FISITA COP-15 Communiqué

Minimising the Effects of Road Transportation on Climate Change

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The International Federation of Automotive Engineering Societies (FISITA) is the world body linking the professional automobile engineering societies in 38 countries together with 55 of the world's leading vehicle manufacturers, automotive suppliers, technology and energy companies. FISITA's mission is to share knowledge among the world's automotive engineers and contribute to the development of automotive technology for the benefit of mankind. Established in Paris in 1948, we are a non-profit, non-governmental association speaking for more than 165,000 engineers across the automotive industry, academia and the public sector.

A number of natural factors drive climate change, but the world's automotive engineers share society's concern about the need to reduce man-made CO_2 emissions and we are committed to playing our part by working in partnership with the energy and fuels industries, government and society to further reduce emissions from road transportation. According to the World Resources Institute, approximately 16% of the world's man-made CO_2 emissions come from motor vehicles. Although road transportation is not the largest contributor to man-made CO_2, we are confident that still more can be done to reduce it. Moreover, while technology is already improving the fuel efficiency of new vehicles, at the same time rising demand for personal mobility in emerging markets presents an added challenge for engineers and policymakers.

Globally, the auto industry spends EUR 85 billion per year on R&D to help build safer, cleaner and more fuel-efficient automobiles, with the majority of this investment dedicated to technologies which lower the carbon impact of vehicles throughout their development, manufacture and use. Advances in automotive engineering have already led to significant reductions in vehicle emissions since the 1970s, through improvements in fuel combustion as well as after-treatment devices like catalytic converters. Concern about climate change has shifted the focus from air quality to CO_2 reduction and in recent years automotive engineers have responded, developing a wide range of low-carbon vehicles and technologies which provide for significant reductions in CO_2 emissions.

However, the further progress we all want to see cannot be realised by engineers alone. FISITA believes that society needs to find imaginative ways – fiscal, behavioural and technical - to improve fuel efficiency further and cut greenhouse gases. We advocate an integrated approach combining joint action by industry, academia, government and consumers with particular attention to the following areas:

- Fuels and Fuel Economy
- Electric Vehicles
- Traffic Management

Fuels and Fuel Economy

Automotive engineers are cutting vehicle energy consumption using a wide range of improvements in engines and vehicle technologies such as direct fuel injection, variable valve timing, downsizing, optimised transmissions, lightweight and low friction materials, stop-start-control, regenerative braking, low-energy lighting etc. At the same time, we are developing vehicles for alternative fuels like biofuels, natural gas, hydrogen and electricity.

Meanwhile the Energy Industry, faced with an unprecedented increase in worldwide energy demand, is advancing technologies for clean and efficient fuels from unconventional oil and gas resources as well as carbon capture and storage technology. They are also developing alternative fuels from sources like biomass, and are promoting

demonstration projects for hydrogen and electricity. Together we are cooperating with governments worldwide in order to establish clear frameworks for clean and sustainable transport.

Governments can help by:

- Supporting R&D into advanced fuel technologies, such as renewable diesel and 2nd generation biofuels.
- Setting fuel economy and emissions standards which focus on accelerating the application of currently available vehicle technologies for the next 10–15 years, while stimulating the development and commercialisation of advanced technologies such as pure-electric, plug-in hybrid electric and fuel-cell electric vehicles for the longer term.
- Providing a stable, predictable regulatory and fiscal environment, taking account of the long lead-time required to develop, test and produce new automobiles, fuels and refuelling infrastructure, as well as the necessary continuation of existing fuels for existing vehicles (backward compatibility).
- Making sustainable production a precondition for the encouragement of biomass for fuel with international certification to address the sustainability criteria. Conflicts between biomass for fuel stock and food production, or negative environmental impact due to change of land use, must be avoided.
- Targeting incentives to drive the penetration of affordable clean and sustainable fuels in the market, but only if they can be shown to produce lower CO_2 compared with fossil fuels on the same 'well-to-wheel' basis.
- Helping to develop the necessary infrastructure for fuels including diesel, biofuels, CNG and hydrogen.
- Supporting the global harmonisation of legal and test requirements.
- Offering incentives to purchasers of new fuel-efficient vehicle, accelerating fleet renewal.
- Promoting consumer eco-driving for immediate CO_2 reductions of up to 20% from both old and new vehicles.

Electric Vehicles

Electric Vehicles (EVs) can be one important weapon in the fight to lower CO_2 from road transportation. Start-stop systems on conventional IC engine vehicles, mild and strong hybrids, battery electric vehicles with or without range extenders and ultimately Hydrogen Fuel Cell Electric Vehicles all offer improvements in fuel economy. More importantly, electricity used from the grid can provide the pathway to clean, renewable sources of energy and reduce consumption of carbon-based fuels. However, certain technical and policy challenges remain to be solved before EVs can be considered a mainstream solution and it is important that expectations in the early stages are not exaggerated.

The first serial-production battery electric vehicles will enter the market around 2015. However existing battery technology provides a range of only 150–200 km between charges in every-day driving conditions. For mass acceptance, EV range must be increased to between 300 and 500 km and it is unlikely that the necessary battery technology will be commercially available before 2020. Further research is also needed to deal with durability, weight, capacity, safety, and especially cost reduction – as EVs are currently much more expensive to produce than vehicles with internal combustion engines. These issues are at the boundaries of current scientific knowledge and automotive engineers are working to solve them. Hybrid drive technology, which combines the internal combustion engine with electric drive to reduce CO_2 emissions, is already available on a great many production vehicles and will serve as a bridge to accelerate the development of future electric-drive-only vehicles. EVs in turn may provide an important stepping stone towards the longer term prospect of vehicles powered by Hydrogen Fuel Cells, although even greater cost and infrastructure hurdles surrounding Hydrogen distribution and storage mean that mass production Fuel Cell Electric Vehicles are more than 20 years away. Meanwhile, prior to a broad market introduction of EVs, a sound basis of technical, political, regulatory and infrastructural requirements has to be established in a common approach of policy, industry, science, and energy economics. As with all other energy options, decisions to promote electricity as an energy carrier need to be based on a

holistic analysis of vehicle life cycles: from the generation of primary energy to its use in vehicles, and from the production of new vehicles to end-of-life disposal. An EV is only as low-carbon as the electricity used to power it. Any encouragement of the use of EVs charged from the grid must be complemented by an increase in renewable electricity generation to avoid simply moving the problem to an alternate location.

Governments can help by:

- Providing enhanced, targeted R&D assistance to universities, automakers and suppliers for the development of electric drive and battery technologies.
- Offering performance-based financial incentives to assist early market entry of advanced technology vehicles in sufficient numbers to ensure viability for automakers and value to vehicle owners.
- Investing, with the utilities, in low carbon electricity supply, Smart Electrical Grids and charging infrastructure.
- Encouraging global harmonisation of regulations and standards relating to EVs, batteries and recycling.
- Providing public information and education programmes for consumers.

Traffic Management

Stuck in traffic, even the most fuel-efficient vehicles waste energy. There is great potential for reducing fuel consumption (even by as much as 60%) by improving the efficiency of traffic itself. Traffic management can play a complementary role alongside vehicle innovations in the reduction of overall CO_2 emissions, while simultaneously helping to improve the mobility, safety, and efficiency of the transportation infrastructure. Indeed the potential CO_2 savings could outweigh those that are achievable today, even with the most advanced and costly vehicle and fuel-based options available. Intelligent Transportation Systems (ITS) enable advanced communications between vehicles and infrastructure. They can help reduce CO_2 by enabling optimal route planning / timing; smoothing stop-go driving; reducing congestion; enabling pricing and demand management and encouraging smart multi-mode transportation (eg Park and Ride) among other benefits.

Measures available include Dynamic Route Guidance, Optimised Signal Control, Ramp Metering as well as vehicle control technologies which can cut wasteful acceleration and deceleration. The technology for these measures already exists, but viable business models and implementation plans are needed. There is a 'chicken and egg' situation as private sector players cannot expect a return on investment from major ITS projects until critical rates of market penetration are reached. Progress depends upon close cooperation among the ITS bodies, governments, road authorities, telecommunications providers and the automotive industry.

Governments can help by:

- Encouraging Public-Private Partnerships for the deployment of advanced ITS
- Promoting a truly inter-modal approach to transport planning, combining private vehicles and public transport to best effect (eg Park and Ride) and providing live journey planning tools to the travelling public.
- Working with ITS bodies at national and international level to develop architecture, standards and quality assurance mechanisms for traffic management.
- Facilitating the acquisition and provision of reliable traffic flow and incident data and exchange of information between traffic management centres and private providers of traffic information and routing.
- Helping with investment to install roadside technology into dated infrastructure.

Public Policy

The right policy framework is essential if engineers are to continue to make progress in the above areas. Climate change is a global issue, demanding global approaches. CO_2 tax policies should take into account that every gram of CO_2 saved is worth the same, allowing global players to act in a coordinated way.

In regulating to mitigate climate change, governments should set targets and provide support, leaving engineers and the industry to pursue the most cost-effective technologies to meet those targets.

Consumer acceptance is key to the success of any new vehicle and mobility technology. In setting policy therefore, it is vital that the cost of new vehicles remains affordable for consumers.

Conclusion

The world's automotive engineers have already made great progress in reducing CO_2 emissions from road transportation and will continue to pursue the ultimate goal of zero-emissions personal mobility for all. Engineers can be trusted to deliver solutions for low-carbon mobility and should be free to follow whichever solutions are technically the best.

Government policies that encourage the take up of specific technologies are less helpful than those which encourage the take up of low carbon vehicles in general. It is too early to say which technologies will win out. Electric vehicles show potential and are attracting a great deal of interest from policy-makers and the public, but they should not be considered the only answer at this time, given the multitude of issues surrounding battery technology and the need to generate enough low-carbon electricity.

Indeed, vehicle technology itself is just one part of the solution. If we are to realise the full potential of all the CO_2 reduction technologies available for road transportation, we need a truly integrated approach, taking into account the real carbon costs of different energy sources as well as road infrastructure, consumer behaviour and fiscal policy. This means action from all stakeholders including fuel companies, governments, road operators, drivers and vehicle manufacturers.

In parallel with global efforts, governments at the national and regional level must work with the auto and energy industries, engineering societies, the ITS community and other stakeholders to develop and implement national plans and targets to reduce CO_2 from road transportation, taking actions to improve system-wide efficiency with vehicle energy efficiency improvements as an integrated part of these plans.

With the right support from government and society, and a stable policy landscape which incentivises and supports long-term R&D planning, the world's automotive engineers can deliver the technologies and the strategies which will help to meet the climate challenge.

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