on the EU emission trading scheme (ETS).

	Budget 1	Budget 2	Budget 3
	2008-2012	2013-2017	2018-2022
Carbon budgets (MtCO <sub>2</sub> e)	3018	2782	2544
Percentage reduction below 1990 levels	22%	28%	34%
Traded sector (MtCO <sub>2</sub> e)	1233	1078	985
Non-traded sector (MtCO <sub>2</sub> e)	1785	1704	1559

**Table 1 - Legislated Carbon Budgets**

The report identified a number of measures / targets to reduce emissions from transport and outlines extended scenarios to increase the level of reduction. The main measures identified for the UK were as follows:

- Reducing emissions per km of internal combustion engine vehicles from the current 158 gCO<sub>2</sub>/km to 95gCO<sub>2</sub>/km
- Increase use of electric vehicles and plug in hybrid vehicles. The take up rate of electric vehicles and plug in hybrids is expected to be 240,000 by 2015 and 1.7 million by 2020
- Eco driving . aim to have 3.9 million drivers trained and practicing eco driving by 2020

The report identified a number of areas where policy might be strengthened to facilitate a step change in emissions reduction (extended scenarios):

- Support for electric cars and plug-in hybrids, including the funding of plug-in infrastructure and large scale pilot projects
- Smarter choices. Phased roll-out of smarter choices (based on the methods established in the pilot projects) across the UK to encourage better journey planning and more use of public transport
- Integrated land use and transport planning. A new strategy to ensure that land use planning decisions fully reflect the implications for transport emissions

The report also identified a number of measures that could be implemented with changes in policy which were as follows (stretch scenarios):

- Travel demand management measures including a form of road pricing to manage travel demand
- Enforcing speed limits and reducing speed limits

The committee on climate change outlined the key issues in relation to reducing transport emissions in the UK. The opportunity for ITS (UK) is to determine how ITS can be used to support the emission reduction strategies. The next section outlines the issues in relation to these opportunities.

## **Key opportunities for the ITS Industry**

ITS technology can be used to reduce transport emissions. There is a need to be able to demonstrate the ability of existing ITS technology to reduce emissions and to develop new solutions in relation to some of the new opportunities that arise from the challenge of climate change.

## **Policy support**

These are areas where ITS may be used to support key areas of carbon emissions reduction policy.

### **Electric vehicles**

The key policy for reducing emissions is reducing the emissions per km from vehicles. In the short term this is being undertaken by improving the efficiency of internal combustion engines and increasing the proportion of electric and plug-in hybrid vehicles. The ITS industry needs to investigate how this policy can be supported by ITS to facilitate the take up of lower emissions vehicles.

### **Eco driving**

Eco driving involves driving the vehicle in a different manner that reduces the energy required to propel it. This involves less volatile acceleration and less sharp braking. Technology could be used to encourage particular driving styles using in-vehicle and infrastructure-to-vehicle systems. There are also other ways of improving fuel efficiency of driving namely: changes to driving test, variable message sign messages, use of motorway speed signs etc.

## **Supporting policy step changes**

The committee on climate change assessed the impact of existing climate change policies and put forward a number of scenarios that could be implemented if there was a significant step change in climate change policy and travel behaviour. The opportunities for the ITS industry are to identify how ITS technology could facilitate or encourage the step changes.

### **Electric vehicle roadside infrastructure**

The current aim is to have 1.7m electric and plug-in hybrid vehicles on the road by 2020. This may require an extensive network of roadside charging infrastructure. The ITS industry has a lot of experience in delivering roadside powered infrastructure. The opportunity could be to make a roadside charging point part of a network of intelligent infrastructure. This may include the booking of points and provision of information on availability, which could include the booking/payment of hot swap batteries

### **Smarter choices / Journey planning**

The committee on climate change expects there to be a high impact on emissions due to smarter choices. The sustainable travel towns have provided some evidence<sup>5</sup> for the potential of smarter choices through the use of car clubs, travel plans, travel awareness campaigns and car sharing. The opportunity here is to determine how ITS might support such initiatives.

### **Integrated land use and transport planning**

The committee on climate change estimates that the implementation of an appropriate land use and transport planning framework could result in a reduction in emissions of at least 2 MtCO<sub>2</sub> in 2020. Information on walking, cycling and public transport can play a key role in this area. The opportunity here is to determine how ITS can play a role in supporting these initiatives.

### **Travel demand management**

The committee on climate change identified a number of pricing measures that could assist in the reduction of travel demand. These include increasing fuel duty and road user charging. ITS techniques have been used to introduce road user charging in various locations around the world so the opportunity here is to identify how this might be undertaken in the UK and what would be the impact.

### **Enforcing traffic regulations**

The committee on climate change identified the enforcement of traffic regulations and in particular speed limits as a possible method of reducing emissions. Historically this has been undertaken at particular locations for safety reasons. The opportunity here is to understand how speed limits, and more broadly traffic regulations to support carbon reduction objectives, may be enforced and what sort of impact this might have on emissions reduction and complementary measures such as eco-driving. It could also include the enforcement of low emissions zones

### **Opportunities arising from changes to business as usual**

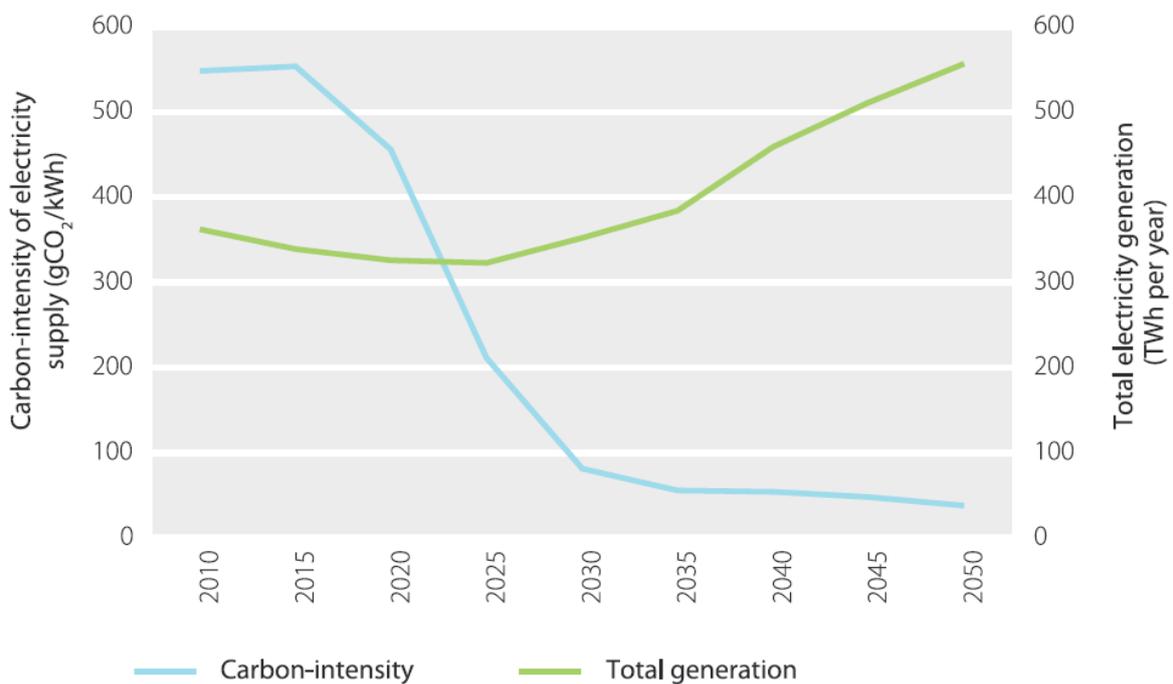
ITS is currently in widespread use in transport applications in the UK. The reasons for the deployment of ITS historically have mainly been safety (reduction or avoidance of accidents) or economy (reduction of congestion, improving journey times / reliability) related. The opportunity now is to understand what impact existing and new deployments of ITS have on carbon emissions. This section looks at three areas where this is likely to be an important issue.

### **Transportation of goods**

There is increasing emphasis on reducing the emissions that result from moving goods around the UK. There is scope for ITS technologies to be utilised in order to reduce emissions from the freight sector. The areas of particular concern are the last five miles of deliveries, issues around out of town hubs and the use of the railways for carrying goods. Technology can play a role in providing information and statistics on the movement of goods as well as providing information in real time on the status of networks.

### **Energy consumption of equipment**

One of the key emissions reduction policies is to reduce the carbon intensity of the energy supply network. The figure below (figure 6 from climate change report) outlines the current expectation for demand and carbon intensity of the energy supply network. It should be noted however, that the major shift in carbon intensity does not start until mid 2020. Consequently, as ITS mainly uses electricity to operate, there is a need to investigate how the industry's energy use could be reduced in the short term. Reducing energy consumption in the short term not only reduces CO<sub>2</sub> emissions but also reduces costs.



Source: CCC based on AEA (2008) MARKAL-MED model runs of long-term carbon reduction targets in the UK.

**Figure 2 – Reducing the carbon intensity of energy generation**

### Network management

Network management is becoming an increasingly important technique with networks running at capacity for longer periods. UTMC and Managed Motorways are two techniques that are increasingly used in the urban and interurban environments. Normally the focus of these techniques is either economic (congestion reduction) or safety (accident prevention / reduction), however, there is a need to formulate techniques that are tailored for emissions reduction.

### Issues related to climate change and greenhouse gas reduction

The reduction of Greenhouse Gas Emissions is the main focus of this strategy, however, this cannot be viewed in isolation from other issues. In this section some of those other issues are highlighted.

### Social inclusion and health

Addressing issues of emissions reduction is often seen as complementary to addressing issues of social inclusion and health. The opportunity here is to understand where the measures to address the problems are complementary and where they are not. The Department for Transport's delivering a sustainable transport strategy<sup>6</sup> (DaSTS) guidelines take into account economic growth, social inclusion, health, quality of life and climate change as criteria for assessment. This wide ranging method of assessing transport measures may become more widespread in the future which is why it is important to understand the relationships between the criteria and the impacts that ITS has on each element. This is becoming increasingly relevant in the justification for a new scheme.

### Economic growth

The recent recession has put the need for economic growth very high on the agenda. The opportunity here is to understand the relationship between economic growth and emissions reduction. The low carbon economy is seen as a way of encouraging economic growth; the opportunity here is to understand what this means for the ITS Industry and the deployment of ITS measures. This area is key to understanding the opportunities surrounding the ITS (UK) theme for 2010 of Lean and Green ITSq

### Climate Change Adaptation

The IPCC reports and the climate change forecasts, produced by the UK Met Office, highlight that a certain degree of climate change is inevitable. The Copenhagen accord has the aspiration of limiting temperature increase to 2°C. In this context it is key to understand what impacts the changes in climate and weather conditions might have on the UK. Managing change in real time when networks are stressed or disrupted is one of the key strengths of ITS. The opportunity here is to understand how ITS might be applied to the area of climate change adaptation.

### Carbon tools and climate change information

Greenhouse gas emissions and in particular CO<sub>2</sub> emissions have to be estimated, based on particular activities that are undertaken. The tools that are used for that estimation need to be consistent and independently verifiable. The setting of baselines and targets for particular activities is also key to understanding aspirations and measuring achievement. There are a number of different tools available or in development that address these issues. The opportunity here is for the ITS industry to take a view on what tools and monitoring / measurement techniques are suitable for determining the impacts of ITS. The understanding of climate change and its impacts is an ongoing area of research. Within the industry and in the wider public arena there are different, competing views. The opportunity is to provide useful information to assist in developing policies and strategies for the future.

## Conclusions

Climate change and carbon reduction represent a significant challenge for the UK as a whole. The ambitious targets for carbon reduction in the short term (up to 2022) present a significant challenge to the transport sector. For ITS technology and the ITS industry there is a significant opportunity to assist and support the transport sector in reducing carbon emissions. This paper should be seen as a step in the journey to reducing carbon emissions from the transport sector.

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