

A new serene and sustainable mobility: designing and using environmentally friendly vehicles

*Summary of the report prepared on behalf of the OPECST, by Mr. Denis Baupin, MP,
and Mrs. Fabienne Keller, Senator*

How can we adapt to the depletion of natural resources? How can we break with policies of adapting the city to the car? How can we change the existing car model? These are the issues that Mr. Denis Baupin, MP, and Mrs. Fabienne Keller, Senator, have placed at the centre of their report, which highlights the fact that vehicles must be conceptualised differently. The rapporteurs stress that, in the context of a decrease in demand for cars, mobility needs must become the guidelines. The approach must be respectful of the environment and health, while being dynamic, so as not to have negative effects on employment and foreign trade.

Context and issues

Mr. Denis Baupin and Mrs. Fabienne Keller consider mobility to be a mode of social organisation, an all-encompassing concept, which contains within it various means of exercising it. The automobile is only one of the tools available to implement this mobility. Various factors, such as the financial aspects, and the diversification of modes of transport, are increasingly calling into question the predominance of the individual car over the other modes of transport.

Until recently, the usefulness of possessing a private car was beyond question. It seemed natural to acquire one. It was freighted with values, symbols, and social markers. It was sometimes – and still is, where there is an absence of public transport – a condition for getting a job. It was a symbol of freedom, and even a condition of individual freedom. It was also considered a safety element.

Road safety campaigns led to the maximum speed of a model no longer being a selling point. A new image of the vehicle was then built up which no longer necessarily associates the vehicle with its power but with the services it provides. We see this, for example, with the boom in minivans in France since the late 1980s, which symbolise neither power nor speed, but comfort and capacity of transport. Can a move

towards more sober vehicles follow this new image of a practical and fun vehicle?

The question has nowadays been partially detached from the media, in order to refocus on the objective: what are the mobility needs of today? What are the conditions necessary for serene transport? Are these needs the same for all citizens, or can typologies be established? What attitude should be taken to past developments, as well as to new opportunities which are still unclear? Are these long-term trends, or cyclical events?

The range of vehicles is diversifying and the environmental and health constraints and objectives are becoming more and more pressing. The impact on the mobility demand of the traditional criteria (such as place of residence and work, age, gender, income) are tending, in turn, to decrease.

According to available statistical data, in the Paris region, the average journey ranges from 4 km for women to 6 km for men. As for trips by vehicles, they are longer by public transport (respectively 9 km and 11 km) than by car (respectively 5 km and 8 km). The average trip between home and work – 13% of trips – are also longer than the overall average (10 km and 12 km, respectively). The average number of daily trips also decreases with age, from a high of 3.8 for the active 26-45 age group, to a low of 1.6 for those over 75. Over the long term,

transport expenditures converge progressively, regardless of income or socio-professional category, even though the household equipment rate continues to reflect a disparity (91% of high-income earners have at least one car, as against 81% of middle class and 28% of low-income households).

Lastly, new criteria are emerging: lifestyle (composition of the household), relative performance and availability of means of transport, etc.

The emerging constraints on the automobile market

Mr. Denis Baupin and Mrs. Fabienne Keller consider that the environmental and health constraints are a primary issue, of which the adverse effects of diesel on health and global warming are an illustration.

The observed decline in automotive demand needs to be carefully analysed. Is it only conjunctural (linked to purchasing power) and temporary or, on the contrary, structural (linked to a change in attitudes and behaviours) and of a permanent nature? Are we witnessing the calling into question of a model based on the all-pervasiveness of the automobile and – for France – on the pre-eminence of diesel, as well as the initial consequences of a new international specialisation?

The two major French manufacturers, Renault and PSA, have followed different strategies. Renault, in a global perspective favoured by its alliance with Nissan and Dacia, is betting on the electric vehicle. Peugeot, more isolated after the failure of its negotiations to merge with General Motors, is moving towards hybrid engines, electric or compressed air. In addition, foreign groups, especially those in emerging countries, are growing in power and quality.

Will these strategies be sufficient? Will they make it possible to overcome the current crisis? Will they be able to respond to the global economic changes affecting the automotive sector? These are open questions.

Some technical developments can help meet some of the challenges of pollution reduction, health improvement and safety. But this diversification alone is insufficient to solve the difficulties of the manufacturers. The foreseeable technical evolutions are only one of the elements of an answer: for example, reducing costs and

consumption requires not only a technical evolution but also changes in behaviours, which have already begun, and are likely to impose a reassessment of the business model itself.

Finally, the rapporteurs stress that it is the very perception of the usefulness of the motor vehicle which is changing. Difficulties with parking and access to certain urban sites lead to a questioning of the "all-automobile" tradition. The incompatibility of the automobile with the city thus seems to increase.

The necessity for a new model

The context is changing

It appears that assessment of mobility is based less and less on the distance between point A and point B and more and more on the time necessary to cover this distance and, on the other hand, that the notion of ownership of a vehicle is declining, especially because of the development of pooling: car-sharing, Velib', etc.

The field of possibilities is widening

Technological evolution is rapid and constant, as much for manufacturers as for component suppliers and technical service providers. Manufacturers are diversifying their provision of motorisation and equipment manufacturers their products. All manufacturers are expanding their range, offering electric, gas, hydrogen or hybrid vehicles. Nevertheless, some are more advanced than others in this process. These new vehicles also aim to better adapt to environmental and health constraints.

A new ecosystem and new services are emerging

The combination of mobility technologies with information and communication media is enabling the development of a new ecosystem.

The geolocalisation applications offered by smartphones are already making it possible to gradually simplify mobility in the area, whether it is with regard to the search for an optimal route, refuelling and battery charging sites or even car-sharing and carpooling opportunities.

In addition, intermodality, the principle of which is based on the use of different means of transport within a single journey, is increasing. Nevertheless, it remains necessary to facilitate it further.

On the political front, the issues must focus on infrastructure, the organisation of urban transport and, more generally speaking, the design of a new urban policy. In particular, it is necessary to determine the role of local and regional authorities, the evolution of tax legislation, regulations and support measures for industry and individuals.

The rapporteurs believe that all these observations give rise to new controversies and debates

Are the technical evolutions highlighted a bubble ready to explode and revolutionise mobility?

Do the services developed or under development not tend to align exclusively with the reality of the big cities? Is not lower car usage only related to the context of recession? Should the model of the car of the future still fulfil all uses, from the daily commute to the holidays?

Finally, who will be the developer and the seller of tomorrow's mobility offer? Which model of motorisation will be the most widely used?

Major technological developments have historically taken place at the conjunction of revolutions in communication, currently in operation, revolutions in energy, which are being put in place, and innovation in mobility. The terrain therefore seems most conducive to an evolution of vehicles, which is both technological and qualitative.

It is necessary to carry out a sufficiently detailed analysis to check if the evolutions felt in Paris and in other big cities are valid for the whole of France. By extension, it is necessary to check if the solutions envisaged, which seem suitable for the urban network of Paris and that of other large regional metropolises, are also suitable for peri-urban and rural areas.

A comparison must be made between the various techniques, their performances, their cost, their level of development, their impact on pollution and human health, their projected and actual lifetime, and their reliability.

The vehicle of tomorrow

Its ergonomics and its functions

Mr. Denis Baupin and Mrs. Fabienne Keller note that the vehicle is a living space and not merely a means of transport. Accordingly, speed of travel should not be the only variable in conceiving the

vehicle of tomorrow. Thus, the Renault Twizy is, for some, the only truly prospective product, because its engine is less powerful than that of other electric vehicles.

The challenge is not to have electric vehicles which resemble thermal vehicles, but rather to take the opportunity to rethink the vehicle. The electric vehicle makes sense if it is economical and small, which increases its autonomy. The transition to electricity should, moreover, be an opportunity to change its form and its uses, but also to integrate mobility into a responsible energy mix. Electric motorisation should *a priori* completely change the automobile over time.

In this respect, Japan offers an interesting example of innovative vehicles. Vehicles with three or four wheel drive, highly computerised and automated, can be parked or stored, using a space-saving stacking system. These are machines weighing 200 kilos, their battery is not too heavy. Recharging is done when stored in dedicated spaces, which are similar to silos (designed especially by Toyota). They are attractive machines, as their speed varies depending on the situation.

In addition, information and communication media and vehicles evolve in concert. In particular, mobile telephony can facilitate spatial, temporal and social agility. Each of these technologies thus participates in the development of the others.

The regulation of supply and demand

Alternative modes of transport such as carpooling, the development of teleworking, e-commerce, e-health or e-training have a negative impact on demand in the vehicle market.

According to some observers, the vehicle of tomorrow should, consequently, become a hybrid between the individual and the collective. It should, according to others, perform different functions and be adapted to diversified needs: be a shared object but also a multi-handly mobility tool, without affecting the quality of the air.

Thus, in summary, the concentration of a multitude of offers in a single product will make it possible to increase demand.

The reconciliation of collective and individual choices

The rapporteurs note that it is necessary, first of all, to reconcile the analyses of economic forecasters with the projects of manufacturers,

which today can differ. Collective choices must then be consistent with the availability of resources as well as environmental and societal challenges.

There is also a need to support incentives for eco-driving and vehicle sharing. Moreover, the energies used must be as renewable as possible. Engines must be conceived of holistically, in terms of "energies" rather than "fuels".

It is also important to think about how to shorten the time between the emergence of a new idea and its industrial implementation. The distribution of new vehicles must also be accelerated by public incentive policies, which should make more attractive what is desirable for the community: subsidies, energy saving certificates, tax incentives, and lane or parking priorities are examples of these support instruments.

Strengthening the effectiveness of public intervention

Mr. Denis Baupin and Mrs. Fabienne Keller believe that public subsidies do not have enough effect on reality and that tax measures can on the contrary have undesirable effects (like the "over-dieselisation" evident for a long time in France). New motorisations will not, for their part, become widespread as long as the distribution of new fuels remains unevenly spread out over the territory.

At this stage, the resources put in place by the State and the local authorities appear to be insufficient and will have to be increased.

Present technical standards do not go beyond 2020. They should be more ambitious and set not only regular schedules but also long-term objectives. It is also important that they be binding and that means be defined to verify their implementation.

Ensuring the effectiveness of research

The rapporteurs stress that research must be given sufficient funding: this is currently the case and it should be continued. An effective transition from research to innovation and distribution of new products also needs to be organised.

In the field of social sciences, research must focus on the analysis of changes in behaviours and needs, on the definition of more precise typologies, and on thinking on the acceptability

of new vehicles as well as on the spreading of new forms of mobility.

Regarding the technical sciences, automation, the development of embedded digital equipment, wheel drive, the search for energy savings and the development of alternative fuels are all priorities.

Conclusion

Mr. Denis Baupin and Mrs. Fabienne Keller note that technical possibilities and supply are diversifying, but that efforts still need to be made in several areas in order to boost demand. New infrastructure must be built and the organisation of urban transport redesigned.

Public incentive policies must be designed differently in order to allow real alignment of the manufacturers' strategies with the objectives set out in the framework of this report.

The response to multiple needs must be diversified: several choices are still possible, for both engines and fuels. New services must also find their economic model. International comparisons show that the range of possible choices is very wide.

Finally, the rapporteurs highlight the fact that individuals should take into consideration the possibility of collective use of vehicles. This new use should be fostered by the establishment of infrastructures allowing efficient intermodality, the development of car-sharing and carpooling, the setting up of new parking areas, accompanied by new services, the diversification of available public transport and, more generally, a restructuring of the city.

This report can be read on the OPECST site:

<http://www.assemblee-nationale.fr/commissions/opicst-index.asp>

<http://www.senat.fr/opicst/index.html>