

Reducing CO2 Emission on Road Traffic - European and Asian Approach



Deutsche Umwelthilfe
Stefan Bundscherer
Dorothee Saar

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1 The Situation in Europe

1.1 Background

In order to respect its Kyoto commitments¹, the EU is trying to reduce CO₂ emissions from road transport - a sector that generates more than one fifth of all CO₂ emissions in the EU. Passenger cars alone are responsible for more than half of these emissions.

In 1996, the European Governments followed the proposal by the EU Commission to reduce CO₂ emissions from passenger cars. The average CO₂ emissions from passenger cars should be reduced to 120 g/km by 2005 or 2010 at the latest. This is equivalent to an average of 5 litres per 100 km for petrol cars and 4.5 litres per 100 km for diesel cars.

In July 1998, the automobile industry, represented by the ACEA, committed to reducing the average CO₂ emission for new cars from 186g/km in 1998 to 140g/km in 2008. This corresponds to an average mileage of 6 l/100 km for gasoline and 5.3 l/100 km for diesel.

In a parallel commitment, Japanese (JAMA) and Korean (KAMA) manufacturers set their goal at 140gCO₂/km in 2009.

1.1.1 Progress of Commitment

It is now clear that the target for 140 g/km will not be met, as progress has slowed down considerably in recent years. The average emission within the ACEA in 2005 was 160gCO₂/km. A reduction by 4.3% would be necessary to reach the target by 2008. The average reduction per year is about 1%, the best change since 1998 was about -2.9%.

The development within KAMA and JAMA is comparable: With an average emission of 169g CO₂/km (2005), JAMA would need an average reduction of 5% per year as well as manufacturers from the KAMA consortium, who produce cars with an average emission of 172g CO₂/km (2005) (Transport & Environment T&E, August 2006).

According to the T&E data, ACEA is set to miss the target by approx. 13 grams if the present trend continues. The Asian producers will miss their target by 20g or more (T&E 2006).

The lack of one responsible contact person within ACEA is one reason for this development. ACEA represents several manufacturers producing very different types of cars from small and efficient cars to large, sporty models with high consumption. Within the institution, no one is authorised to fix the emission rate for each single

¹ Reduce greenhouse gas emissions by 8 % by 2008-2012 compared to the 1990 level

manufacturer. ACEA as well as JAMA and KAMA are not legal entities that can be held accountable for their members' products. Workable legislation would require CO2 targets at manufacturer level (Dings, T&E 2005).

There is no lack of technological potential. The Federal Environmental Agency (UBA) showed in a study how to lower the consumption by up to 30% by implementing several fuel saving measures (UBA, Axel Friedrich 2006). According to the Friends of the Earth Germany (BUND), the currently available potential to minimize consumption is about 60%. Efforts to reduce the consumption by about 40% lead to extra costs of 750-1250€ per car (BUND-Magazine 3/2006). Several improvements lead to reducing fuel consumption such as:

- advanced lightweight materials such as seats etc.
- advanced drive trains, stop/start engines, regenerative braking etc
- hybrid drive trains with smaller petrol and diesel engines (T&E 2005)

or

- gearshift indicator
- smooth covers, smooth underflow
- narrow low rolling resisting tires
- latent heat storage
- gearbox with long transmission
- engine stop at idling.

The biggest reduction in fuel consumption would be achieved by reducing the weight of cars. This can be done partly by using different materials. It is however to a large extent a question of the kind of cars which are put on the market and bought. Many cars in Europe are unnecessarily heavy, big and fast (e.g. SUVs, which in Europe are hardly used at all of off-road driving) and advertisement of the car industry is heavily biased towards cars with higher fuel consumption. In this context, the problem of "parasite-security" needs to be addressed: Increasingly, people choose heavier cars which are considered to be more secure for the passengers, but which are often causing more severe accidents and therefore decrease the security of other car drivers and pedestrians.

The European Commission estimates extra costs for technological improvements to be 577 Euro per car (IEEP report 2005). These extra costs will be reflected in the price. The need for an initial capital outlay by the producer without a direct benefit prevents the producer from applying efficient (and available) technology (A. Petersen, 2006). T & E analyzed the report regarding the estimated costs. The summary of the report itself gives hints about overestimating the costs and underestimating the benefits.

Without mandatory limits combined with a penalty system² in cases where targets are fallen short of, the car industry will not apply technological improvements to reduce consumption. Several models for a legally binding system on the EU level are currently discussed. Accurate specifications for each model-group, setting upper limits of CO₂-emissions, could, for example, stimulate technological development.

As a reaction to the current debate about setting mandatory limits, the European Automobile Manufacturers Association (ACEA) underlined the fact that consumer demand for safer and larger cars and regulations concerning safety and air pollution have had a counter-productive impact on the reduction of CO₂ emissions for new cars. Despite these developments, it said, the industry has successfully achieved a 13% reduction in CO₂ emissions since 1995. Communications Director Sigrid de Vries said it was much too soon to say that the car industry would fail to meet its 2008 target. "This is 2004 data only," she said. "ACEA does not think it is yet appropriate to talk about legislation". According to data put gathered by T & E the progress in 2005 was however equally slow.

1.2 Position of the German government

In 2005, the cabinet adopted the German Climate Protection Program 2005 to update the program of 2000. Taking a balance of the efforts of the years past, the government asserts a decline of the emission of CO₂ of about 15 mill. tons in 2003 compared to 1999. In addition to financial incentives, the government counts on the voluntary commitment of the ACEA and German car manufacturers. Encouraging a change in the manner of driving offers potential for a reduction of CO₂ as well and is another pillar within the program. Tuition of car drivers is supposed to reduce emission of inner-city traffic by about 12% in the long run.

Another aspect within the Climate Program to reduce CO₂ emission is the use of bio fuels. The government therefore decided to increase the share of bio fuels in the total fuel consumption. The government plans to make the mineral oil industry add a certain amount of bio fuels: from 2007, 4.4% to diesel and 2% to gasoline. In the coming years, this amount shall increase.

This strategy aims at concentrating resources on this alternative and at advancing their development.

According to the government, the choice of the preferred technological means to reduce CO₂ emissions is up to the manufacturer. Hybrid cars are one solution among others. It is up to the customer to decide.

The German government has also announced that it will – on the national level – change the taxation for cars, putting higher taxes on cars with higher CO₂-emissions

² This system could include the refusal to register cars that fall short of the target

and lower taxes on energy-efficient cars respectively. The main discussion in Germany is currently how big this differentiation will be.

Given the foreseeable failure of the ACEA commitment, Sigmar Gabriel, the German Minister for the Environment, Nature Conservation and Nuclear Safety has now reacted. According to the Minister, the average mileage now is about 8 litres per 100 km. Facing the failure of the voluntary standards of 6.5 litres in 2008, he announces mandatory standards to reach the guidelines set by the EU commission.

In detail, Minister Gabriel has announced that he would support a legally binding scheme on the EU-level in case that the voluntary agreement of 140g/km is not reached by 2008. He proposes to establish legislation that makes sure that a target of 120g/km (for the average of all new cars sold) is reached by 2012. However, Gabriel has also announced that biofuels should count for reaching this aim. Given the ambitious biofuel-targets, this could mean that actually car makers would only have to reach a target of approximately 130g/km by 2012. This would result in the car industry getting a reduced target for 2012 in reaction to the failed voluntary agreement in 2008.

1.3 EU Commission

In the year 2000, the European Commission set up a group (European Climate Change Program, ECCP) to identify costly efficient measures to reach the aims of the Kyoto protocol. In 2005, the Commission declared that it will continue the work of the ECCP (ECCPII) to develop options according to the strategy of Lisbon. The new program shall develop measures for a cost-efficient reduction of CO₂ from cars.

In line with ECCPII, the Commission plans to publish a note to Parliament and the Council on further strategies. This overview might be based on an analysis published in July 2005 "Service contract to carry out economic analyses and business impact assessment of CO₂ emissions reduction measures in the automotive sector" by the Institute for European Environmental Policy (IEEP), TNO, and Centre for Automotive Research CAIR (IEEP 2005). Head of the group is the Commission (DG Environment C 1).

The ECCPII report has not yet been published.

The current EU-strategy is based on 3 pillars

(http://ec.europa.eu/environment/co2/co2_home.htm):

- 1) Agreements committing the automobile manufacturers to reducing CO₂ emissions from passenger cars mainly by means of improved vehicle technology
- 2) Improvements of consumer information on fuel economy and CO₂ emissions of cars by labelling new cars when marketing new passenger cars

3) Market-orientated measures to influence motorists' choices towards more fuel-efficient cars:

Work on fiscal framework measures and provision of a framework for member states to link car taxation to CO₂ emission

Though tax regulations are not part of the EU's authority and the member states do not seem to agree on relinquishing their autonomy on this area, the Commission plans to implement financial incentives for "environmentally friendly" cars. In July 2005, the Commission presented a proposal for a "Directive on the taxation of passenger cars", which integrated for the first time a factor on CO₂ emission both on registration tax and on yearly motor vehicle tax.

Underlying the whole strategy is an independent data collection system in order to monitor progress towards the target of the strategy.

1.3.1 Review of the EU strategy (2005-2006)

Under the framework of the European Climate Change Program, the European Commission presented, in June 2005, the following "Communication: 'Implementing the Community Strategy to Reduce CO₂ Emissions from Cars: Fifth annual Communication on the effectiveness of the strategy' (COM (2005) 269 final). The report concentrates on indicating the reductions achieved by ACEA and JAMA.

In the sixth communication ((COM (2006) 463 final) in August 2006, the efforts achieved by KAMA are reviewed.

Though confirming the efforts of all three associations, the reports highlight the need for additional efforts to achieve the commitments.

As part of this review process, the Commission services have decided to set up a stakeholder Working Group "on the integrated approach to reduce CO₂ emissions from light-duty vehicles". The general objective of this Working Group (see final mandate) is to assist the Commission services in preparing the review of strategy, and specifically provide a stakeholder consultation forum that gives assistance in the preparation of the impact assessment of the future strategy, as foreseen in the Commission's guidelines on impact assessments.

In the context of the current development, the review serves to define a strategy for the post-2008 period.

In addition, the general public is being consulted in an online questionnaire on passenger road transport's contributions to climate change and possible future ways to reduce it. The results of this survey will be published and will form part of the impact assessment which will accompany the above mentioned Communication (EU site).

In order to support the development of the EU strategy concerning CO₂ emissions from passenger transports, the commission has carried out a number of supporting studies, such as

- development of a procedure for the determination of the additional fuel consumption of passenger cars (M1 vehicles) due to the use of mobile air conditioning equipment
- review of the commitment of car manufacturers to reduce CO₂ emissions from M1 vehicles
- options to integrate the use of mobile air conditioning systems and auxiliary heaters into the emission type approval test and the fuel consumption test for passenger cars (M1 vehicles)
- measuring and preparing reduction measures for CO₂ emissions from N1 vehicles
- report on the effectiveness of the car fuel efficiency labelling directive 1999/94/EC, and options for improvement
- service contract to carry out economic analysis and business impact assessment of CO₂ emission reduction measures in the automotive sector.

1.3.2 High Level Group on CARS 21

The Vice President of the Commission, Günther Verheugen, responsible for enterprises and industry, has implemented the “High Level Group on CARS 21” in January 2005 to define the car of the future. In a joint press conference, he was accompanied by Bernd Pischetsrieder, President of ACEA and CEO of Volkswagen.

The task of the group is to recommend suitable means for the short, medium and long-term public policy and a regulatory framework for the European automotive industry. The recommendations ought to be based on the Lisbon Strategy claiming that “Europe must renew the basis of its competitiveness, increase its growth potential and its productivity and strengthen social cohesion, placing the main emphasis on knowledge, innovation and the optimisation of human capital” (LLG draft 9.6.2005).

Mr. Verheugen invited representatives of the Commission, of the member states, from industry and representatives of the trade unions, NGOs and users (one each).

“The Group recommends that the Commission bring forward proposals to reduce pollutant emissions from light and heavy duty vehicles. Regarding the reduction of CO₂ emissions from cars, CARS 21 agrees that the responsibility for CO₂ reductions from the road transport sector cannot rest with the automotive industry alone.

The Group therefore endorses an integrated approach to reach the EU’s target of 120 g/km involving all relevant stakeholders and measures. The Group welcomes the

impact assessment which is being carried out to examine how it can be achieved in the most cost-efficient way.

The Group has identified a number of concrete actions, which could contribute to CO₂ reductions, such as vehicle technology, alternative fuels, eco-driving and gear-shift indicators, taxation, consumer information and labelling or congestion avoidance. It recommends that specific attention be given to 2nd generation bio fuels (bio fuels which can be sourced from a wider variety of feedstocks and offer significant environmental benefits). Furthermore, hydrogen has been identified as a promising option as an energy carrier for the longer-term, which needs a major research and development effort.” (IP/05/1564)

The car industry is overrepresented, the ‘green’ sector is underrepresented, and one main critic is that HLG’s efforts to implement efficient technology are not sufficient.

1.3.3 Low Level Group on Clean Cars

As a response to the High Level Group, the Low Level Group (LLG) was formed in March 2005. Representatives of the European Parliament, NGOs, car manufacturers, member states and other interested persons discussed in four informal discussions ideas on how to ensure that the European automotive industry will remain a strong global competitor, a source of high quality employment and a producer of environmentally sustainable vehicles. The report contains a number of key recommendations to the High Level Group (LLG 09-06-2005). The “Call for Action” includes the following aspects:

- tighter pollutant emission limits
- increased fuel efficiency
- strengthening research and development
- employment
- public procurement
- coordinated fiscal strategies
- making green mobility choices possible.

1.4 The EU Parliament

The discussion on implementing targets to reduce CO₂ emission on road traffic started within the EU Parliament in 1996. The Parliament had tried to set a more ambitious target of 90g/km as a mandatory value by 2010. This aim failed due to the resistance of the automobile lobby. The voluntary agreement with car manufacturers is a compromise between the EU institutions and the car industry. In the resolution of November 2005 (2005/2049(INI)) the Parliament calls „for a policy of strong

measures to reduce emissions from transport, including mandatory limits for CO₂ emissions from new vehicles in the order of 80-100g/km ... in the medium term“

Concerning car tax regulation (annual taxation of cars, which exists in many member states), the EU Parliament just refused a proposal by the car industry to admit a linear system according to the CO₂ emission. There is still the option of installing an exponential system instead. This goes with the intention to replace the swept rate-based tax rate with a CO₂-based rate within this legislative period. Action on this must however be taken mainly by the member states, since the EU can decide on taxes only by unanimity (which normally means that no action is taken).

1.5 Latest developments

In August 2006, Mr. Verheugen said that the situation was not satisfying (Press release IP/06/1134). He called on the automotive industry to intensify their efforts in order to keep to their commitment. Stavros Dimas, Commissioner on Environmental Affairs, adopted the same position. They both underlined the necessity for mandatory standards if the commitment should fail.

In the “Communication from the Commission to the Council and to the European Parliament” (COM (2005) 269 final and COM (2006) 463 final), the European Commission comments on the progress of the car industry. The first comment concerns the progress of ACEA and JAMA and is based on 2003 data; the second one concerns KAMA and is based on 2004 data.

The Commission has arrived at the conclusion that all three associations have to substantially increase their efforts in order to meet the final target of 140gCO₂/km which the Commission considers achievable. “It also stresses the need for continued efforts towards technical research, development and demonstration on more efficient propulsion and auxiliary systems (including mobile air conditioning) for passenger cars and light commercial vehicles, with a view to achieving lower costs and improved performance, including overall efficiency and durability” (COM (2006) 463 final).

2 The Asian Approach

In April 2006, the German Environmental Aid (Deutsche Umwelthilfe DUH) held a policy workshop on the Californian approach to reduce CO₂ emission. The European-Asian policy workshop organized by the DUH in July 2006 tended to procure a broad and clear understanding of the Asian path for fuel efficiency and CO₂ reduction. Therefore, the Chinese and the Japanese system are presented.

Mr. Feng An represented the Energy and Transportation Technologies LLC Auto Project on Energy and Climate Change (APECC) and introduced the Chinese Fuel Economy Standards for Passenger Vehicles. The Chinese system is based on weight classes and sets limits for fuel consumption within these classes.

2.1 Chinese Vehicle Fuel Consumption Standards

With total new sales projects of 6.5 million vehicles, China is to become the second largest vehicle market in 2006 after the US (2003: 106 million vehicles). New car sales are projected to surpass 3.0 millions this year. The annual growth in new car sales has averaged about 20% since 1992. The fuel consumption share is dominated by trucks at 35% and busses at 25%, followed by rural vehicles at 15 %, cars at 13 % and motorcycles at 11%. China currently comes in second in oil consumption after the US. In 2004, the import oil amount has reached 40% of the total consumption. The forecast expects an import share of 60% by 2010 and 70% by 2020.

The development of Chinese Vehicle Fuel Consumption Standards began in 2000.

The implementation of Fuel Consumption Standards is due to

- improve the energy security by reducing oil imports
- Consolidate thr car industry by eliminating small and inefficient firms
- increase competitiveness of China´s automotive industry

The first set of standards focussed on light duty passenger vehicles. A test procedure on this type was adopted and issued in 2003. After being reviewed and approved by the WTO in May 2004, the Chinese Government officially approved the standards in September 2004.

The standard is based on a system of weight classes and defines a maximum fuel consumption for individual vehicle models within each class. There are 16 classes and two separate sets of standards for passenger cars with manual transmission and for passenger cars with automatic transmission, SUVs and MPVs with 3+rows. Phase I includes the years 2005/2006, phase II includes the years 2008/2009.

Mr. Feng An showed that about half of the US Models heavier than 3500lb will fail the standards set in Phase I. Most of the SUV will fail Phase II. For the German automobile industry, the consequences will be immediate as well: cars with high-powered engines, such as the Mercedes S-Class, Porsche Cayenne, VW Touareg and other new cars may not be sold any more on the Chinese market.

The system is combined with a tax reform that reduces the tax rate for small engines (1-1.5l) from 5% to 3% and increases the rate for larger engines (> 4l) from 8% to 20%.

There are several proposals for future vehicle tax reform:

- gradually increasing sales tax portion and decreasing exercise tax portion: this leads to a direct exposure to fiscal incentives and disincentives
- introducing fee-bates scheme for sales tax
- implementing a CO₂ or fuel economy based tax scheme instead of an engine size based scheme

In addition to these measures, there are other actions:

- lifting bans on mini cars with engines < 1.0 liters in many Chinese cities
- development of fuel consumption standards for light-duty commercial trucks under 3.5 tons
- promoting hybrid cars, diesel cars and fuel cell technologies
- discussion about fuel tax reform or, as an alternative, bio-fuels program
- development of Environment Friendly Vehicle (EFV) Program

In China, there is a current debate on diesel vs. gasoline. In this respect, China is looking up to the EU for leadership.

Fuel economy data as well as proper vehicle registration are not available in China. In addition, there is a lack of fundamental knowledge about how vehicles have been used in the past and how they are used now. The discrepancies between EU-based test cycles (NEDC) and the Chinese on-road driving conditions have not been solved yet.

The Chinese strategy has two phases:

Most of the car models can meet phase I standards, except imported luxury or sports cars. Also many domestic SUV models (Sports Utility Vehicle) will not meet the standards. There is a stalled proposal to levy a penalty tax on vehicle models that fail the standards.

Additional measures are:

- fuel tax reform

- promotion of hybrid cars, diesel cars and fuel cell technologies
- alternative/ bio fuel program

Both environmental pressure and car industry influence and lobby power are increasing. Chinese vehicle sales will continue to grow. The Chinese system does currently not enforce any sanctions if the target is not fulfilled.

2.2 Japanese Fuel Efficiency Policies for Motor Vehicles

Takao Onoda from the International Energy Agency (IEA) presented the Japanese policies concerning the fuel efficiency of vehicles.

In 2003, Japan emitted 1,259 million tons of CO₂, about 20% from automobiles. In order to fulfil the Kyoto commitment, Japan has to reduce the emission about 14% between 2003 and 2010.

Takao Onoda from the International Energy Agency (IEA) presents the Japanese policies concerning the fuel efficiency of vehicles. He describes the IEA's goal for G8 to encourage the development of cleaner, more efficient and lower-emitting vehicles and to promote their deployment in order to satisfy the Gleneagles Plan of Action (2005). IEA therefore has the task to review existing standards and codes for vehicle efficiency and to identify best practises. Key elements of standards are test procedures and their stringency. The test procedures should represent real traffic circumstances such as

- average speed
- acceleration and deceleration
- cold start etc.

The Japanese standards are based on a mandatory system that applies to manufacturers, not to associations. As fuel economy depends strongly on weight, the classification is based on this aspect. The top-runner system sets standards based on the most fuel-efficient vehicle that is on sale at a certain time. Positive factors (such as technological improvement) have been considered as well as negative factors (exhaust emission regulation etc). Detailed information about concrete targets can be found on www.eccj.or.jp/top_runner/chapter7_1_01.html

The top-runner program also includes fuel economy standards for heavy-duty vehicles (diesel more than 3.5 tons). Manufacturers are required to improve the fuel economy of heavy-duty vehicles by 2015 at the latest. By this date, the target aims to improve the fuel efficiency up to 12.2% compared to 2002.

In addition to this system, the program includes labelling, lower taxes for fuel efficient cars and Research & Development.

The system leads to an improvement for passenger cars of 21 % in 7 years. The system does not include any severe penalty yet.

3 Position and conclusions of German NGOs

German NGOs now brought together their ideas for a legally binding system to increase energy efficiency of cars (and to reduce CO₂-emissions from cars) in a more precise form as an input for discussion within the European Commission and Parliament. In October 2006, German NGOs are presented their joint proposals at the International Conference on the German EU and G8 leadership 2007 to increase influence on the political debate. The NGOs demand from the German Presidency that a process be initiated to halve CO₂ emissions and fuel consumption within the next 10 years ("double efficiency in a decade"). Based on the current CO₂ emissions of all new cars in Europe of 160g/km, emissions must be reduced to 120g/km by 2012 and 80g/km by 2016 in Europe and in each single member state.

The proposal includes the following aspects:

- the EU Commission should adopt a mandatory system in January 2008 at the latest
- the system must be enforceable and achievable and must include mandatory limits
- compliance with fuel-efficiency standards ought to be a precondition for the registration of new cars
- the system should include a dynamic adoption from 120g/km to lower values; with the help of such a dynamic adoption one can ensure that the CO₂ reduction takes into account the continuously growing technical feasibilities.
- the benchmark should relate to different classes like the systems in China and Japan
- another option is a benchmark for every manufacturer
- transparent information about each manufacturer's performance
- the measures should be combined with fiscal measurers and speed limits
- consideraion of the fact that electrical appliances increase consumption; air conditioning systems and other appliances have to become part of the fuel consumption calculation
- bio fuels must not be accepted as a substitute for energy efficiency in the transport sector; bio fuels might be an on-top solution, but not a tool to avoid fuel efficiency efforts.

- Man-made CO₂ should be accepted as an air pollutant by 2008, which will be regulated similarly to European Car emission limits.

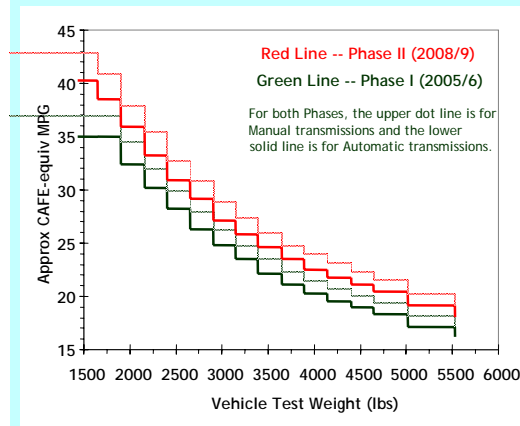
The German NGOs prefer a combination of fleet-specific and car-specific instruments. A fleet target shall control the reduction of the average emissions of all new cars sold in the European Union (monitoring). Legally binding upper limits for different car classes shall be established on the EU-level. Finally, national measures (laws, taxes) shall ensure adherence of the average consumption of new cars within their country and complement the EU-measures.

Please find a compendium of the presentations given at the workshop in July 2006 as addendum.

4 Addendum

Chinese Fuel Consumption Standards (Courtesy of Mr. Feng An)

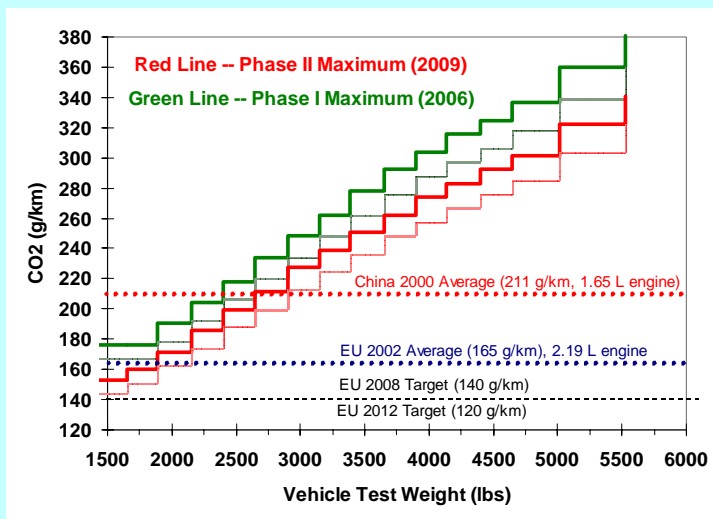
Highlights of Chinese Motor Vehicle Fuel Consumption Standards



- M1 and M1G type vehicles (EU classification), including passenger cars, SUVs and MPVs less than 9 seats
- Two separate sets of standard for:
 - passenger cars with manual transmission
 - passenger cars with automatic transmission, SUVs and MPVs with 3+ rows (all transmission types)
- Weight-based, 16 classes (based on EU emission wt. categories)
- Based on European Test Cycle (NEDC)
- Liters/100 km
- **Maximum fuel consumption level for individual vehicle models within each wt. class**, instead of average value associated with each wt. class

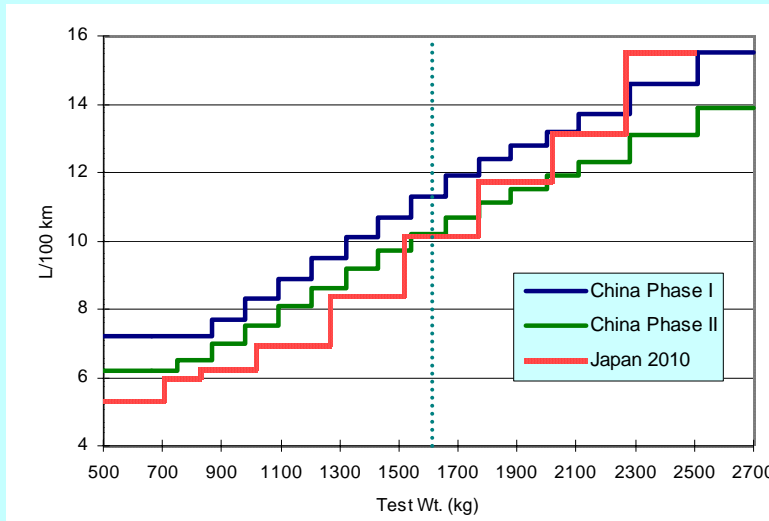
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Chinese Standards vs. EU Standards



16 14

China vs. Japan - China loose on low-wt. categories, strict on high-wt. categories



18

The Japanese System (Courtesy of Takao Onoda)



Characteristics of Japanese Standards

ASPECT	JAPAN	EUROPE
Legal	Mandatory	Voluntary
Responsibility	Manufactures	Industry Associations
Vehicle Classification	Classified by Weight	No Classification
Test modes	10-15 mode	NEDC

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Target Standard values for Light-duty Vehicles (passenger Vehicles) for Fuel Economy Regulation

Set in FY1998.

Target Year: FY2010

Class by weight	<702	703-827	828-1015	1016-1265	1266-1515	1516-1765	1766-2015	2016-2265	2266<
Gasoline (km/l)	21.2	18.8	17.9	16.0	13.0	10.5	8.9	7.8	6.4
Diesel (km/l)	18.9			16.2	13.2	11.9	10.8	9.8	8.7

*Values for light-duty trucks were also set at the same time

More information can be found at; http://www.eccj.or.jp/top_runner/chapter7_1_01.html

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Fuel Economy Achievements for Light-duty Vehicles (Passenger Vehicles)

Source: Japan MLIT

	Target year	Base year (1995) fuel-economy	Target standard value	Achievement (2004)
Gasoline	2010	12.3 km/L (8.1L/100km) (189 g-CO2/km)	15.1 km/L (6.6L/100km) (154 g-CO2/km) <i>(22.8% improvement)</i>	15.0 km/L (6.7L/100km) (155 g-CO2/km)
Diesel	2005	10.1 km/L (9.9L/100km) (259 g-CO2/km)	11.6 km/L (8.6L/100km) (226 g-CO2/km) <i>(14.9% improvement)</i>	10.1 km/L (9.9L/100km) (259 g-CO2/km)

INTERNATIONAL ENERGY AGENCY

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Target Standard values for Heavy-duty Vehicles (Trucks excluding trailers) for Fuel Economy Regulation

Set in FY2005.

Target Year: FY2015

Class by Weight (t)	3.5 -7.5				7.5 -8	8 -10	10 -12	12 14	14 -16
Payload (t)	>1.5	1.5-2	2-3	3<					
Target (km/l)	10.83	10.35	9.51	8.12	7.24	6.52	6.00	5.69	4.97

Class by weight	16 -20	20<
Target (km/l)	4.15	4.04

*Values for trailers, city buses and coached were also set at the same time

More information can be found at; http://www.eccj.or.jp/top_runner/chapter7_2_01.html

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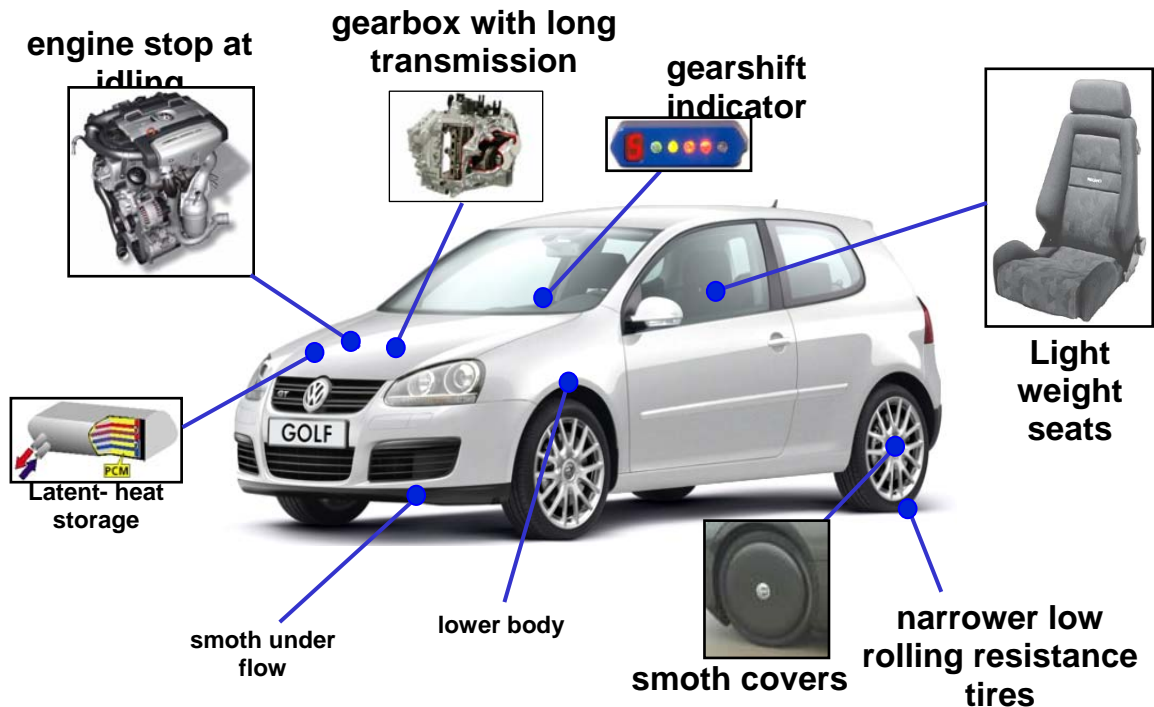
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UBA Data (Courtesy of Dr. Axel Friedrich)

	Costs total (M€)*	Costs average (€/vehicle)*	Costs average (€/t CO2)*	Benefit-cost ratio*
Petrol - Small	-1255/-709	-412/-233	-81/-46	1,9/1,5
Petrol – Medium	-1831/-1085	-587/-348	-86/-51	2,1/1,6
Petrol - Large	-669/-392	-848/-496	-85/-50	2,0/1,6
Diesel - Small	-187/-70	-114/-43	-50/-19	1,4/1,2
Diesel – Medium	-648/-274	-151/-64	-54/-23	1,5/1,2
Diesel - Large	-155/-48	-151/-46	-45/-14	1,3/1,1

*Different values of interest rates: 0% = Net Present Value and 5% = fuel costs savings
 Source:Wuppertal Institute for Climate, Environment and Energy (calculations based on IEEP, 2005) 2006

Demonstration Car Overview of the Fuel Saving Measures



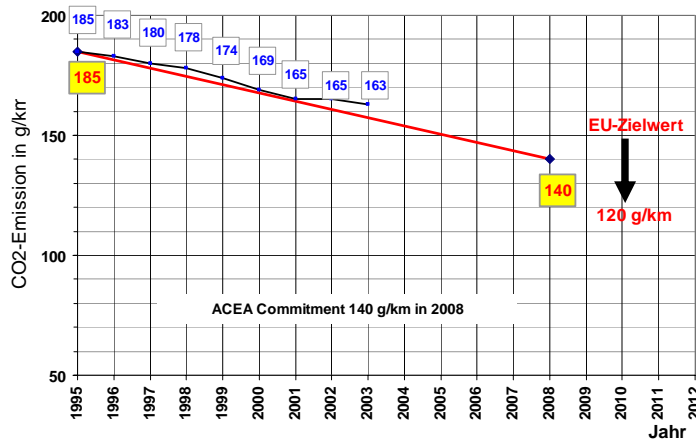
Reduction Potential in the Simulation - combined Measures in the NEDC

	NEDC			
	consumption [l/100km]	CO ₂ [g/km]	reduction [l/100km]	reduction [%]
Basic car				
Golf 1.4l TSI	7.24	173.7	0.00	0.0
combined measures				
c_w=0.28, f_r=0.9%, m=1250kg 2.0l-TDI-gear box, start-stop	5.58	133.8	1.66	22.9
c_w=0.28, f_r=0.9%, m=1250kg 2.0l-TDI-gear box, GSI start-stop,	5.44	130.6	1.80	24.8
c_w=0.28, f_r=0.9%, m=1250kg 2.0l-TDI-gear box, GSI Start-Stop warm	4.85	116.5	2.38	32.9

Courtesy of Dr. Lahl, Federal Ministry of Environment, Nature Protection and Nuclear Safety



ACEA average CO₂ emissions of new passenger cars in EU-15



DUH workshop, July 19th, 2006, Berlin

Courtesy of Dr. Aat Peterse, European Federation for Transport & Environment (T&E)

Voluntary industry commitment off track ...

