

## The car of the future: cleaner and more energy efficient

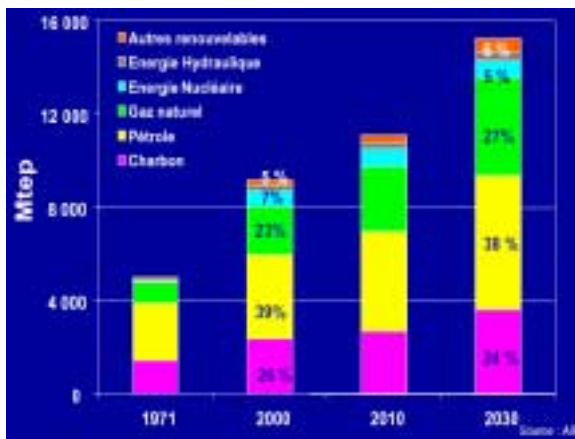
Report by Mr. Christian Cabal, Deputy for the Loire,  
and Mr. Claude Gatignol, Deputy for the Manche, on:  
"The definition and the concept of the clean car"

The report prepared by Mr. Christian Cabal, Deputy for the Loire, and Mr. Claude Gatignol, Deputy for the Manche, was commissioned by the Bureau of the National Assembly for the Parliamentary Office, on the instigation of the UMP President.

### Principal conclusions and proposals

#### Sustainable mobility: a necessity

Economic growth is fed by an ever greater demand for energy and transport. Conversely, a rise in the price of energy or limited mobility negatively impacts economic development.



Rising energy demand, 1971-2030 (IPF-IEA)

The projected increase in both energy demand (+60% for 2030) and road transport (twice as many vehicles in 2020) is unsustainable from an environmental protection standpoint, taking into account the predominance of hydrocarbons. The danger only increases as our societies demand manufacturers to produce ever safer and more comfortable cars, and therefore heavier and less fuel efficient.

Yet, protecting our economies' potential for further growth by providing abundant, in-

expensive energy and by ensuring the free use of various means of transport would appear to be an important political objective.

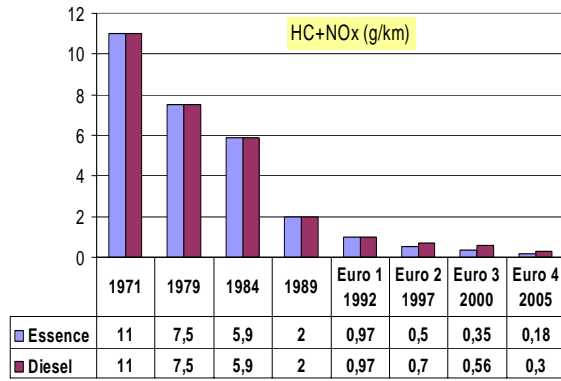
Consequently, it is imperative that economic growth and transport produce fewer pollutants and greenhouse gases, thanks to clean energy and the development of more fuel efficient vehicles.

**Can the solution be found in technological innovations alone?** The reporters' consultations with experts in the field have led them to conclude that new technologies can constitute a **major part** of energy savings (a proportion of two thirds was suggested) in the transport sector. **But they will not suffice** and our societies must commit themselves to a significant reorganization of the transport system, as well as a change in behaviour.

#### Continuing to reduce emissions

**Spectacular advances** in the reduction of local emissions made possible by technological progress and the strengthening of European standards **have allowed for a marked improvement in air quality**. For example, in the Ile-de-France region, the air is considered of good quality more than 80% of the time.

Nevertheless, problems will remain, until at least 2010, near the busiest major roads, in particular with regard to nitrogen oxides and particles.



The evolution of European standards for the emission of nitrogen oxides and residual hydrocarbons for petrol and diesel-fuelled automobiles since 1971.

Urban pollution is an important public health issue. It is difficult to undertake studies in this field because they must be long-term, include a large population, and take into account a particularly complex set of criteria. However, the link between the principal pollutants and health risks, including a rising mortality rate, is becoming increasingly clear.

**DIESEL PARTICULATE FILTER SYSTEM**

For this reason, we must strengthen our research and accelerate the reduction of emissions.

With regard to particle emissions, closed-filter technology developed by PSA Peugeot Citroën is a complete success for it captures almost all particles, even the smallest.

However, its distribution is insufficient and must be accelerated.

With regard to nitrogen oxides, the technologies currently being studied are nearing completion and will likely be incorporated into certain vehicles at the same time as desulphurized fuels become widespread (10 ppm).

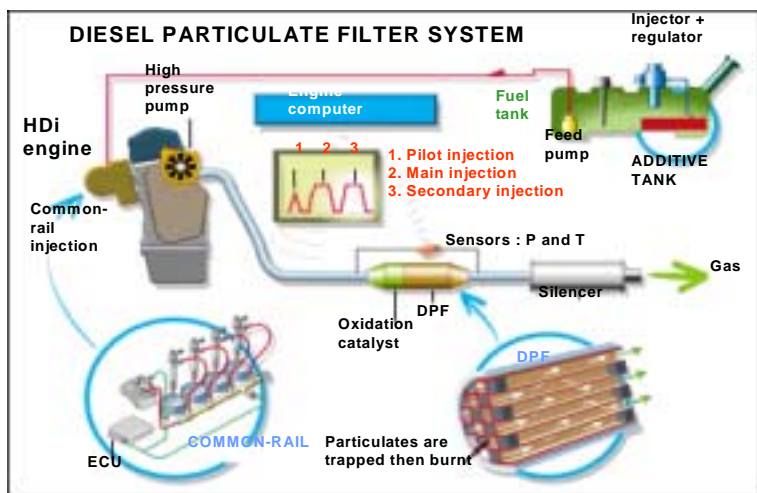
New combustion technologies might be marketed as early as 2010 which will greatly reduce the need for after-treatment systems by largely eliminating engine pollutants.

*Reducing greenhouse gas emissions: the challenge for the car industry.*

Upholding our commitment to reduce by 75% our greenhouse gas emissions by 2050 in the transport sector represents a real challenge. In the short term, it appears unrealistic to expect car manufacturers to respect their voluntary commitment of reducing emissions to first 140 g/km, then 120 g/km.

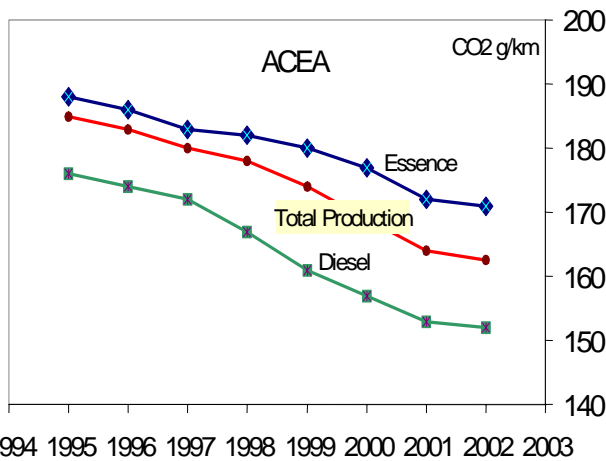
As for greenhouse gas emissions, in order to have a significant impact, priority must be given to wide-spread solutions.

Today, several technologies or industries are scientifically and economically in competition with one another or could be combined.



Functioning of the PSA PF

Photo credits: IFP, CCEA, PSA



Reduction of CO2 emissions by vehicles sold by European manufacturers (ACEA) since 1994.

The diesel engine currently represents the most efficient and affordable means of reducing emissions in Europe, where diesel is widespread. The French car makers are particularly well positioned.

However, in Japan and the United States, where many fewer diesel cars are sold, the hybrid engine will only grow in importance in the coming years.

The LPG and CNG sectors could make an important contribution, but the absence of such vehicles outside the captive fleets and the difficulty of developing these sectors will likely prevent their having a significant effect on the reduction of greenhouse gas emissions.

The development in Sweden of flex-fuel vehicles which run on both ethanol and petrol is also extremely promising; especially as such vehicles could be sold in France.

In the mid term, the development of biofuels mixed with more classic fuels is very interesting, since this can affect all automobiles.

Also in the mid term, the reporters are convinced that the hybrid engine will experience rapid development in all markets, considering its compatibility with all fuel and engine types (diesel, petrol, biofuels, hydrogen,

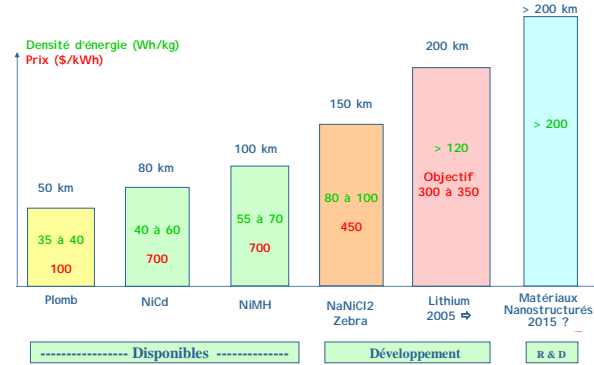
etc.), while at the same time leaving a great part of the market open to other engine types for a long time to come.

The reporters also believe that the electric car could conquer a significant part of the market if in the coming years it confirms advances made in terms of battery life (allowing for a range of over 200 km) and if they remain cost competitive.

Over the next ten years, research will continue on how to greatly improve the efficiency of petrol engines and will allow for the marketing of new means of combustion.

Starting in 2010-2015, it is perfectly possible that advances in battery life will allow for either the supplementary development of 100% electric vehicles, which will monopolize certain sectors, or a significant improvement in the performance of hybrid vehicles. The reporters are convinced that a rechargeable hybrid vehicle offers great potentialities that could realistically be developed.

Le stockage d'énergie : vers des batteries plus compétitives



Starting in 2015, it is also conceivable that bio-fuels from lignocellulose will be produced at the industrial level.

It is difficult to see beyond 2015, but most experts agree that the fuel cell car will only be beginning to appear on the market, in the very best scenario. It is even probable that we will have to wait twenty years before the development of the hydrogen fuel sector.

**In any case, future decisions must be based upon a careful consideration of the life cycle of vehicles.** The electric car can only be developed if powered by electricity without CO<sub>2</sub>, and the fuel cell car by hydrogen without greenhouse gases.

### *Main proposals*

**1-** Assess the cost effectiveness of new automobile regulations with regard to the main objective of reducing the greenhouse effect.

**2-** Rapidly extend the use of "closed" particle filters by diesel vehicles.

**3-** Establish a date for the widespread use of devices for the elimination of nitrogen oxides by linking the Euro V and Euro VI standards.

**4-** In five years time, decide whether to stop or continue the public financing of certain sectors.

**5-** Integrate auxiliary sectors such as air conditioning into the standardized European cycles for controlling consumption and emissions.

**6-** By the year 2010, create a European-wide, multi-criterion label to be placed on newly designed vehicle models.

The analysis of automobile life cycles must become widespread to provide consumers with reliable and comparable information. The energy label established in 2006 is quite positive, but insufficient.

**7-** Starting in 2007 spread the use of the energy label to used vehicles sold by professional dealers, to light utility vehicles and to motorcycles.

**8-** Implement measures to benefit the users of cleaner vehicles: free parking, express lanes (for buses, carpooling), the application of preferential speed limits for the smoggiest days, etc.

**9-** Undertake preliminary studies to evaluate the impact of integrating the emissions of sold cars into the European carbon emissions market, if the car makers were not respecting their commitment to lower emissions.

**10-** Accelerate and increase hybrid-engine research.

**11-** Carry out the biofuel plan and lower production costs to make these fuels more competitive without public funding.

Give priority to substituting for diesel.

Study the implementation of a "flexible fuel" sector and experiment with the direct incorporation of ethanol during the winter.

Modify European regulations to allow for greater incorporations.

**12-** Modify the law on air quality's definition of the so-called "clean" car based on performance criteria rather than on sector. This definition could be revised every five years, according to advances in our understanding and technology.

Starting in 2007, this definition could be based on two criteria:

- An emission cap of 115 g of CO<sub>2</sub>/km or less; in other words, the top ten diesel vehicles of the 2005 ADEME list and the four top petrol models.
- Meeting ahead of time the Euro V standards; for example, diesel vehicles equipped with a particle filter.

The sole objective of this relative definition would be to serve as a tool for the authorities' implementation of incentives. It must therefore be sufficiently restrictive while still allowing consumers to purchase a "clean" car at a reasonable price, therefore encouraging the wide spread sale of such models.

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