

Green corridors through European - Routes for alternative and efficient transportation

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1 . SYNOPSIS

Create a trans-European network of routes for alternative transportation by connecting existing projects. Give the users of environmentally friendly technologies desirable benefits.

2 . ABSTRACT

The character and the growth of the transportation is an issue of major importance that has fostered many analysis on consequences, alternatives, policies and some proposals for action towards “sustainable transport systems” (more energy efficient and using renewable or low carbon fuels). There have also been some attempts to experiment in larger scale and find out more in detail how market and actors react to changes. In the EU there have been several projects to investigate opportunities for alternative transport in cities.

These experiments clearly shows that fundamental, large scale, changes require more than just some simple adjustments in financial incentives to come about. It is not only an issue of supplying alternative vehicles and fuels but also many other things to keep a fleet running and above all to make the alternatives attractive and desired by its users. The "infrastructure" to support a sustained shift to alternative fuels and vehicles is weak or non-existing, but establishment of one is necessary for success.

In Europe there is a magnificent platform to the process by extended use of the existing projects within the THERMIE framework that has already established real experience among people. These "islands" should be maintained, connected and reorganised into extended “networks”. From that base there should be declared and developed an Alternative Europe-route system, **E-ALT** , as a pendant to the already existing Euro-roads.

3 . ARE CARS NEEDED OR DESIRED?

“Everyone realises that the automobile is absolutely indispensable to present living conditions. There are few ten-year-old children who cannot recognise the different makes of automobiles by their radiator caps or hoods. There are scarcely any boys of fifteen who are not dreaming of the day when they will possess automobiles of their own. There is scarcely a doctor, commercial traveller, or inhabitant of the countryside who is not aware of the importance of owning an automobile. I may also say that this change in public opinion, this desire for automobiles, this knowledge of the advantages an automobile brings are largely the result of ceaseless advertising and publicity.

In spreading this propaganda the automobile manufacturers have had to build up a vast organisation. They have had to go in for electric-light signs, automobile advertising, billboards, methodical sales stimulation and expositions and fairs that attract crowds and arouse interest. Some of this has cost us money, but we have also enjoyed free publicity. For example, the many hundred thousand automobiles on our roads in themselves create the desire to possess a car.”

Today, almost 75 years after this speech of Mr Citroen the car has conquered the industrialised world. In EU-15 the statistics from DG-TREN tells the story.

Perspective	Passengers in cars	Goods on road	Employment	Household expenditure	CO2-Emissions
Individual	28 pkm/day ²	9 tkm/person, day ³	14 Million people Services 6 Equipm. 2 Related ind. 6	1600 Euro per person and year from private households	Passenger cars: 125 g/pkm ⁴ Road freight: 190 g/tkm ⁵
Societal (Aggregated)	121% growth 1970-98 Growing 2% per year	114% growth 1970-98 Growing 3% per year	4% of all 375 Million 7% of 250 Mill. Employed	600 Beuro per year (14% of income)	EU-15: 8.2 tons/pers. and year World: 4 tons U.S. 20.8 tons
Market and consequences	72% of households have a car, 9% can not afford one		More than 600 000 enterprises in passenger and freight transport Average commuter time 38 minutes per person and day		Petrol : 82.5% Diesel: 16.3% Other: 1.2 %

The issue of transportation and mobility is more complex today than it was 1928. The desire that Mr Citroen talked about has been turned into a need of the modern society, which is heavily relying on transport for its function. There is still a desire for freedom or for esteem that the use or the possession of a car can provide. And for all those who earn their living from the industry related to transportation there is a need for this desire.

On an individual basis need and desire works well together. The conflict is rather the one between the individual perspective and the collective when individual acts get aggregated. The aggregation of individual acts in transportation has a visible and negative impact both in terms of safety and health seen on our highways, inner cities and in air pollution, but also in the vulnerability when prices on fuel fluctuate and when supply is blocked. The limited variations in technology for transportation further underlines the problem. This sector is "the least flexible to change due to its almost complete dependence on petroleum-based fuels and on the life-style developed and connected to transportation" (IPCC report 2000, chapter 8.).

At the same time there is little chance to make a change with traditional means of energy policy based on economic rationality only.

"A narrow focus on consumer choices ignores the manufacturing of demand, the structuring of choice, the inertia of deeply entrenched infrastructures and the part that governments and commercial organisations themselves play at all levels" (Shove and Wilhite, 1999).

In other words, a policy relying on that customers by choosing to buy or not to buy will probably fail since it does not go to the roots neither of the infrastructural dependencies that exists, nor to the full composition of individual desire.

Who is in charge here?

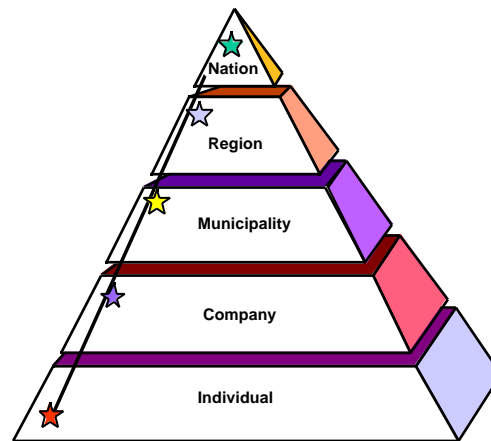
Energy policy alone, set on a national level, it seems, is not sufficient to have the impact needed to make a change of a complete and deeply forged infrastructure. Policies in other fields such as education, trade, buildings, employment, etc. are as important for the final result in terms of energy use. The problem has a width. But it has also a depth. Actors on many other levels such as local governments and business organisations set the policies. Many actors also influence the policies and decisions even without formal responsibilities (*Energy Efficiency Initiative*, IEA,1998). Some of these who set the scene for the users/consumers and their tools are:

- **Governments (Regional, national and local)** – Legal, institutional and market framework.
- **Energy Efficiency Agencies** – Energy efficiency programmes.
- **Business Associations and Municipal Associations** – Agreements to achieve targeted results.
- **Equipment manufacturers** – Products using more efficient technology.
- **Big buyers⁶ (public authorities, business chains etc.)** – Purchasing power to establish new markets.
- **Non-Governmental Organisations** – Maintain energy efficiency in the community's focus and network

- **International organisations** – Forums to disseminate results and act as clearinghouses to establish collaborative actions among countries in the region.

All these are stakeholders that either have business interests or a mandate that influences the "modus operandi" in their sectors, whether it is to maintain things as they are or to change them. A big change requires that many of them find it consistent with their objectives to do so.

Figure 1. Policies and practices on many levels must work together - be coherent.



“If it is to affect energy consumption by more than a few percentage points, energy policy needs to adopt a broader and a more sophisticated theory of social and technical change. In a policy framework, which addresses the longer term and which demands deeper changes, it is the wide sweep of social practice which counts, not the colour of any energy label, the technical efficiency of one rather than another air conditioning unit, or the preferences of the individual customers.”(Shove and Wilhite 1999).

Still most policy advice are focused on issues formed on a national level and on customer preferences that should be influenced with monetary incentives and information aiming at improved calculations, such as taxes, rebates, road pricing or information via campaigns or labels. Some advice stresses the need for agreements with manufacturers or that these should perform deployment programmes for alternative technologies (*The road from Kyoto. Current CO₂ and Transport Policies in the IEA, IEA/OECD 2000, and World Energy outlook 2000, IEA 2000*). If policies however are set on different levels and is not coherent, and if the consumer responsiveness to information or financial incentives is low (or slow) the impact can not be very high. In any case it is a matter of which alternatives that can be made available and how the consumer/user perceive these alternatives apart from the simple obvious things as prices or performance in physical terms. There is a case to make policies more client-oriented and less product-oriented: “What is the colour of the customer desire?”

4. A CHANGE IS NOT A BIG PROBLEM... TECHNICALLY SPEAKING

The alternatives suggested to the existing transport system are many and fall broadly in three categories, The vehicle, the fuel and the transport organisation (IPCC report 2000).

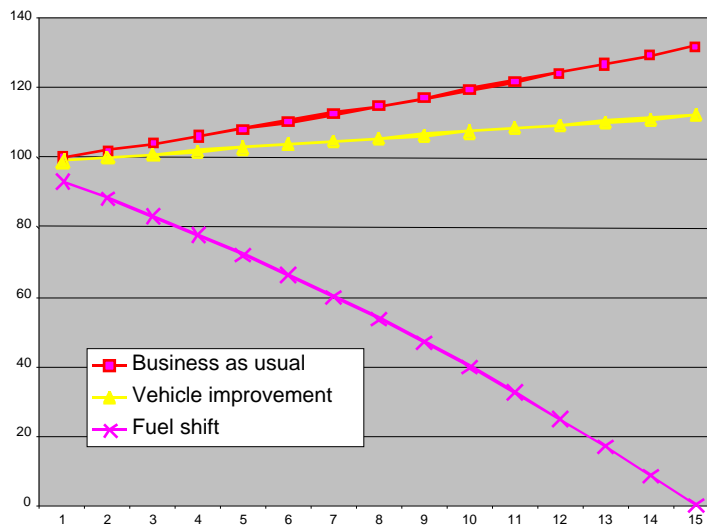
- Vehicles can be improved in several ways and motors could be produced with both better conversion efficiency and better environmental performance. The improvements are typically in the size of 5-15%, which is easily consumed by the growth rate and the "up-grading" of accessories in cars.
- Fuel substitution show many variations from reformation of petrol via blending of alcohols in petrol and use of low-carbon fossil fuels to use of entirely different fuels. The impact could therefore be total in terms of use of fossil fuels and still with mobility demand intact. There is of course a strong link between fuel

substitution and vehicles which in some cases require entirely new types of motors with different performance characteristics.

- Transport organisation could also be of many sorts from the simple "modal shift" where passenger or goods transport is shifted to something more efficient in terms of energy use or emissions to the transport substitution where physical transport is replaced by telecommunication. Improved transport planning also falls in this category where the new IT-services could assist in logistics as well as in avoiding congestion.

It has often been said that the future society probably will hold a wider variation of transport alternatives than the present. That the search for an alternative is not primarily a search for a replacement but for something that is better fit for a specific purpose or for a specific category of users. It seems that such a search should primarily begin with choosing a different fuel since that is the only one that gives an impact big enough to offset the present trend in growth of transport services. Even if each vintage of vehicles were replaced by a new one with substantially better performance it will not have the same impact as if it was replaced by a vehicle that is run on a different fuel (see figure below).

Figure 2. Impact from growth (2% year) offset by vehicles with 15% better performance over a 15 year period and by a total fuel shift in replacing vehicles over the same period.



There is, however, no clear path to solve all problems nice and neatly and even clean bio-fuels could have substantial problems with emissions from their production (*Automotive fuels for the future. The search for alternatives.* OECD/IEA 1999). In the following table some remarks are given related to user perception of comfort and/or risks.

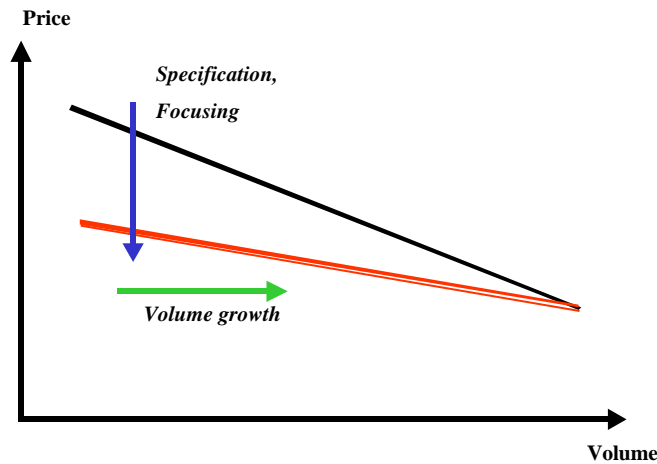
Fuel	Application Type	Positive	Negative
Electricity	Electric	Silent	Short range,
	Hybrid	Performance	Still uses petrol
Gas	Liquified (LPG)	Available	Heavier than air, could motivate parking restrictions
	Compressed (CNG)	Available	Very low energy content per volume
	Biogas	Produced from residuals and waste	
Biodiesel	Rapeseed methyl ester (RME) and alike products	Coherent with agricultural policies	NOx emission is high. Corrosion of components and seals. Problems with emission in harvesting and refineries
Alcohol	Methanol	Biodegradable Could be blended in petrol	Toxic
	Ethanol		Negative GHG unless produced from Cellulose
Hydrogen	Fuel Cells	Compatible with applications for other sectors (power, space, etc)	Very low energy content per volume. Highly flammable
	Otto Motors		

DME (Dimethyl Ether)	Diesel engines Gas turbines	Degradable and non-toxic. Also interesting for power plants	The least developed of the alternatives
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All the alternative fuels have roughly the same disadvantage, the economy. The creation of a market is necessary to have costs and hence the prices reduced by the learning effects. One way to achieve this is to bring customers/users together in purchasing effort both to specify and focus market interest and to get bigger volumes.

“Efficient strategies to make CO₂-friendly technologies available in the early decades of the new century must rely on international co-operation. Technology learning needs to be global, but technology deployment will be local. This calls for a long-term, collective effort, requiring local actions which lead to joint, coherent learning on a global scale. On the other hand, local autonomy is needed in order to ensure efficient use of local resources, meet local demands and spread the risk of technology failures.”
(*Experience Curves for Energy Technology Policy*. OECD/IEA 2000)

Figure 3. Lower costs require bigger volumes and more focus on the issues



Often the first attempts to arrange the alternative infrastructure is extremely expensive but follows the general rule for a learning process and drop dramatically for the following.

Infrastructure is more than roads and fuel-stations.

Infrastructure for transportation is often regarded in a narrow sense as the necessary "hardware" to get vehicles on the road and keep them running, i.e. vehicles, roads and fuelling facilities. The infrastructure to uphold a transportation system has several components of which only some are controlled by national decisions and actions. It is essential to identify that some components goes beyond the traditional "hardware" but are necessary to give the user of transport the service and confidence required to make the system work. Many operators could be prepared to take both extra costs and extra risks if they see a beneficial role for their company, for the environment or for development of their business.

Component	Responsible party		Facilitating arrangement
	Actor, Supplier	Influenced by	
Vehicles	Manufacturer, dealer	Taxes, Standards, Authorisation	Second hand market Leasing arrangements Car sharing Joint purchasing
Fuel	Fuel suppliers, local authorities		Develop a strategy that takes into account: Partnerships, Safety and land use Competition

Component	Responsible party		Facilitating arrangement
	Actor, Supplier	Influenced by	
Roads and parking, Safety	Road administration, local authorities	Tariffs, Land-use	Fringe benefits for alternatives: Parking Use of fast lanes Combined services (train, car)
Maintenance and care	Manufacturers, garages	Authorisation, Education	See Fuel above + education programmes in schools
Training	Manufacturers, schools		Information programmes and testing of alternatives to give hands-on experience. Education programmes
Inspection and verification	National and local administration		See Maintenance and care above
Risk management (Insurance and accident treatment)	Companies, local administration	Tariffs, Authorisation	Negotiated insurance fees for environmentally conscious drivers Special plan for police, fire department and others involved in road safety
Specification of requirements	User, consumer	Testing, Evaluation	Develop purchasing ability, specifications and evaluation methods as well as routines and organisation for purchasing (LCC)

Existence is not equal to success.

Investigations and calculations of opportunities, to get an impact by energy efficiency improvements, are often made with mixed perspectives. On one hand there are noted high potentials in terms of technologies that could provide better solutions. The bottom up calculations based on technology performance give such results. On the other hand there is little evidence that the solutions get accepted quickly. The top-down calculations based on analogies and recorded response from the market demand side are often pessimistic. To fully understand the opportunities of technologies and the need to address them correctly both the perspectives should be combined. The acceptance of a proposed measure by the individual (person, company, and organisation) is crucial for achieving the full impact and the exploitation of the analytically calculated potential (*Energy Efficiency Initiative*, IEA, 1998).

IMPACT=POTENTIAL*ACCEPTANCE

There is a strong interaction between the two parameters. In order to understand the chances to start and maintain a positive process it is useful to identify a few issues of importance and in what sense they influence the result:

ISSUE	POTENTIAL	ACCEPTANCE
TIMING: Most cars will be exchanged during the next 10-20 years. If all those opportunities are used there will be big impact. Purchasing/procurement by some big and/or influential actors is of great importance.	The effect could be considerable if timed into planned replacements of vehicles and if consideration is paid also to the need for supporting infrastructure.	Access to verifying sources (with experience) is important. Predisposition of the user if possible.
FOCUS: Directed on improvement and deployment of the improved products. Redirection of the purchasing power and opening of the dialogue between important customers and manufacturers.	Intentional statements by management. Establishment of routines and development of assisting "kits" to find products, suppliers etc.	Risk and comfort are important factors that can be dealt with by information and "hands-on" demonstration

ISSUE	POTENTIAL	ACCEPTANCE
NICHE MARKET: Actors willing to develop improved concepts as the business environment changes are necessary to drive up the volumes for the new technology. Larger volumes ensure that costs for improvements can be distributed and that competition brings forward new solutions. A forced growth in volume will make these effects arrive sooner. Such force is at hand when procurement is made by central purchasers or by a group of co-operating purchasers.	Such market must have a volume or a position of interest for the suppliers. For some applications small markets are very interesting if they are controlled by influential users.	Lead users and other primary stakeholders have to be identified.
DISTRIBUTION: Evolution is necessary. Promotional systems, labelling, improved design instruments, new routines for purchasing etc, are all instruments to develop in order to guide customers better. Car-leasing and car-sharing can be of great importance in a change process	The traditional distribution must be encouraged to support delivery of alternative fuels. There is a need to develop second hand business with alternative vehicles.	There may be a need for pooling (sharing) of resources (cars, garage, mechanics facilities etc) when developing markets for alternative vehicles and fuels
COHERENCE: Between measures and levels of influence that takes better care of multiple aspects of technology shifts	City fleets are of great importance since cities often also can affect other factors of importance such as access to lanes, parking space etc	A technology shift requires several reasons to gain size and to be sustained.

“ Diffusion of innovations into the market is a process by which the innovation is communicated through certain channels over time among the members of a social system” (Rogers).

It is hence obvious that there are many obstacles and opportunities for success. How do we communicate? Who communicates with whom in a credible way? Which channels are available and when is the suitable time? Who are the members to target in the social system and which are their values?

The users of the alternative transport have their individual preferences and attitudes that changes over time and as experience is gained. In the ZEUS-project there were made extensive surveys of factors relevant to the acceptance. Drivers were divided into "professional" i.e. those driving for public transport and "private" i.e. those (mostly) municipal employees who used low emission vehicles for their own (professional) use within the city fleet of cars. Mechanics in charge of maintenance and operation of the vehicles have been interviewed as well as passengers in the public transport (ZEUS Project Final Report).

- **Perceived risk:** There is clear evidence that activity is governed by perceived risks and that the basis for the perception is only vaguely connected to vehicles but to other related experiences. In the ZEUS-project the perception varied widely between the cities and could even be totally opposite from one to another. Mostly the perception is related to the fuel and the handling of fuel.
- **Comfort:** Most users, mechanics and passenger found the alternative vehicles as comfortable as the traditional ones.
- **Performance:** There is a general perception that acceleration, speed or even braking could be inferior in alternatively fuelled vehicles of all sorts. It seems as if this perception is primarily based on experience from some types of early deliveries.
- **Environmental aspects and odour:** Most parties involved consider the alternative vehicles to be environmentally friendly and that odour is better than with traditional vehicles.
- **General attitude:** All interviewed regardless of category (from 60% and up) have a positive attitude and think it is a good thing for cities to take invest in clean vehicles for their own purpose. Private companies have shown great interest in using alternative vehicles and fuels either on their own or in co-operation with the city. The cities role as in exposing of the vehicles and as a source for information seems highly appreciated.

5. EXPERIENCE IS GAINED EVERY DAY

There are several projects throughout Europe dealing with development of experience for alternative transports. As can be seen from the following the experience developed in these projects is very diverse.⁷ It covers many

aspects of infrastructure as described and it shows how there must be a coherence between issues if sufficient attractiveness should be gained. These 7 projects count throughout Europe 58 cities with first hand experience in arranging alternative transports.

1. The **ZEUS** project, was carried out in co-operation between 8 European cities, thereby contributing to the creation of environmentally viable and sustainable transport systems within Europe. *City administrations can often impose restrictions, but they also represent an important market actor in the field of vehicle procurement. As a united group, city administrations form an influential market player with the capacity to promote zero and low emission vehicles, to help augment the corresponding infrastructure, to press the prices of cleaner, "greener" fuels and vehicles, to arouse public interest and to provide the incentives needed to encourage the rest of the market to follow their example. In these efforts, city administrations must join forces with private industry, the motor industry, universities, national research commissions and other government bodies.*

City	Vehicles	Fuels	Systems & Equipment	City planning & infrastructure
Athens/ Amaroussion	5 buses, 25 electric cars	Natural gas, electricity (optional photovoltaics)	Local transportation, car sharing	Car parking, dedicated lanes, charging stations for EV, fuelling stations for gas vehicles
Bremen	2 advanced diesel/ electric hybrid buses, 100 natural gas vehicles	CNG, electric hybrids	Car sharing with intelligent lockers	Integration with urban city planning
Copenhagen	50 electric cars, 4 biofuelled (DME) buses, 600 city bikes	Electricity, DME "pedal power"	Improved transfer system, telematics	Incentives for electric vehicles, recharging facilities for EV, cycle infrastructure
Helsinki	5 LPG buses 11 CNG buses	LPG CNG	Traffic signal priority scheme	Fuelling facilities, public awareness campaigns
London/ Coventry	286 cars, vans, buses and other municipal vehicles, 52 taxis, 25 buses, 281 third-party cars/vans	CNG & electricity, LPG	Fleet management and car sharing, passenger demand buses, on-board vehicle monitoring systems	CNG, electric fast charging stations, car/ride sharing, incentive schemes, evaluation of environmental impacts
Luxembourg	Re-equipping of public transport vehicles, 45 RME buses	100% RME fuel - new additives	Engine equipment for 100% RME running	Dedicated bus lanes
Palermo	25 CNG buses, 10 electric freight vehicles, 10 CNG taxis, 210 CNG cars 100 electric cars	Electricity using photovoltaics, CNG	4 interchange parking centres, car sharing	Gas and electric fuelling, access for low-energy cars to city centre
Stockholm	222 vehicles (cars, vans, light trucks), 6 hybrid buses, low floor, 3 biogas waste trucks, 1 biogas- fuelled biogas distribution truck	Biogas and ethanol, electricity and electric hybrids	Infrastructure for electric and biogas vehicles	Electric vehicles in car pools and car rental companies, transportation system study

2. **CENTAUR** (Clean and Efficient New Transport Approach for Urban Rationalisation) the introduction of environmentally friendly transport vehicles and the coherent implementation of measures for a modal change from private cars towards increased use of public and other collective transport.
3. **JUPITER-2** (Joint Urban Project in Transport Energy Reduction) To implement large-scale projects integrating aspects of city planning and infrastructure provision, optimisation of transport infrastructure,

innovative vehicle technologies and clean fuels, with an aim of demonstrating viable strategies for energy-saving and environmental improvement.

4. **ENTRANCE (ENergy Savings in TRANsport through Innovation in the Cities of Europe)**. Targets a number of technologies, which have the potential to increase the efficiency and attractiveness of public transport, such as advanced transport telematic systems including real-time information systems for traffic control and guidance and dynamic information systems for users of public transport. Park-and-ride facilities integrated into transport networks. Installation of these systems on a wide scale, improves the overall efficiency of public transport networks, leading to less use of private vehicles.
5. **ENTIRE (European City Network on Transport Innovation for the Rational Use of Energy)** a follow up of ENTRANCE that will examine the synergistic effects of European networks and integrated approaches in transport management for improving the energy and emission balance. Results of these demonstrations will provide support to raise the market profile of energy saving technologies on the basis of practical achievements, and to promote their further implementation in other European sites through active technology transfer.
6. **SAGITTAIRE**. The name of the project refers to the mythical creature of the Sagittarius, hybrid creature in itself who is symbol for the complementarity between horse and man, and thus translates into the complementarity between power and energy on one hand, and control and management on the other hand.
7. **The NGVeurope project**. To demonstrate 'environmentally friendly' vehicles is in cities, where the greatest concentration of people, vehicles and, therefore, air pollution exists. The innovative project "Natural Gas Vehicles for European Cities and their Integration with Urban Transport Management – NGVeurope" succeeds through co-operation and partnerships between public and private urban interests. NGVeurope combines innovative, early market NGV technologies with scientific advancement aimed at improved urban air quality.

Country	No. of cities	ZEUS	CENTAUR	JUPITER-2	ENTRANCE	ENTIRE	SAGITTAIRE	NGV europe
Austria	1		Graz					
Belgium	5			Gent			Bruges, Leuven	Mechelen, Ixelles, Gent
Denmark	2	Copenhagen		Aalborg				
Finland	1	Helsinki				Helsinki		
France	6		Toulouse	Nantes	Caen		Besancon	Colmar, Poitiers
Germany	6	Bremen	Leipzig	Heidelberg	Cologne			Koblenz, Augsburg
Greece	3	Athens		Patra	Pireus		Athens	
Ireland	2		Dublin		Cork			Dublin
Italy	9	Palermo	Bologna, Napoli,	Florence		Venice	Savona, Belluno, Trento	Rome
Luxembourg	1	Luxembourg					Luxembourg	
Netherlands	2				Rotterdam			Haarlem
Portugal	2				Evora		Sintra	
Spain	6		Barcelona, Las Palmas	Bilbao	Santiago	Salamanca,	Alicante	
Sweden	4	Stockholm,		Luleå,				Göteborg, Eslöv
United Kngdom	6	London	Bristol	Liverpool	Portsmouth, Southampton	South Hampshire		

Country	No. of cities	ZEUS	CENTAUR	JUPITER-2	ENTRANCE	ENTIRE	SAGITTAIRE	NGV europe
Others	2			Riga (Latvia)			Stavanger (Norway)	

Name in italics signifies that a city participates in more than one project

On top of this (and in conjunction with) several networks have been created to engage people and administrations, and encourage them in a change of transportation systems. Just to mention a few:

- **ICLEI**, International Council for Local Environmental Initiatives. The European Municipal Green Fleets Project - „Buy Efficient“ was developed and initiated by ICLEI's to determine how European cities could work together to promote low-emission technologies and operational methods in their fleet operations. The Cities taking part in the European Municipal Green Fleets Project were Barcelona, Copenhagen, Hannover, Helsinki, Leicester, Lisbon, Rome, and Saarbrücken.

The aim of the European Municipal Green Fleets Project is to establish a market for fuel-efficient and low-emission vehicles among cities throughout Europe. Local authorities can show leadership - and improve their overall vehicle fleet efficiency - by purchasing vehicles that are more fuel efficient.

- **Car-free cities**, The Car Free Cities Network was launched by DG XI (Environment) of the European Commission in March 1994 at the "Car Free Cities?" Conference in Amsterdam. Today, the Car Free Cities Network brings together some 60 European Cities actively involved in strategies promoting sustainable mobility towards the process of improving the quality of life. This network has fostered the STREET project aimed at bringing together successful experiences and good practices in the area.
- **ALTER**. The ALTER Project aims, through joint action by European cities (altogether 150), to generate a demand for clean vehicles which encourages manufacturers to shift to volume production at lower costs. ALTER undertakes to:
 - ▲ Organise conferences and workshops for the exchange of experience and progress reports
 - ▲ Enable producers to present information on the availability of cleaner vehicles and fuels
 - ▲ Organise joint procurement of low emission vehicles through the ALTER Procurement Consortium

6. CONNECT THE PROJECTS TO A STRING OF PEARLS

The aspect of joining forces to get a substantial demand for new vehicles seem to be well identified and it could be assumed that the networks existing could care for the need of aggregated and sizeable demand. There is also a general awareness of the multitude of aspects to achieve a real impact on the market. The amount of seminars and conferences arranged and the items on the agendas bear witness to this. The missing link, however, seem to be to put together more concerted, comprehensive and targeted actions comprising not only vehicles and fuels but to develop all the details of the "infrastructure" that gives the customer full confidence in the alternatives.

Many of the actors concerned are also stakeholders in a change. Both as users and suppliers they could find benefit from the change itself whether it is from a plain business perspective or from the perspective of creating an image or to position oneself for future activities. Many companies are e.g. deeply engaged in environment certification. Creation of a "Stakeholders Forum" for those who are prepared to take the lead, the innovators and the early adopters of new technologies, could facilitate the implementation (Månsson 1998).⁸ Participants in a Forum should make commitments showing that they accept to be in (and move) the frontline as a business concept for the new technology achievements. Such commitments can force the process of market acceptance and thereby ease the learning process. A Forum should *aggregate demand* by gathering enough of the important buyers⁹, but also *stimulate communication* between market actors in such a form that development of products, deployment of models and dissemination is facilitated.¹⁰

Niche markets have to be identified. It could be routiers, bus-companies and others having stable routes that they drive more or less on schedule across countries. Benefit packages have to be developed for those who want to participate. It could be certification as to their compliance with the environmental schemes (EMAS, ISO 14000) and their reduction of GHG-emissions that they could use in advertising or just for verification. It could be secured places in fast lanes, and for parking as well as negotiated tariffs with insurance companies for their environmentally friendly behaviour, etc.

To get a real and lasting impact one has to:

- Firstly address the full range of concerns (risk, comfort, performance, etc) that the users have and not restrict the activities to simple dealing with economic incentives or standardised information.
- Secondly make use of the many influencing actors in an orchestrated way so their support is coherent and confidence on behalf of the users achieved.
- Thirdly find and target those actors and their applications that is likely to be champions of a change.

In Europe there are some important elements already in place and will serve as a magnificent platform to the process. The existing projects within the THERMIE framework that has produced results established real experience among people and created networks. These should be maintained and reorganised into extended “super-networks” and be the inner core of e.g. “Stakeholders Forums”. With this base and with all the other existing and developing networks, there should be declared and developed an Alternative Europe-route system. **E-ALT** as a pendant to the already existing Euro-roads. These should connect concerned cities and allow actors in all parts of the structure such as big routiers that drive fixed routes, to gradually strengthen the network from virtuality into reality, from single projects and isolated networks into a string of pearls. Just as desired as once the vision of Mr Citroën.

7. REFERENCES

Methodological and technological issues in technology Transfer, IPCC report 2000, Cambridge University Press

Energy Policy: what it forgot and what it might yet recognise, Elizabeth Shove and Harold Wilhite, ECEEE 1999

Diffusion of Innovations, Everett M. Rogers, The free Press, New York, 1995

Energy Efficiency Initiative, IEA, Paris 1998.

Experience Curves for Energy Technology Policy. OECD/IEA 2000.

Automotive fuels for the future. The search for alternatives. OECD/IEA 1999.

The road from Kyoto. Current CO₂ and Transport Policies in the IEA, IEA/OECD 2000, and *World Energy outlook 2000*, IEA 2000.

Reducing Barriers to Zero and Low Emission Mobility. A guide for cities. ZEUS Project Final Report. European Commission 2000. http://www.zeus-europe.org/archive.reports.html#GUIDE_FOR_CITIES

Clean Vehicles with Biofuels, KFB Report 1998:18. Tommy Månsson

8. END NOTES

¹ *The future of the automobile*, André Citroën in a speech before The institute des Arts et Metiers, Paris 1928

² 79% of 35 person km (pkm) per day. Public transport 21%

³ 44% of 20 ton kilometers (tkm) per day. Sea 41%, rail 8%, inland waterways 4%

⁴ Bus 45 g/pkm, rail 65 g/pkm, air 175 g/pkm

⁵ Rail 30 g/tkm, inland waterways 30 g/tkm, sea 20 g/tkm

⁶ The public sector in its role as provider of services controls a substantial building stock, vehicle fleet, workshop facilities etc. Supply for such activities represents a huge purchasing power that can move the benchmark for products on the market.

⁷ All descriptions are taken from the respective projects web-pages to better show the width of the ambitions and the awareness of the coherency aspect.

⁸ "The 1997 International Conference on Use of Biofuels for Transportation - Creating the Market" Sept. 1997.

⁹ Importance in terms of their purchasing power or as leaders

¹⁰ In the words of a preliminary Transport meeting in Paris the Forum could be focused on;

- Communicating intentions which gain partners and influence policies,
- Setting agenda for voluntary actions (e.g. procurements),
- Showing priorities and defining niche-markets for early actions,
- Putting up warning for non-sustainable actions and strategies based on own experiences, and
- Developing and communicating Joint Statements (Contracts for First Movers).