ERF's Position Paper on Road Transport and Energy Saving

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The ERF's main area of action being road transport, this Position Paper focuses on European energy policies and measures dealing with road transport issues.

I. The European Energy Policy and Road Transport

The current energy saving policy of the European Union is based on the main belief that:

- Road transport is the greatest consumer of oil products: 80-82% of the final demand for oil in the transport sector is for road transport[1];
- Road traffic accounts for about 82-85% of overall transport CO_2 emissions[2].

Accordingly, the ERF very much welcomes the European Commission's effort to reduce energy dependency in the EU by 1) seeking security in the supply of energy and 2) improving energy efficiency in the European Union, especially in the road transport sector.

However, the ERF appeals to the European Commission to rethink its method of dealing with road-related energy and pollution issues. At present, current energy saving policies and measures aiming at tackling road transport externalities are based on out-dated concepts. They should therefore be re-focused on efficient and innovative measures.

It is undeniable that road transport creates externalities. This is why, in the interest of our future well-being and the sustainability of our environment, exhaust emissions and oil consumption must be further reduced, in spite of continuous improvements.

The European Commission focuses its energy policy in the transport sector on the concept of intermodality. Nevertheless, drafting policies on the idea that transport can be simply transferred from one mode to another is rather naïve. Transport is a well integrated system, in which each mode caters for a certain niche of the transport market. Other modes have to be promoted, but the overlaps of niches in the transport system, where transport modes can substitute for each other, are very limited. Indeed, how could 14 billion km travelled by rail transport every year minimise 3,000 billion km travelled annually by road? Moreover, the European Commission ought to acknowledge that the actual European focus on inter-urban solutions, such as with intermodality, is a mere political choice and not a necessity. As a matter of fact, congestion and pollution are a mainly urban issue: about 50% of all road-related emissions are emitted in urban areas[3].

[1] European Commission, "Green paper: Towards a European Strategy for the Security of Energy Supply", 2001, page 71.

[2] European Commission, "Action Plan to Improve Energy Efficiency in the European Community", COM(2000) 247 Final, 2000, page 6.

[3] The European Commission has itself recognised this fact in various documents.

Hence, policies based on intermodality are neither able to yield energy consumption reductions nor reductions in CO_2 emissions of the scale needed. The European Commission's energy policy should therefore address energy consumers according to their true characteristics.

II. Innovative Energy-Saving Solutions for Road Transport

Numerous innovative solutions related to road-transport already exist. If they were correctly promoted, they could have a significant impact on energy saving and would reduce road-related CO_2 emissions.

This report addresses two types of solutions:

- **Solutions seeking energy saving by directly reducing road traffic**. This type of solutions should focus on solving transport issues in urban areas;
- **Solutions seeking energy diversification in favour of non-polluting energies,** such as with the development of new and renewable energies.

III. Solutions Seeking Energy Saving by Directly Reducing Road Traffic

The impact of such measures can easily be calculated. Indeed, road transport accounts for about 82% of the overall transport sector energy consumption in terms of million tonnes oil equivalents and for about 82% of the overall transport sector CO_2 emissions[4]. Thus any reduction in energy consumption will lead to an equivalent reduction in CO_2 emissions and any reduction of CO_2 emissions due to a road traffic reduction will lead to an equivalent reduction in the consumption of energy.

Further, as stated earlier, 50% of all road-related emissions are emitted in urban areas. In other words, 50% of the CO_2 emissions and of the energy consumption made by road traffic are made in urban areas (counting for 41% of the overall transport energy consumption and of the overall transport sector CO_2 emissions).

In the table below are presented innovative solutions seeking energy saving by directly reducing road traffic and supported by the ERF:

[4] Figures for the year 1997. European Commission, "EU Transport in Figures. Statistical Pocketbook 2000.", 2000.

Innovative Solution	Potential Saving
"Intelligent Transport Systems" (ITS): Intelligent transport uses information technology to coordinate transport (transport flow, speed limits, etc.), offering an almost indefinite potential.	❑ According to the Swedish Delegation on Transport Telematics, the combined effect of **five transport telematic** systems would **reduce vehicle emissions by 15% to 25%** and would therefore allow for a respective **energy saving of 15% to 25%**.. ❑ According to the European Commission, **computerised route planning, digital maps and electronic document handling represent a potential 15% improvement in road transport efficiency** (in other terms, in energy efficiency). The European Commission even suggests that, when the system becomes more dynamic and faster, with more information available with regard to congestion, average speed, road works, accidents, etc., **the potential improvement could be around 25%**[5]. ❑ The KomFram project in Gothenburg (Sweden) is based on "**the intelligent use of traffic lights**". It aims at reducing waiting-time at red lights by 20%. The estimated potential of this project represents an energy **saving of 5 million litres of fuel per year in the city**, as well as a drastic reduction of emissions[6].
Car-pooling: Car-pooling refers to the maximisation of the use of free seats in cars. With the support of ITS, it is possible to complement public transport with schemes that distribute free car seats to interested transport users. Political incentives, such as fast lanes open to public transport and cars with more than a certain number of people, could stimulate car owners to offer seats.	❑ Carpools are formed almost exclusively on a private basis and very little is done by the authorities to make cars become means of public transport. As 80% of road transport is still performed through private means, which is highly inefficient, there is plenty of room for improvement in energy spending and related greenhouse gases emissions by pooling resources. As an example, **increasing carpooling by 20%**[7] **could reduce energy spending by 18% and CO_2 emissions accordingly**.

[5] European Commission, Directorate General Information Society, "The knowledge Economy and Climate Change. An Overview of the New Opportunities", March 2001, page 27.

[6] European Commission, Directorate General Information Society, op. cit. and the Swedish National Environmental Protection Agency.

[7] A 20% increase of car-pooling would imply a reduction of the number of drivers in Europe by more than 1 million, these drivers becoming car-poolers.

Car-sharing: Car-sharing refers to communal car ownership. A fleet of cars is owned by an operator and can be booked through participants in a car-share scheme.	❑ It is estimated that car-sharing schemes can alter individual habits towards mobility and reduce the distances crossed by 50%. At the European level, car-sharing schemes would reduce the distances crossed by private vehicles by 30.000 million kilometres per year[8]. New European cars emit on average 140g of CO_2 per kilometre[9]. Consequently, car-sharing schemes could potentially **reduce CO_2 emissions by 4.2 million tons (Mt) per year in Europe**. ❑ A study found that users of car-sharing schemes potentially consume up to as much as **57% less fuel** than other drivers[10]. ❑ In **Switzerland**, it was estimated that **potential fuel savings in the field of motorised transport, thanks to car-sharing, amounts to 4,200 terajoules per year**.
Parking management: The management of scarce parking spaces can help optimise the use of parking spaces in urban areas and thus contribute to a coherent urban transport policy. Essentially with the support of ITS, it will be possible to rationalise the use of parking spaces.	❑ In fact, it is estimated that up to 30% of urban traffic is due to the so-called "search traffic", which is the traffic induced when searching for parking spaces[11]. ❑ **A reduction of up to 12.3% of road energy consumption and CO2 emissions in urban areas could be reached through efficient parking management.**

[8] Breme, Autocard. Department for the urban environment.

[9] Comité des Constructeurs Français d'Automobiles, "Les dossiers du CCFA. Des Progrès pour l'environnement. L'automobile citoyenne", 2001.

[10] P. Muheim, "Energy 2000 in Support of CarSharing", Swiss Federal Office of Energy, Energie 2000 Motor fuels section, 1998.

[11] Mr Khal, E.P.A., "Future evolution of automobiles and parking structures", 1997.

Efficient urban public transport: Efficient public transport offers the economies of scale necessary to fully capitalise on the extreme transport demand in urban areas and is capable of minimising urban transport problems.	❑ Nowadays, the organised pooling of surface travellers is performed through "public transport", accounting for 10 to 20 % of kilometres crossed and numbers of trips. The remaining 80 to 90 % of kilometres and trips are crossed through private transportation means. **Public transportation is on the average 5 to 10 times more efficient in energy spending than private transportation**. ❑ Indeed, public transportation accounts for 3 to 5% of the energy spending and private transportation for 95 to 97%. Thus, we can estimate that an increase of 30% in the share of public transport in terms of distances covered would cut energy spending by 31%.
Road improvement solutions: *Ring roads:* ring roads relieve urban areas from inter-urban traffic and offer the potential for a switch between cars and public transport, allowing for a swift access to city centres ("Park-and-Ride"); *Metro-routes:* tunnel-digging technology makes it possible to dig underground motorways through cities, with minimal surface interference. *Improving motorways and road connections*	❑ A study monitoring the impact of the improvement of bottlenecks through the provision of a steady traffic flow, by improving roads in the USA, indicates that **CO_2 emissions and energy consumption can be cut by 71%**[12].
Awareness raising and behavioural change: An EU-wide awareness programme could aim at changing consumer attitudes towards the use of cars.	❑ Eco-driving techniques, including driving style, vehicle maintenance, etc., have been estimated to bring a **saving of 5 to 25% of fuel consumption** in the road sector[13]. Projected to the year 2010, it could correspond to a reduction of **50-250 million tonnes in CO_2 emissions.**

Consequently, we could imagine three scenarios aiming at reducing road traffic in urban areas, each having a different impact on road energy consumption and CO2 emissions: very good, good and comparatively poor results.

[12] American Highway Users Alliance, "Unclogging America's Arteries: Prescriptions for Healthier Highways", 1999.

[13] European Commission, ECCP Effort 's evaluation.

- **Scenario 1 – Radical Scenario:** the measures adopted reduce road traffic in urban areas by 25%. The results of this measure reducs global transport energy consumption and CO_2 emissions by 10.25% ;
- **Scenario 2 - Voluntarist Scenario:** the measures taken decrease road traffic in urban areas by 12.5%. The impact is a 5.12% reduction in the transport sector of the energy consumption and CO_2 emissions;
- **Scenario 3 – Pessimistic Scenario:** the measures followed reduce road traffic in urban areas by 5%. A 2.05% reduction in overall transport energy consumption and in CO2 emissions is reached.

Scenario	Urban Road Traffic Reduction (% of total)	Road Transport Energy Saving (% of total)	Transport Sector Energy Saving (% of total)
Radical Scenario	25%	12.5%	10.25%
Voluntarist Scenario	12.5%	6.25%	5.12%
Pessimistic Scenario	5%	2.5%	2.05%

These numbers are estimates based on general European figures. In reality, the impact of measures aiming at reducing road traffic in urban areas could have a greater impact. Indeed, the radical scenario could appear rather conservative.

IV. Solutions seeking diversification in favour of non-polluting energies

Innovative Solution	Potential Saving
New environmentally friendly technologies and materials: Advanced technology engines, new exhaust after-treatment systems and completely new engine technologies are being developed. In addition, the construction and maintenance of roads, such as with pollution-absorbing paving stones, could have an impact on reducing road externalities.	❑ Regarding advanced technology engines, two examples can be given: 1) The **camless technology** is expecting to reduce **energy consumption by up to 15%**, 2) Direct fuel injection **reduces vehicle fuel consumption by up to 20%** in certain functioning modes. ❑ In addition, on should mention the development of a new **electrical alternator-starting motor**, as it is estimated to **decrease vehicle energy consumption by 15%** [14].

[14] Comité des Constructeurs Français d'Automobiles, opus cit.

New environmentally friendly energy: Various project, such as those on the de-pollution of fuels, the use of bio-fuels, electric, hybrid or hydrogen vehicles, etc., can increase road transport energy efficiency and reduce pollution.	❑ According to the "Auto Oil II" study, reformulating fuels could bring an important reduction in exhaust emissions. Indeed, the **desulfuration of petrol** from 382ppm to 18ppm (parts per million) would diminish by **10% the emissions of CO, HC, NOx.** It is worth stressing that this reduction would apply to the whole existing vehicle fleet. ❑ The use of **natural gas for road transport** also represents a promising alternative, as it allows for **a reduction of 20% in CO_2[15] emissions and energy consumption.** ❑ In France, the use of **bio-fuels** has reached 300,000 TOE (tonnes of oil equivalent), which implied a reduction in CO_2 emissions of 810,000 tonnes in 2000[16].

V. Conclusion

The ERF believes the European Commission ought to focus on urban areas when addressing energy efficiency and road-related externalities. The European authorities should therefore strongly encourage, politically and financially, the above-mentioned measures (which could imply an energy-saving potential of 15-25%).

[15] Comité des Constructeurs Français d'Automobiles, opus cit.

[16] ADEME, "The Advantages of Bio-fuels", International Newsletter, n. 18, Summer 2001.

The ERF

The **European Union Road Federation (ERF)** represents the interests of thousands of organisations and institutions working in the road sector all over Europe, directly or indirectly accounting for 7% of all European jobs towards the European Union.

The ERF has been offering its resources and expertise to the European institutions in carrying out policies and programmes aimed at promoting economic growth and trade relations, improving road safety and enhancing the environment as well as advancing social conditions by improving the European road network.

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