

Reducing Carbon Emissions from Transport

Response by the Institution of Mechanical Engineers to a New Inquiry from the Environmental Audit Committee, House of Commons. February 2006

The Institution of Mechanical Engineers is well placed to respond to this New Inquiry, having some 35,000 of its professional engineering membership involved or associated with transport in the UK. This institution considers that reducing carbon emissions from transport should be very high on the Government agenda and it is disappointing, that the Environmental Audit Committee has allowed such a short time to reply to this Inquiry. Whilst the short time available for a response does not allow us to propose realistic definitive targets, we consider that it is almost certain that current revised Government targets for reducing carbon emissions will not be achieved.

There appears to be no public awareness of a DTI underpinning strategy for reducing carbon emissions from transport nor any “Projects Grandes” aimed at facing up to unpopular choices for the national good. A rail system for a population pattern a century out of date is one such issue and the expanding demand for cheap short-haul flights could well be another. Bold long term Government policies going beyond the life of one Parliament and that have cross party support are required to effectively tackle these issues.

There are numerous opportunities to improve environmental impact of transport, all of which need to be addressed and radical action taken now if the UK is to achieve maximum net benefit.

Whilst it is obvious that action in some areas will yield significant “step change” gains, an integrated approach is more likely to achieve the best overall results.

With informed forecasts of a net increase in carbon emissions from transport if strong early action is not taken, it is considered that the opportunities outlined in this response should be exploited as a matter of urgency, irrespective of the Government’s revised targets.

The following response covers strategic issues and the main modes of transport. This should be read in conjunction with the Institution of Mechanical Engineers comments on UK Energy Policy which can be found on www.imeche.org.uk/media/parliament/position_statements.asp

Strategic

- Carbon dioxide emissions targets – it is considered that the revised Government targets for 2010 and 2020 are not achievable with the current planned levels of public investment. The setting and structuring of realistic and progressive targets together with methods of measuring success should match resources and the technology available. Government should determine what needs to be done to deliver these targets and provide sufficient Government (DfT) financial support for what is needed to deliver. Substantial long term support should be provided for research to underpin a programme that is achievable.

- Cleaner existing fuels – the production and use of lower sulphur diesel has had a major effect on particulate emissions and hence reduced exhaust emissions. This has been geared to meet gaseous emissions legislation and the downside of this is that this has been also been an enabler in the development of larger and more powerful engines that consume more fuel. More detailed study of the net effects of producing lower sulphur fuels is urgently required. Existing grants schemes for relevant R&D in this area should be extended and additional funding ring fenced. At the same time a more stringent policy on the production and use of the more pollutant fuels should be adopted, backed up with legislation if necessary.
- Alternative fuels – bio-fuels, blends, fuel cells and other alternatives are all being researched and these offer great potential for reducing CO₂ emissions as well as reducing our fossil fuel dependency. Government needs to invest even more in detailed research into these options as a matter of urgency ensuring that any resulting intellectual property rights provide a return on this investment.
- Government incentives – tax credits or other similar incentives should be offered to reward success. Any such structure should not be too prescriptive so as not to stifle any lateral thinking and should accommodate innovative approaches. It should be applicable across the whole spectrum from fuels and engines to materials and infrastructure. It is expected that the application of Microsystems and Nanotechnology in many areas will have the greatest potential impact.
- Government policy – a clear and workable integrated long term Government transport policy is required together with appropriate and adequate financial incentives. The policy should aim to encourage a better balance of transport usage (passenger and freight), favour the most environmentally friendly solutions and promote increased use of public transport. Other areas of Government policy such as housing, employment, leisure and city regeneration should empathise with this to ensure no department works in isolation.
- Public education – the penalties and costs incurred in pursuing a policy of reducing carbon emissions by transport and the implications of not doing so have to be faced by the whole population. There is an alarming public ignorance of these issues and Government needs to invest in a simplified and clearly worded programme that informs people of all ages and especially in schools. Included in this programme should be Government strategy, realistic aims, achievements, incentives and the various funding mechanisms currently available. Most of the solutions will directly affect the general public and it would be naïve to expect their support if they are uninformed of the issues.
- Cleaner production of electricity – this is a major part of the wider energy debate and the policies adopted here will play a crucial and integral part of the strategy to reduce carbon emissions in transport, particularly in rail. Authentic and realistic estimates of the net emissions benefits for transport should be commissioned for each option under consideration for national power generation. These figures should be made public as soon as possible. Government should press for early introduction of sustainable and economically balanced electricity generation with no source discounted for political expedience.

Specific

Rail

- This mode of transport has the most favourable passenger/pollutant ratio even when the environmental cost of producing the base power is taken into account. Increasing the capacity of the rail system appears therefore to be highly desirable.
- Significant investment is already being made by Government and private sectors to improve infrastructure, signalling and rolling stock and this should be continued.
- However, in the long term the real limitation will be lack of track and bold long term policies backed by legislative support are needed to solve this issue. This may be politically unpopular but the consequences of not doing this are more unpalatable.
- Other areas that need to be encouraged as a matter of urgency are efficiencies in regeneration of power, the use of hybrid engine technology and materials research aimed at weight reduction.

Road

- Road transport is almost entirely fuelled by oil and therefore any advances in “cleaner” or alternative fuels will have a significant impact. However, with the whole of road transport being responsible for only 5% of the total of carbon emissions, even a major reduction would have minimal net effect. That said, this is one clear area that has potential for sustainable and environmental benefit.
- Any improvements in the quality of fuels will have a direct effect as will developments in alternative fuels.
- Considerable research is being undertaken by engine manufacturers into reducing emissions, alternative sources of power and increasing efficiency. However, this high level investment in R&D by the private sector despite pressures of a very competitive market is not matched by similar levels of Public support. It is considered that current levels of public investment will yield insufficient environmental returns to meet realistic targets.
- Government should stimulate research through financial investment and encourage success through matching environmental legislation.
- Government should mandate for priority schemes for public transport, providing a financial, regulatory or incentivised structure to encourage a shift to electric traction. Priority should also be given to schemes that demonstrate a net environmental advantage (e.g. CrossRail in London and trams in Leeds). Other areas that should be addressed are intelligent highway systems, a school bus service that makes domestic “school runs” unnecessary and reform the road taxation system to be more cost/unit – distance focussed.

Air

- Air transport currently produces 12.5% of carbon the total emissions by transport (Intergovernmental Panel on Climate Control and www.greenerbydesign.org.uk hosted by RAeS) and is therefore an area of considerable potential gain for advances in improving fuels
- There are opportunities in materials and design, including engines and in the associated support infrastructure, but these generally involve long term research and benefits will take a long time to impact. Much valuable research has been carried out in these areas by the Aerospace Innovation and Growth Team (AeIGT) and “Greener by Design”, both of which are supported by Government and this is encouraging.
- The modus operandi of aircraft should be a target for detailed research that can be used as a firm basis for formulating policies, in conjunction with the European Union. Policies should favour the most environmentally friendly methods of transport and discourage the most pollutant. Much is often made of research into overall journey times between city centres using different modes of transport (rail/air in particular) but there has been no independent comparative research on the net emissions effect on the environment. This is required urgently bearing in mind the rapid growth of cheap short-haul flights.

Summary of Recommended Actions

1. Strategic Actions

- a. **Carbon dioxide emissions targets**
 - **Fund urgent research and use results as base for targets**
 - **Set realistic progressive targets**
 - **Determine what needs to be done to deliver**
 - **Provide necessary assistance to deliver**
- b. **Existing Fuels**
 - **Commission study to determine net effects of producing lower sulphur fuels**
 - **Extend and ring fence existing R&D schemes**
 - **Legislate to discourage production and use of the more pollutant fuels**
- c. **Alternative Fuels**
 - **Government to increase investment in research as priority**
- d. **Government incentives**
 - **More tax credits or similar incentives to reward success**
- e. **Government policy**
 - **Government to set bold, clear, integrated and long term transport policy with financial incentives**
- f. **Public education**
 - **Invest in extensive public information programme to get public support**
- g. **Production of electricity**

- **Commission major study on net emission effects on each option under consideration and publicise results**

2. Specific Actions

a. Rail

- **Adopt bold long term policies and the necessary legislation to introduce more track**
- **Encourage research into efficiencies in regeneration of power, the use of hybrid technologies and weight reduction for existing rolling stock**

b. Road

- **Increase Government support for R&D of reducing emissions, alternative power sources and increasing efficiency**
- **Legislate or provide incentives to encourage priority schemes for public transport and a shift to electric traction and other schemes that reduce pollutant emissions**

c. Air

- **Commission detailed research to use as basis for new policies favouring the more environmentally friendly modes of transport and legislate accordingly.**