Scrapping allowance for old private cars to stimulate sale of modern green vehicles…

http://www.ferrybank-nissan.com/images/NewsImages2/scrapCar.jpg

…fact or fiction to reduce CO_2 emissions from Dutch car fleet!

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Summary:

A hypothetical scrappage regulation could potentially reduce CO_2 emissions. We found that the maximal remaining mileage a car is still likely to cover, fuel efficiency and the efficiency of the replacement car mainly determine the success of such a regulation in reducing total car fleet CO_2 emissions. Including the energy it takes to produce a car it seems environmentally beneficiary to replace current average 10 year old cars with modern small or medium sized ones. Replacing it with larger vehicles will however only create additional emissions and since the recently introduced national scrappage scheme does not specify strict conditions concerning fuel efficiency of the new car in order to receive an allowance, it will most likely only further increase CO_2 emissions. Furthermore, current allowances are too little to persuade owners of large fuel inefficient vehicles and only promote the scrappage of very old, mostly small and cheap or unpopular private cars. A really effective scrappage regulation might however not be very cost effective compared to current measures to promote the sale of fuel efficient cars. A truly green scrappage regulation will therefore most likely not be feasible.

Chapter 1: Background and main question

In February 2009 the Dutch car dealers society (BOVAG) proposed the introduction of a scrapping allowance for old cars to stimulate consumers to buy new and more fuel efficient cars (Appendix 1a). Besides the positive effects this would have on the current economic depression by selling more cars, the BOVAG also claims that an early retirement program could reduce the automobile emissions and benefit the environment. During the development of this essay the Dutch government actually granted part of this proposition which is now freshly active since 3 April 2009. To find out whether this early retirement program could really benefits the environment I dedicated this essay to address the following question:

Will a scrapping allowance for replacing 10 year old private cars by new and more fuel efficient ones reduce the automobile CO_2 emissions in the Netherlands in the very near future and thereby benefit the environment?

Within the framework of reducing the environmental impact of the Dutch car fleet, Wee *et al.* (2000) estimated the optimal lifetime of a car to be approximately 15 years. At this point the fact that a new car will be more fuel efficient than the car that will be replaced outweighs the energy needed to produce the new car. By introducing an early retirement program for cars younger than 15 years, the total energy use and matching life-cycle CO_2 emissions would thus actually increase. Other objections against the claim that a scrapping allowance to buy a new car would benefit the environment come from Goodwin (1992). He stated that a new, more fuel efficient and comfortable car will lead to an absolute increase in distance driven and even to an absolute increase in fuel consumption. More rebound effects that partly cancel out fuel efficiency gains are also not unlikely. Cornelissen (1993) for example found from that from 1987 till 1990 new cars were only relatively more fuel efficient since they also increased in weight, power and cylinder volume. Moll and Kramer (1996) found no change in this trend from 1990-1994 and also for the period from 1995-2006 curb weight and rated power increase both with approximately 15% and 25 % (de Haan *et al.*, 2008). Therefore, Wee *et al.* (2000) already clearly stated that real reductions in fuel consumption per car would only occur when average car weight would cease to increase.

Nowadays however, with high fuel prices and growing confidence in the increasing safety of modern small cars, a turning point in this trend of ever bigger and more powerful cars might have been reached in consumer's behaviour. In Germany for example, one of the major car producing nations in Europe, the (re)introduction of a scrapping allowance of €2500,- in January this year has already led to a mass sale of especially small and fuel efficient cars (Appendix 1c). A change in consumer's behaviour might thus lead to a significant improvement of average fuel efficiency of an entire car fleet and hereby reduce the optimal car lifetime since the research of Wee *et al.* in 2000. Whether the environment will now really benefit from the proposed early retirement program and legalize current measures will become clear in the rest of this report.

Chapter 2: Method of approach

As mentioned in Chapter 1 just very recently the Dutch government introduced a national scrapping allowance. Preceding, in spring 2008, the Dutch minister of transportation, Mr. Eurlings, announced an inquiry to the environmental effects of a national scrapping regulation as already in place in Amsterdam and The Hague. Both cities have been working on the introduction of a local ban of strongly polluting vehicles, comparable with the traffic policy of London and the "Umweltzonen" system of many German cities (1). To compensate citizens that live inner city Amsterdam or The Hague and that own a car that would soon be banned, they already got an allowance of €1000,- for scrapping their old car (Appendix 1e). Whether these citizens can now apply for both allowances seems unlikely although the local ban still forces people to get rid of their old car while the national regulation is purely voluntarily.

Besides a website in reconstruction (http://www.nationaleslooprregeling.nl, 2) announcing the exact conditions, publications on how to participate are still in progress. In many other countries however scrapping programs for older cars have yet first been introduced in the 90's to reduce the number of cars without a catalytic converter (Kilde and Larsen (2001) & Fontana 1999). In this period much research has already been done on optimal fleet conversion policies and effects of scrappage grants on household vehicle transaction. In 1996 for example Albertini *et al.*(1996) designed a function for the fraction of vehicle owners that would offer their car for scrapping for a certain amount of money. De Palma and Kilani (2006) however state that a scrapping allowance might on the other hand also create a tendency to delay the replacement time of old cars since relative repair and maintenance costs drop significantly in relation with the end value of the car. In this report I will however merely go into detail in the scraping decision of individual consumers though.

When I first started working on this report I assumed that a scrapping allowance would only be granted provided that it is used to replace the scrapped car with a new fuel efficient one (energy label A or B). A reward for consumers that scrape their car but do not buy a new car would also not be excluded but was already beyond the scope of this report. Now with all details known (see chapter 4), instead of replacing the scrapped car with a brand new one, it is also allowed to buy a car from 2001 or younger to apply for the appointed allowance. Nevertheless, some people might still decide to use their allowance to finance a brand new car after all. Also when people buy a second-hand vehicle, the previous owner of that car might buy a brand new vehicle, or also a used but newer one. Clearly this new approach will be more complex and would divide our analysis into potential scrappage vehicles, possible second-hand younger vehicles and possible brand new vehicles. To therefore avoid an extensive arrangement of individual consumer decisions and potential cars they might buy, I assume the Dutch car market to be a given constant. This quite acceptably means that scrapping a single old car will eventually lead to the sale of a single brand new one.

Important detail for this secondary approach might be that since January 2009 the Dutch government also gives multiple tax cuts for cars with CO_2 emissions below 110 g / km (95 g / km for diesel cars) to further stimulate consumer's choice for environmental friendlier and mostly smaller cars (Appendix 1h). Because potential environmental benefits were one of the arguments to introduce a scrapping allowance I will consider these benefits as guidance in my analysis. I therefore assume that the reported sale share of 54% of energy efficient cars Labelled A and B in the last quarter of 2008 (Appendix 1b) will continue to increase.

More considerations worth mentioning are that I have focused only on the Dutch car market. As mentioned in Germany but also in France and Spain car scrapping program are already in place that seem to have generated a boost of the sale of new replacement vehicles (Appendix 1c). Since current policies already exist in promoting fuel efficient cars in most European countries I will also only focus on the effect of a scrapping allowance on top of the current existing measures in the Netherlands.

To eventually find out whether replacing 10 year old cars by new and more fuel efficient ones might now reduce the net automobile emissions in the Netherlands, we will integrate the optimal lifetime estimation equation of Wee et al. (2000) with actual CO_2 emission data for the different aspects involved. Since for once diverse data of the current offer of modern cars is thereby needed, we will first start with an exploration of fuel efficiency of modern cars that fit our requirement of energy label A and B in chapter 3. Also average emission rates of older cars will be estimated in this chapter. In chapter 4 we will explore the current Dutch car fleet dynamics and with use of actual data from the Dutch Central Bureau of Statistics (CBS, 3) I will try to estimate how many cars would potentially apply for an early retirement regulation in the Netherlands. The effects of average mileage for cars of different ages, differences in curb weight and production emissions of new cars will be dealt with in chapter 5. With use of all this data I will estimate the current optimal replacement moment of a car considering CO_2 emissions in chapter 6. Since a national scrappage scheme is already in place we will also propose our vision on an optimal reduction of CO_2 emissions of the Dutch car fleet in chapter 7 and discuss the strengths and possible weaknesses of this regulation, based on what will become clear from our results.

Chapter 3: Ordinary every day efficiency of old and modern cars

In 2001 Dixon and Garber (2001)estimated that vehicles of age 15 year and older accounted for only 11% of the yearly distance traveled by car while contributing up to 39% to the total vehicles emissions in the United States. Considering this, some literature reported that a scrappage payment for these cars would initiate an immediate reduction of emissions (e.g. BenDor & Ford 2006). Others however reported a reduction of all pollutants but not for CO_2 (Hyung Chul Kim *et al.* 2004). In the Netherlands, Wee *et al.* (2000) found the optimal lifetime of a car to be approximately 15 years, as aleady mentioned in chapter 1. They combined the energy use of both old and new cars and included the energy it cost to produce and scrape an old car. Since the average age of a car was on average only 12 years, they suggested that a scrappage scheme would thus not be effective at that time.

In the past 9 years however, or actually more recently, the environment has become a greater issue of interest in the car industry ever since the sale successes of Toyota's Hybrid Prius in 2004. TV commercials seem to be focusing more on fuel efficiency nowadays with for example the Volkswagen Blue Motion series, the Smart diesel engine with start-stop system, likewise the Fiat 500, and the Toyota IQ. A possible reason for this might be that many countries have introduced an energy-labelling and feebate system with cash incentives for very fuel efficient cars (A & B label) and additional fees for (highly) inefficient cars (D - G label, Table 1). As a consequence more than 40 % of new cars sold in The Netherlands in 2008 were classified with fuel efficiency A or B (appendix 1b). Especially the recent introduction of multiple tax cuts for new cars with emissions of less than 110g CO_2 / km (or 95 g / km for diesel fuelled ones) might further make these cars extra attractive. Momentarily however approximately only 15 cars qualify for this tax cut regulation but more will certainly follow.

Table 1: Energy labels and corresponding fees (or incentives) for new bought cars in the Netherlands effective from 1 February 2008 till 31 December 2009 (4).

Energy label:	A	B	C	D	E	F	G
Regular vehicles	- 1.400	- 700	0	+ 400	+ 800	+ 1.200	+1.600
Hybride vehicles	- 6.400	-3.200	0	+ 400	+ 800	+ 1.200	+ 1.600

To at least accurately estimate how fuel efficient these modern A and B labelled cars are today I have combined data from the Dutch car owners union (ANWB) with records of a governmental organisation in the UK. The Dutch ANWB publishes a top 10 for most fuel efficient cars every month divided over three classes, namely small, medium sized and large vehicles (5). The British "Act on CO_2" lists somewhat more sizeclass like Supermini, Small family, Family, Estate, MPV, etc (6). The latter also not only keeps record of CO_2 emissions of most recent fuel efficient cars but also shows specifications of less fuel efficient energy labelled cars for each class specified. Crucial in combining both databases however is that classification of energy efficiency in the UK takes place based on the absolute level of rated CO_2 emissions. In the Netherlands this classification into categories A to G is however based on relative energy efficiency and related to car size (de Haan *et al*, 2008). As a consequence, most cars in the large size class in the ANWB

top 10 labelled A and B were in most cases labelled C or D in the UK top 10. According to Peters *et al.* 2007 a relative energy efficiency system might nonetheless be more successful in involving more consumer groups, since not every one likes small cars. That this is still not the most effective system to reduce absolute energy consumption can easily be determined by looking at the differences in fuel efficiency between the three most fuel efficient vehicle classes of the ANWB (Figure 1 & 2).

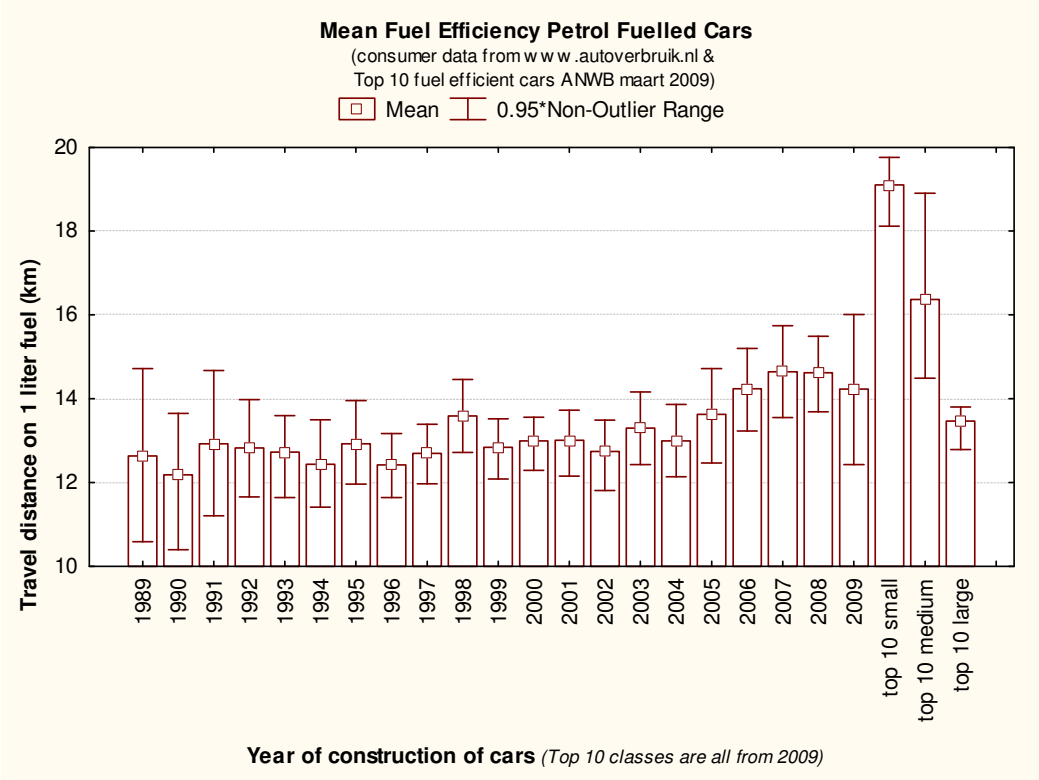

Figure 1: average fuel efficiency of petrol fuelled private cars over the past 20 years. As becomes clear, large cars from the ANWB top 10 are only fuel efficient in the Dutch relative energy efficiency labeling system but not in the absolute sense. Cars from the smaller and medium size classes do however indeed seem to be more energy efficient than their older predecessors.

A very important argument against using both top 10 databases is that both organisations use factory prescribed data for fuel efficiency. This usually indicated the maximal achievable efficiency and not ordinary every day efficiency. For fuel consumption and exhaust emission of older cars I have therefore used more realistic data from consumers themselves found on the website www.autoverbruik.nl (7). A possible flaw in this data record could nonetheless be that consumers that accurately record the fuel consumption of their car are already more involved in reducing their energy useage and will on average thus not drive in extremely fuel inefficient vehicles. Average efficiency from this data will thus probably be exaggerated as well. Unfortunately little consumer data was readily available on newest cars from 2008 and 2009. Some of the vehicles from the Top 10 most fuel efficient cars have nonetheless been tested by the ANWB for their ordinary every day efficiency. From these results and the few consumer data that were available, we found that fuel consumption was approximately 15 % higher than factory prescription for both diesel and petrol fuelled cars when driving relatively normal. Therefore we

corrected the factory data of both top 10's and found reasonable realistic averages for each size class and fuel type separately for the most fuel efficient new vehicles of this moment labelled A and B according to the Dutch system. Average results for all vehicles can be found in Figure 1 and Figure 2.

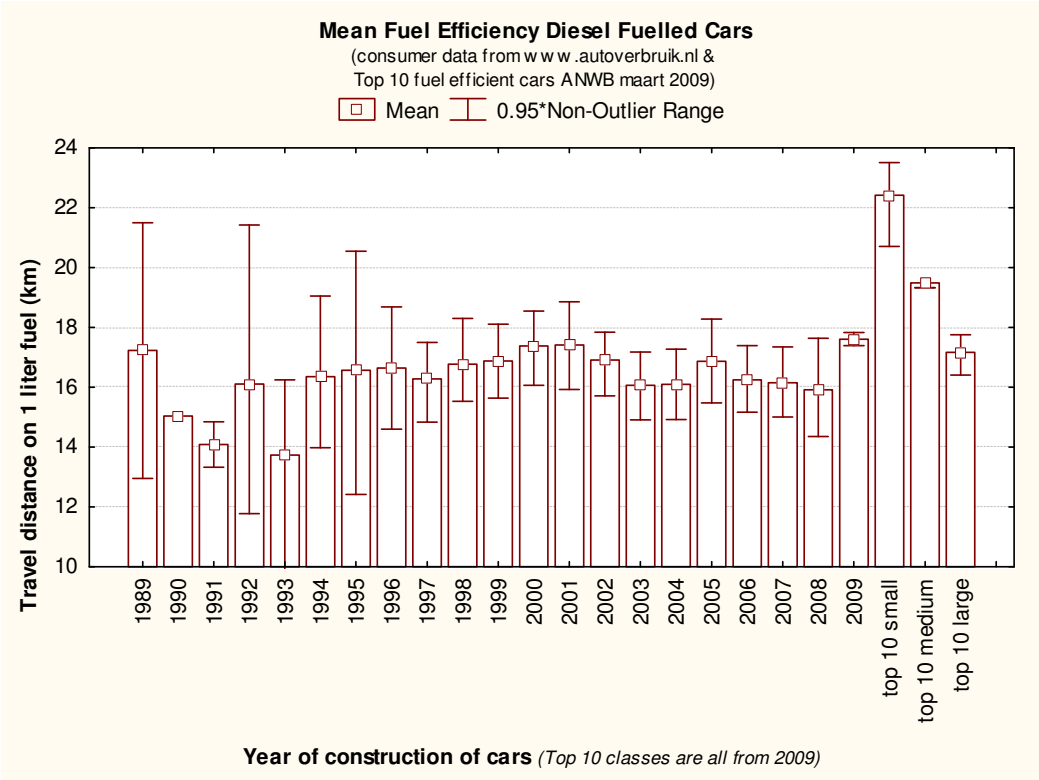

Figure 2: average fuel efficiency of diesel fuelled private cars over the past 20 years. Only cars from the smallest size class in the ANWB top 10 are much more fuel efficient than their older predecessors.

From the graph for mean fuel efficiency for petrol fuelled cars (Figure 1) we clearly see that small and medium vehicles from the top 10 are indeed much more efficient than cars of the past 20 years. The average fuel efficiency of the larger top 10 cars falls however inbetween averages of cars from the past 20 years. Also for Diesel fuelled cars (Figure 2) we find similar results. This either means that large cars have not become much more efficient the past 20 years, or that the database we used from www.autoverbruik.nl (7) does not contain many large cars in the first place. Unfortunately the database does not keep record of the weight of cars so we can not go into detail on this. What we do however know is that in 1999 the Dutch Central Bureau of Statistics (CBS, 3) found that cars from 1990-1998 on average drove 12 km on a single litre of petrol and 14.5 km on 1 litre diesel (Appendix 1d). In this same period the average fuel efficiency we found with the data we have used lays well above these values indicating that our data for average old cars is at least a bit optimistic. If we furthermore keep in mind that cars from the top 10 are only a minimal fraction of all available new cars and that most cars are thus less fuel efficient, the fuel efficiency of modern cars is a bit optimistic as well. This might already indicate that replacing an average old car with a modern large vehicle does not seem beneficiary for the environment. Most important indication of this chapter however

remains that modern small and medium cars do seem significantly more efficient than cars built before 1999 and might thus potential reduce net CO_2 emissions when the Dutch car fleet will be rejuvenated.

For use in our analysis, we conclude this chapter with some solid figures. I have combined the overall averages for all cars older than ten years with the above averages reported by the CBS. This should in our opinion most likely represent ordinary every day efficiency of old cars. We also calculated the emission of CO_2 matching the combustion of fuel for a single kilometre of travelling for both old and modern cars. For the combustion of 1 litre of petrol we put down an emission of 2370 grams CO_2 and for 1 litre of diesel an emission of 2650 grams. The resulting estimates of ordinary every day CO_2 emissions can be found in Table 2. Probably redundantly to mention is that the factory prescribed efficiency + 15% of modern cars in turn also leads to approximately 18 % higher emission values of CO_2 than found in factory specifications.

Table 2: average overall fuel efficiency and CO_2 emission rates of private cars aged more and less than 10 years, and the three size classes form the ANWB top 10. The absolute figures represent the estimated average ordinary every day results as will be used in our analysis in the next chapters.

Fuel type	Year / Size	Average km / l	g CO_2 / km
Petrol	'89-'99	12.5	191
	'99-'09	13.5	174
	Small	19.0	124
	Medium	16.5	145
	Large	13.5	176
Diesel	'89-'99	15.5	171
	'99-'09	16.5	159
	Small	22.5	118
	Medium	19.5	136
	Large	17.0	154

Chapter 4: Scrappage schemes applied to the Dutch car fleet!

The exact regulation conditions to receive a scrapping allowance from the Dutch government are as follows: voluntarily scrapping a petrol fuelled private car or delivery van constructed before 1990 yields a payment of €750. Scrapping petrol fuelled vehicles from 1990 upto and including 1995 results in a payment of €1000, likewise all diesel fuelled vehicles constructed before 2000 with a curb weight < 1800 Kg. Heavier diesel fuelled delivery vans even receive €1750. In all cases a newer car has to be bought in return constructed in 2001 or later and it has to have a factory fitted soot filter when the new vehicle is a diesel fuelled private or delivery vehicle. Also the scrapped car has to meet a few conditions like being actively ensured, it is supposed to be in an operational condition and the obligated annual safety inspection (APK) needs to be valid for at least three months (2). For this new scrappage scheme in total a fund of €85 million is reserved to remove approximately 100.000 old vehicles from the Dutch car market. It is explicit introduced to reduce emissions of all pollutants except of CO_2 (8). This does however not yet answers my main question because it does not indicate that it is not possible to reduce CO_2 emissions with a scrapping allowance in general. To nonetheless cope with this contradiction I will continue with both the possible effect of the current regulation as well as with my own investigation in the potential environmental benefits a scrappage scheme could have when only new fuel efficient modern cars will be bought for each scrapped vehicle older than 10 years.

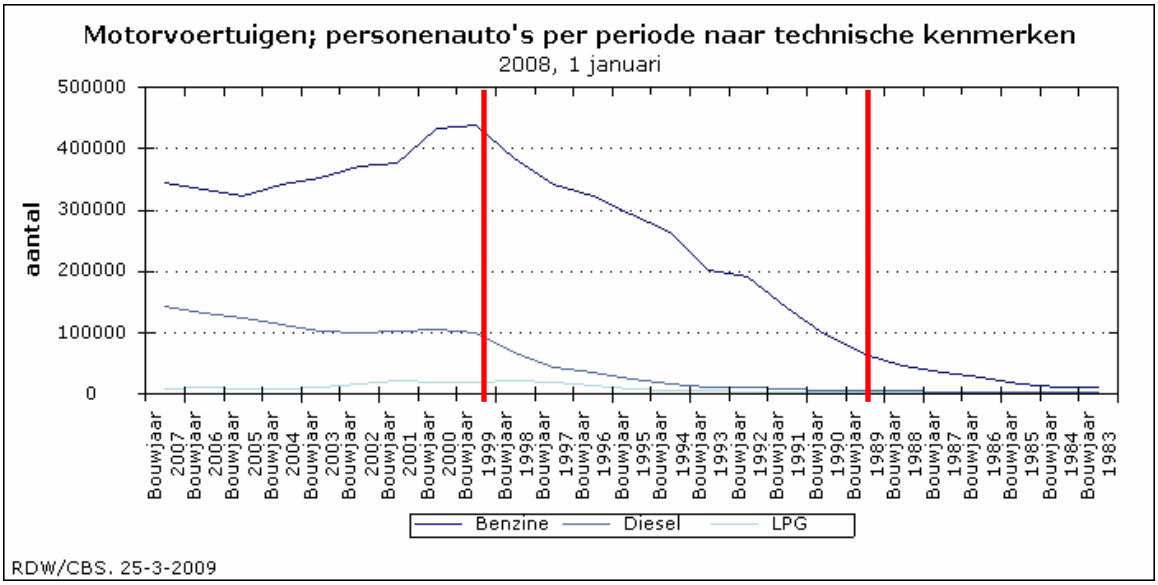

Figure 3: overview of registered private cars by year of construction as registered by the CBS on 1-1-2008. The more or less constant natural decrease of cars aged between ≥10 (1998) and ≤20 years (1989) indicate the number of cars that are removed annually from the Dutch car fleet, either by scrapping or exporting them.

With data collected by the CBS, the number of cars that are potentially available for srappage can quit easily be determined. The Dutch car fleet, as registered on 1-1-2008, exits in total out of more than 10 million vehicles. Almost 7.4 million of these vehicles are registered as private vehicles and depending upon the age class approximately 70% to 75% is fuelled by petrol. As can be seen in Figure 3 (previous page) most cars are being scrapped before aged 20 years. Therefore I have focussed on cars between 10 and 20 years old. For the natural decrease of registered petrol fuelled private cars older than 10 years we found a more or less a linear correlation of minus 36204 vehicles each year. (754740 – 36204 × age of vehicle, R^2=0.9922). We also found an exponential decrease (1517100 × exp{-0.32 × age of vehicle}, R^2=0.9850) of number of diesel fuelled registered private cars aged 10 to 20 years. This relatively constant decrease of vehicles also includes vehicles that are being exported to for example Eastern Europe or other parts of the world. Furthermore, total number of new bought cars clearly varies each year and obviously numbers of sales from 1989-1995 do not have to be comparable to new car sales in for example 1999. For our purpose nonetheless, Figure 3 indicates the remainder of cars that have not been removed yet and can thus still be offered for srappage.

To calculate the total number of cars that might thus potentially be scrapped we can now easily calculate the exact number of cars still driving around at this moment. Take for example that at 1-1-2008 exactly 438191 petrol fuelled private cars constructed in 1999 were registered by the CBS. At this moment in 2009 these cars are now however aged 10 years and by following the natural decrease of registrations approximately 392700 cars constructed in 1999 are left. Without any kind of regulation 36204 vehicles constructed in 1999 will probably be scrapped anyways this year. Considering all vehicles constructed from 1998 till 1999 in total 10 times 36204 petrol fuelled private cars will approximately be scrapped. This roughly corresponds with the number of yearly new sold petrol fuelled cars over the past 10 years and quite convincingly illustrates our assumption from chapter 2 that every scrapped car is eventually replaced by a brand new one, independent of the number of individual car transactions. The total Dutch car fleet thus seems approximately constant. In conclusion, a summary of the maximal number of potentially available private vehicles for scrappage dependent on the minimal age of a car to apply for a scrapping allowance can be found in Table 3.

Table 3: combined number of private diesel and petrol fuelled cars, in millions, potentially available for scrappage in relation to the minimum age set for a scrapping allowance.

Maximal year of construction (minimal age)	cummulative potential # of private cars	# private cars scrapped anyways without allowances	# private cars potential extra scrappable by allowance
>1999 (10)	2.55	0.38	2.17
>1998 (11)	2.09	0.34	1.75
>1997 (12)	1.69	0.30	1.39
>1996 (13)	1.34	0.26	1.08
>1995 (14)	1.03	0.22	0.81
>1994 (15)	0.77	0.18	0.58
>1993 (16)	0.54	0.15	0.39
>1992 (17)	0.36	0.11	0.25
>1991 (18)	0.21	0.07	0.14
>1990 (19)	0.10	0.04	0.07
>1989 (20)	0.03	0.00	0.03

The current regulation scheme goals are set at an estimate of 100.000 vehicles that have to be removed at a cost of €85 million. With an average allowance of only €850,- the current scrapping allowance thus clearly focuses mainly on vehicles constructed before 1990. Concerning the height of the different allowances this is probably quite realistic. Many private owned cars in the Netherlands constructed between 1990 and 1995 can yet easily be sold for more than €1000 without being compelled to buy a car constructed in 2001 or later. Only people that have an old private car worth less than €1000 and that have at least another €3000 extra to spend on a much newer one might decide to scrape their car in stead of selling it or trading it in. As a consequence, mainly cars from before 1990 and cheap and smaller or unpopular cars constructed before 1995 will probably be offered for scrappage. We have unfortunately not found the exact estimates as used by the Dutch government. To nonetheless get a global idea of the supposed direct effect of the current srappage scheme we quickly estimated that it might be likely that around 95.000 private cars will be scrapped of which 75.000 will be constructed before 1995. This will lead to an exact total expense of the anticipated €85 million and therefore we assume these numbers of scrapped cars, summarized in Table 4, to represent the most likely outcome of the current scrappage regulation.

Table 4: estimated numbers of voluntarily offered vehicles as a direct effect of the current national srappage scheme based on the height of the allowances and the average value of the vehicles concerned. Heavy van stands for delivery vans < 1800 kg.

Vehicle type	Number of applications	Construction year	Fuel type	Height of allowance (€)	Represented € (in million)
private car	75.000	< 1990	Petrol	750	56,25
car & van	19.000	< 1995	Petrol	1000	19
car & van	1.000	< 2000	Diesel	1000	1
heavy van	5.000	< 2000	Diesel	1750	8,75
total	100.000				85

Another notification concerning the current scrappage scheme is that although it is intended to remove vehicles still in good condition, Albertini *et al.* (1995) found that with a relatively limited regulation and mediated allowances, only a temporarily boosts of scrappage is created of cars that would have been scrapped within a few years anyways. Nonetheless it is seems plausible that people in consequence will replace their car by a newer one than they would normally have done. A secondary effect could than be that the enquiry and the relative or absolute value of all other cars constructed before 2001 will decrease. Whether this effect will then shorten or extend the lifetime of these older cars could also be very interesting but lays well beyond the scope of this essay.

Chapter 5: Rebound effects and CO_2 emissions on the production of new cars

In this chapter we will include the fact that the efficiency of an individual car also strongly depends on its weight. Not surprisingly a small car from 1989 will probably be more efficient in the absolute sense than a modern car twice or three time the weight of the old car. We already analysed the average fuel efficiency of old and modern cars in chapter 3 but have no indication of curb weight development over the past 20 years yet. Therefore we again used data from the ANWB top 10 and called in a database from the CBS which indicates number of vehicles still operative at 1-1-2008, ranked by curb weight and construction year. Our results are depicted in Figure 4 and clearly demonstrate that the average vehicle curb weight indeed continued to increase as reported in chapter 1 (see also Appendix 1g, Moll and Kramer 1996 & de Haan *et al*. 2008). Past technological gains in fuel efficiency are apparently almost cancelled out entirely by this trend (also see Table 2) and most importantly only small cars from the top 10 weigh significantly less than the average of cars constructed in the past ten years. The only difference with Wee *et al.* (2000) is thus that nowadays small cars are readily available and could potentially really reduce the actual fuel consumption per car by decreasing average car weight.

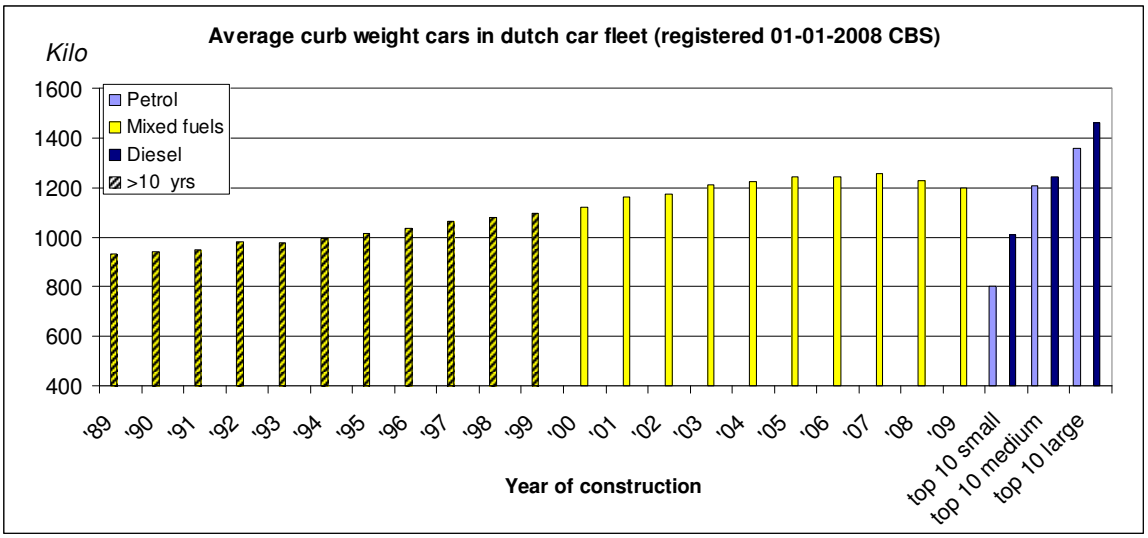

Figure 4: average car weight over the past 20 years per year of construction and for the cars from the ANWB top 10 size classes. Data for 2008 was roughly estimated from the averages of adjacent years and data of 2009 depicts average weight of all top 10 fuel efficient cars by the ANWB, March 2009.

Second topic of this chapter are the predicted rebound effects of a comfortable, safe and cheap to drive car. As already mentioned in chapter 1, Goodwin (1992) stated that owning a new, more fuel efficient and comfortable car will lead to an absolute increase in distance driven. Nonetheless two objections to this statement can be given. First, a distinction can be made between different consumers. Some mostly younger people with an old car that are willing to invest in a newer car in most cases indeed anticipate to drive

more in the future. These consumers would therefore have bought a newer car in time anyways but chances are that with an extra allowance they might buy an even newer car than they had in mind, or just buy the same car they had wished for but only sooner. The other type of consumers are the ones that buy a new car every few years or so for other reasons. These mostly middle aged or older people might even decrease their average annual driven mileage and in some cases also switch to one of the modern A class small vehicles.

My Second objection against Goodwin's statement is that a newer car will indeed probably generate more kilometres itself, but imagine for example modern households with more than a single car. Who would not prefer to drive in the newer car when both vehicles are available in weekends or during holidays? Partially the distance extra driven by the newer car can thus be subtracted from the distance driven by the second car consumers might own. Also when differences in variable cost are substantial, a cheaper to drive and newer car will usually win in discussions over who's car will be taken for joint excursion to work of for pleasure. Nonetheless Rouwendal (1996) still proved that incentives to stimulate fuel efficiency driving behaviour will weaken with lower variable costs. In this case we however believe we have already included this effect in our ordinary every day efficiency estimates for modern new cars (chapter 3). Because of both given arguments we therefore state that the absolute yearly distance driven by the entire car fleet will not increase because newer cars are more reliable and more comfortable, but it only assure that newer cars are used more often than older ones. Since consumers behaviour is however always hard to predict and because there might be processes we have overlooked we just in case decided to account an extra 10% of mileage after all, for all brand new vehicles that replace the scrapped ones.

Third and last topic of this chapter is the energy is costs to produce all the new cars that should replace the older cars removed by an early retirement regulation. In the period between 1990 and 1994 Moll and Kramer (1996) readily computed that ~ 15-20% of the energy used in the total life cycle of a car was required to produce the car itself and ~80-85% was related to driving, maintaining and scrapping the car. The UK society of motor manufacturers and traders limited (SMMT) also estimated that in 2007 about 85 % of life cycle CO_2 came from the usage of a vehicle whereas 15 % was emitted at the production and recycling of a vehicle (9). With estimates of an average total life time of ten years and a total travel distance of 150.000 km Renault nonetheless reported an emission of six tonnes of CO_2 by their assembly plants, suppliers and supply chain distributors to manufacture a single average car (10). This in turn equals almost 20 % life cycle CO_2 so estimates of 15-20% are still in place. When the absolute energy demand for driving a car however seems to drop, energy used for production of a car will of course become more important. By considering that the SMMT in turn also reported a drop of 45 % of CO_2 emission for car assembly alone towards an average of 0.7 tonnes in 2008, an estimate of 15 % might still be likely. By knowing the average lifetime mileage and emission rate of a vehicle in ten years we can thus provide the exact estimate of total CO_2 emission on the production of the vehicle but moreover, the energy required to produce a specific car is of course also directly related to its mass.

We found specific data on the average annual mileage of older cars from the CBS for both diesel and petrol fuelled cars between 2000 and 2006 (11). They also found that annual travelling distances was related to weight of the car and that private diesel fuelled cars covered up to two times higher distances than petrol fuelled ones did (12). Now with use of Figure 4, some data from Wee et al. (2000), and the figures from the CBS, we have attempted to construct plausible maximum travelling distances as depicted in Table 5. These values might not append to each individual cars since 315.000 km is more than most petrol fuelled cars will probably ever cover in their lifetime and most of them would also not survive 25 years of service (see Figure 3). Nonetheless it gives us the basis we need to be able to carry out our final modelling.

Table 5: maximum achievable mileage a car will cover in its entire lifetime of maximum 20-25 years. For each separate age an estimate can be made by summing the maximum distance a vehicle covers according to number of years it has been travelling over these years. For example: a 3 year old petrol fuelled car (2006) covered at maximum 1 × 22.000 + 2 ×17.000 km's.

Maximal year of construction (minimal age)	# years covered	Maximum annual distance	
		Fuel type	
		petrol	Diesel
2009 small (<1)		16000	22000
2009 medium (<1)		22000	38000
2009 large (<1)		28000	48000
2009 (average)	1	22000	36000
2008-2000 (<10)	9	17000	30000
1999-1995 (>10)	5	15000	20000
>1995 (>15)	5	10000	20000
>1990 (>20)	5	3000	0
>1985 (>25)		0	0
total distance		315000	506000

From Table 5 the maximum total distance covered in ten years is 175.000 km for a petrol fuelled car (1× 22.000 + 9 × 17.000) and 306.000 km (1× 36.000 + 9 × 30.000) for a diesel fuelled one. With the average CO_2 emission estimates from Table 2 and the lower estimate of 15 % life cycle CO_2 we can now calculate the CO_2 emission on the production with the following equation:

$$[CO_2] \text{ production} = \text{“}1 / ({}^{85}/_{15})\text{”} \times \text{“lifetime travel distance”} \times \text{“efficiency”}$$

(efficiency = g CO_2 / km from table 2)

Hereby we found emission values of around 3.8 tonne of CO_2 for small, 4.5 tonne for medium and 5.4 tonne for our average large size petrol fuelled modern cars from the ANWB top 10. Because of the higher total lifetime distance of diesel fuelled vehicles we also found higher estimates of 6.4, 7.3, and 8.3 tonnes for the three ANWB diesel fuelled vehicle classes. To however better base our estimate on the weight of a car (see Figure 4) and because the 15 % life cycle CO_2 might still just as well be an underestimation we decided to use a guideline of 0.5 tonne CO_2 per 100 kg of vehicle. For the petrol fuelled vehicles of the top 10 this means in order from small to large an emission estimate of 4.0, 6.0 and 7.0 tonnes, likewise for diesel; 5.0, 6.0 and 7.0 tonnes.

Chapter 6: Optimal vehicle replacement based on CO_2 emissions

In the previous chapters we have collected the figures we need to find out whether scrapping 10 year old private cars could potentially reduce the automobile CO_2 emissions of the Dutch car fleet. Using the average distance a car could potentially still drive from Table 5 and the CO_2 emission estimates from Table 2, we can now easily calculate the potential emissions from both the car that is removed and the new car. As explained in chapter 5, we also include an extra mileage of 10 % for the newly sold cars and still need to account for at least some of the extra emission caused by the production of this new car. Scrapping for example a ten years old car that would normally last up to 20 years will ultimately cause the accelerated scrapping of the newer car as well since it would otherwise have been bought 10 years later. For scrapping a 10 years old car we can thus write down at minimum half (10/20) of the energy needed for the production of the new car. Likewise for scrapping a 15 years old car, at minimum only 5/20 = ¼ of the energy needed for the production of the replacement car can be written down since the old car would otherwise have been replaced after 5 years anyways. In short we used the following equations to calculate overall CO_2 emission reductions:

New total [CO_2] = [CO_2] removed + [CO_2] added

[CO_2] removed = # cars scrapped × (old total mileage still to go) × old efficiency

[CO_2] added = # new cars × (1.1 × old total mileage still to go × new efficiency) + (20 − age scrapped car) / 20 × [CO_2] production new car

Scrapping a single 10 year old petrol fuelled car according to this equation would thus maximally remove: (5yr × 15.000 + 5yr × 10.000 + 5yr × 3.000) km × 191 g/km CO_2 => 26.74 tonne of CO_2. When this scrapped car is for instance replaced by a medium sized A class vehicle, the [CO_2] added = (1.1 × 140.000 km × 145 g/km CO_2 + ½ × 6 tonne CO_2 => 25.33 tonne CO_2. The new total [CO_2] is thus − 1.41 tonne of CO_2 meaning that scrapping cars could potentially induce a reduction of 1.41 tonne of CO_2 per car. Replacing the same 10 year old car with a brand new small sized one might even remove another 4.23 tonne of CO_2. A summarization of these results, as well as the potential CO_2 reductions for scrapping 15 years old vehicles, can be found in Table 6.

Anticipating our final conclusion, we found potential reductions of 1.28-5.74 tonne of CO_2 by scrapping 10 year old vehicles, but only when they will be replaced by small or medium sized fuel efficient ones. Replacing old vehicles with cars from the larger size class from the ANWB top 10 will however only create additional emissions of 3.18-3.86 tonne of CO_2 per car. For 15 years old cars we only found potential reductions of 0.55-2.55 tonne of CO_2 per car when replacing petrol fuelled ones for smaller or medium sized modern ones. Reducing the automobile CO_2 emissions might thus seem possible in some, but certainly not in all cases.

Table 6: estimated possible maximal net CO_2 reductions by early retirement programs for cars aged >10 and >15 years. All figures are in tonne CO_2 per vehicle.

Fueltype	Petrol			Diesel		
Remaining distance + 10 %	154.000 (>10 yr)			220.000 (>10 yr)		
Top 10 vehicle rebought	small	medium	large	small	medium	large
Bruto reduction	7.64	4.41	-0.36	8.24	4.28	0.32
Productie	2.00	3.00	3.50	2.50	3.00	3.50
Net reduction	5.64	1.41	-3.86	5.74	1.28	-3.18
Remaining distance + 10 %	71.500 (>15 yr)			110.000 (>15yr)		
Top 10 vehicle rebought	small	medium	large	small	medium	large
Bruto reduction	3.55	2.05	-0.17	0.41	0.21	0.02
Productie	1.00	1.50	1.75	1.25	1.50	1.75
Net reduction	2.55	0.55	-1.92	-0.84	-1.29	-1.73

In the final part of this chapter we calculated the breakeven points for the use and production of the modern cars from the ANWB top 10's (see Table 7). With this method we found that consumers that are going to drive at least another 60.000 km in an average older petrol fuelled car could indeed better buy a new small A class vehicle to cover their travel and reduce their overall total CO_2 emission. Buying a medium sized vehicle will on the other hand only outbalance benefits for the environment if a consumer would otherwise keep on driving in an older car for at least 130.000 km. For diesel fuelled cars figures are even higher but since these vehicles usually cover a much higher distance, it might in some cases also be environmentally beneficial to replace them for newer vehicles. We already found that scrapping diesel fuelled vehicles of ten years old could result in a reasonable reduction of emissions when replacing them with a small modern one. Now we found the exact breakeven point to be 94.340 km. Also of interest for older diesel fuelled cars waiting for minimal another 170.000 km is to replace them by new medium sized ones.

Table 7: optimal breakeven remaining travelling distances of old cars to compensate for the entire energy needed to produce a brand new vehicle.

Fuel type & size class In the ANWB top 10	fuel economy gain <10yr old and new cars In g CO_2 / km	production of new vehicle (tonne CO_2)	distance to compensate with new vehicle (km)
Petrol			
small	67	4	59701
medium	46	6	130435
large	15	7	466667
Diesel			
small	53	5	94340
medium	35	6	171429
large	26	7	269231

Chapter 7: Discussion and conclusions

In chapter 4 and 5 we learned that the total number of cars in the Dutch car fleet will most likely remain constant. By removing 10.000 older cars from the car fleet by the current scrappage regulation eventually 10.000 brand new cars will thus eventually replace the ones that are scrapped. In chapter 4 we however also briefly mentioned the effect a scrapping regulation could have on the end value of old cars. Since the government still pays a certain amount of money for the old car, second hand prices of these vehicles might rise (de Palma & Kilani 2006). Current national scrapping scheme also demands that the car that is bought as replacement has to be constructed in 2001 or more recent. As a consequence these cars might also rise in value. This might nonetheless just as well only balance out the lowering effect the economic depression has on second hand car values. In either case, a brand new vehicle might become more attractive since it will be relatively less expensive compared to second hand ones. Marketing research yet only confirms our statement that the current allowances are too little. Only 23% of old car owners have consider scrapping their car and one third of these consumers already believe the allowance to be too little (Appendix 1j). We also predicted that as an effect of the current scrapping regulation most scrapped vehicles will be older than 20 years and almost entirely only petrol fuelled (Table 4). Maximum remaining distance for these cars is as low as 15.000 km per car. Having these cars scrapped will thus only accelerate the production of new cars and gains in fuel efficiency are almost neglectable over such small distances. Many of these very old cars would have been scrapped in a short while anyways (Albertini 1995). The current national scrappage scheme will thus most certainly not reduce CO_2 emissions of the Dutch car fleet. On the other hand, removing old vehicles does promote the production of new cars. Since the production of a single car causes at least 4 tonne of CO_2, the current regulation might boost the production of another 400.000 -700.000 tonne of CO_2 as long as it is in place. Subsidizing this acceleration of automobile emissions is most likely not what most Dutch politicians had in mind but unfortunately the disappointing result of the current scrappage regulation.

In the previous chapter we have however seen that reducing CO_2 emissions of the Dutch car fleet by introducing a scrapping allowance does not seem entirely impossible. First we have shown that replacing an average 10 year old private car by a new and more fuel efficient one can indeed benefit the environment. In contrast to Wee *et al.* (2000) the average optimal lifetime of a car seems to have been reduced to ten instead of 15 years. Reducing CO_2 emissions dependents nonetheless mainly on which car is bought back (see Table 6) and of course also on the precise car that is offered for scrappage. In this report we have however used averages for all old cars (Figure 1 & 2) while there are of course many differences in fuel efficiency between these old cars as well. We also made several other assumptions that might not reflect individual considerations to scrape or buy a new car. As with the maximal achievable mileage estimates (Table 5), more realistic distinction between users of small shopping cars and large kilometre cruisers can thus still be made. Such a distinction will however be most important in determining the actual potential CO_2 emissions reductions per car when a vehicle is replaced by a modern one but is less essential when goals are set to replace every 10 year old vehicle.

When we simply assume that all 2.17 million cars older than 10 years (Table 3) will be replaced by small A class type vehicles the emission reduction can be as much as 10.5 million tonne of CO_2 (0.58 million cars >15 × 2.55 tonne reduction + 1.59 million cars >10<15 × 5.64 or 5.74 for diesel fuelled ones). Also when replacing all these older cars by medium size modern fuel efficient ones, emission reduction will still be approximately 2.6 million tonne of CO_2. Replacing them by large vehicles will however only create additional emissions and should be of great concern when introducing a scrappage regulation. Car sales over 2008 did fortunately already indicate an increasing consumer interest in fuel efficient cars by 54 % and a drop in interest in the larger size classes by 15% (see Appendix 1b). It nevertheless remains very complex to predict consumer decisions to purchase a certain car type (e.g. Hayashi *et al.* 2001, Peters *et al.* 2007). Seemingly realistic at least will be that with limited or low allowances alone, consumers might only scrape very old, mostly small and cheap or unpopular private car and use the money to buy a larger equal or even less fuel efficient vehicle in return. This effect could thus furthermore boost the total CO_2 emissions of the Dutch car fleet as a direct consequence of the current national scrappage regulation. This would fully contradict our proclaimed objective and a firm recommendation would therefore be to closely register scrapped and newly bought car under the current regulation.

To nonetheless persuade owners of large private cars to replace their just 10 year old vehicles as well, higher allowances should thus be given. In relation to this, Albertini (1996) estimated that back in 1996 an allowance of $3000 could persuade 90 % of American consumers to voluntarily trade in their 15 year old vehicle. Nowadays the German government is paying their fellow citizens an allowance of €2500 to voluntarily scrape their 9 year old car (Appendix 1c). Setting at least the same allowance in the Netherlands to potentially scrape the majority of the 2.17 million cars older than 10 year will thus easily cost at least 5.5 billion euros. Striving to scrape all 10 year old vehicles will become nonetheless much more expensive since many used cars are still worth more in the Netherlands than in Germany. Even with for example an age coupled allowance, a massive scrapping scheme might roughly require almost 10 billion euros.

Summarizing, we state that it is indeed possible to reduce the automobile CO_2 emissions in the Netherlands in the very near future by replacing 10 year old private cars. Whether a scrapping allowance will however really promote this is unfortunately difficult to determine. Without strict conditions on the new car like a minimum fuel efficiency of for example 18 km/l fuel for diesel fuelled cars and 16 km/l for petrol fuelled ones, excluding large size vehicles, the potential achievable environmental benefits lays completely in the hands of consumers. If we furthermore include the financial resources that an effective scrapping scheme might require, it might seem less cost effective than other approaches to reduce the CO_2 emissions of the Dutch car fleet. Further intensifying current stimulation programs in favour of the sale of fuel efficient cars by incentives and tax benefits (see Table 1 & Appendix 1h) seem therefore a much more effective strategy. Additionally, the first completely electric driven vehicles are also already awaiting their progressive new owners and could really be driven green if powered by emission free generated electricity. In conclusion we must thus deduct that for the time being, a green scrappage regulation is still based upon pure fiction.

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(2) http://www.nationaleslooprregeling.nl/index.html

(3) http://www.cbs.nl/nl-NL/menu/cijfers/statline/zelf-tabellen-maken/default.htm

(4) http://www.anwb.nl/auto/kiezen-en-kopen/tips-en-advies,/kiezen/groen-en-goedkoper/Top-10-zuinige-auto-s-overzicht-toelichting.html?popup=true

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(12) http://www.cbs.nl/en-GB/menu/themas/verkeer-vervoer/publicaties/artikelen/archief/2006/2006-1912-wm.htm

Appendix 1: Newspaper Clippings

1a: http://www.ed.nl/economie/4447954/Sloopsubsidie-op-politieke-agenda.ece

Sloopsubsidie op politieke agenda

door Harrie Verrijt en Michiel Elands. dinsdag 03 februari 2009 | 02:45 | Laatst bijgewerkt op: woensdag 04 februari 2009 | 07:58

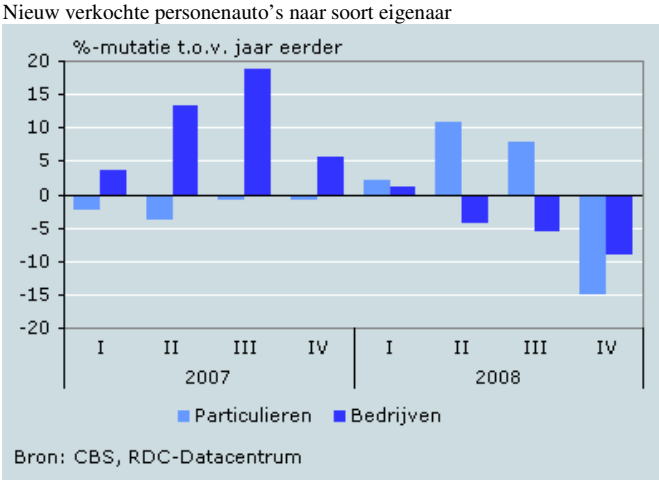
HELMOND/EINDHOVEN - Volgende week komt de Bovag, samen met de RAI, met plannen voor een sloopsubsidie. Details daarover worden nog niet prijsgegeven. De bedoeling is dat autobezitters die hun vervuilende Heilige Koe inruilen voor een 'groener' voertuig beloond worden. De Tweede Kamer en minister Cramer voelen wel wat voor zo'n regeling. Een woordvoerder van het ministerie van Milieu zegt dat in een dergelijke regeling de bestrijding van milieu- en kredietcrisis goed te combineren zijn. Hij noemt Autorecycling Nederland, dat de geïnde milieuheffing voor auto's beheert, als belangrijke financiële bron. Die zou gecombineerd kunnen worden met bijdragen van de autobranche en van de overheid.

1b: https://www.rdc.nl/Portal/nl-NL/Nieuws/Algemeen+nieuws/Omzetverlies+autobedrijven+in+2008.htm

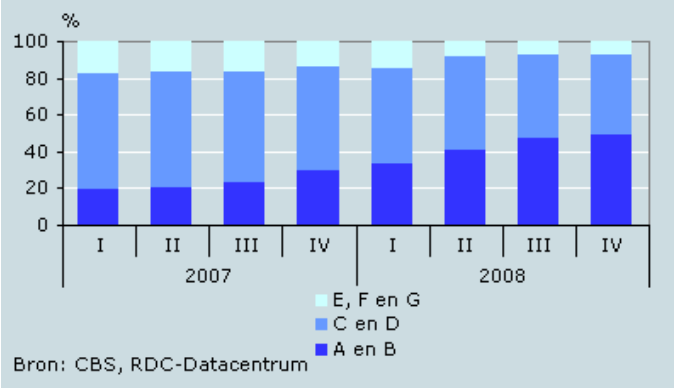
Klein en zuinig erg polulair

Consumenten kochten in 2008 flink meer kleine auto's. Het aandeel van deze auto's in de totale verkoop van nieuwe auto's aan particulieren steeg van 49 procent in 2007 naar 54 procent in 2008. De meeste kleine auto's zijn ook energiezuinig.
De verkoop van nieuwe energiezuinige auto's steeg vorig jaar dan ook fors, mede door de fiscale stimuleringsregeling en slurptax. Van iedere tien verkochte personenauto's waren er vier met een energielabel A of B. Dat is een stijging van meer dan 80 procent in vergelijking met 2007. Van de minder zuinige modellen werd verleden jaar een kwart minder verkocht.

Nieuw verkochte personenauto's naar soort eigenaar



Nieuw verkochte personenauto's naar energielabel



1c: http://www.ed.nl/economie/alg/4447949/Duitsers-gaan-massaal-op-autojacht-door-sloopsubsidie.ece

Duitsers gaan massaal op autojacht door sloopsubsidie

dinsdag 03 februari 2009 | 02:45 | Laatst bijgewerkt op: dinsdag 03 februari 2009 | 09:01

"Ik zit nu acht jaar in de handel, maar dit heb ik nog nooit meegemaakt", zegt verkoopleider Nico Wünsche van Peugeot in het Berlijnse Weißensee. "Gemiddeld haal ik zo'n zeven auto's per maand, dat doe ik nu in één dag. In Duitsland heeft Peugeot zes keer zoveel verkocht als normaal in januari. Veel modellen zijn op. We halen de wagens nu weg bij collega's in heel Europa, daar zuchten ze blijkbaar nog wel onder de economische crisis."

Wie zijn minstens negen jaar oude auto laat slopen en tegelijkertijd een nieuwe koopt, krijgt van de Duitse regering sinds kort 2.500 euro cadeau. Goed voor economie en milieu. De regeling heeft effect. Vanuit heel Duitsland melden autoverkopers en sloopbedrijven een stormloop. De Duitse autobranche heeft de verkoopprognoses voor dit jaar inmiddels met enkele honderdduizenden exemplaren opgeschroefd en ziet het jaar plotseling toch niet meer zo somber.

Het gaat vooral om de wat kleinere auto's, zegt Wünsche van Peugeot. "Kopers wilden eigenlijk nog een tijdje in hun huidige auto blijven rijden, maar hebben ondertussen toch alweer een kleine tienduizend euro gespaard voor een volgende. Met de 2500 euro premie erbij zoeken ze nu iets voor zo'n twaalfduizend euro. Dan kom je meestal uit bij buitenlandse merken, want Duitse auto's zijn net wat duurder. Collega's bij Audi en BMW melden dat ze niks te doen hebben."

Benzineconcern Aral is boos, omdat al die nieuwe auto's veel minder benzine verbruiken dan de oudjes die nu nog in groten getale de Autobahn bevolken.

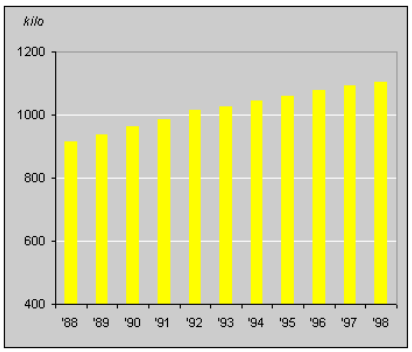
1d: http://www.cbs.nl/nl-NL/menu/themas/verkeer-vervoer/publicaties/artikelen/archief/1999/1999-0361-wm.htm

Webmagazine, maandag 11 oktober 1999 10:00

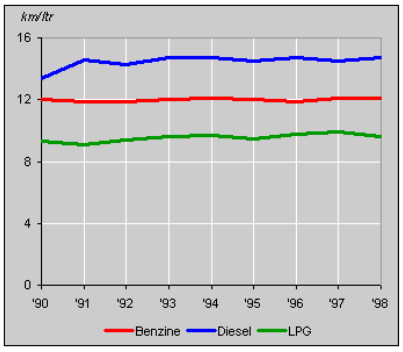
Auto’s worden zwaarder

Nieuwe auto's worden gemiddeld steeds zwaarder. In 1998 met gemiddeld acht kilo en in tien jaar tijd zelfs met bijna 190 kilo. Bergbeklimmers en autofabrikanten hebben iets gemeenschappelijks. Beiden zijn gefixeerd op het terugdringen van gewicht. Bij bergbeklimmers gaat het soms om enkele grammen, bij auto’s zijn vaak kilo’s te winnen.

Gemiddeld gewicht auto's per bouwjaar



Gemiddeld verbruik personenauto's



Bron: Kentekenregister RDW, ongecorrigeerd voor export

Met allerlei kunststoffen is het gewicht van de carrosserie in de loop der jaren verminderd. Maar het effect daarvan weegt niet altijd op tegen het gewicht van allerlei snufjes die de hedendaagse automobilist in zijn auto wil. Voor de autobouwer is er in de race om gewichtsreductie nog een handicap. Dat zijn de grenzen van de motorrijtuigenbelasting. Veel van de huidige modellen hebben een gewicht dat ligt tussen de 951 en 1050 kilo. Wordt dan bijvoorbeeld stuurbekrachtiging aan een model toegevoegd dan zal men proberen niet boven die grens te komen. Voor een auto van 1051 kilo moet al gauw zo’n 150 gulden meer belasting worden betaald.

Luxe kost gewicht

Soms zorgen wettelijke bepalingen voor een ongewilde gewichtvermeerdering. Zoals autogordels. Eerst alleen voorin verplicht , vanaf 1992 ook achterin. Het meeste gewicht komt echter van de luxe accessoires. Een audio-installatie is al bijna standaard. Airbag, stuurbekrachtiging, elektrisch bedienbare ruiten, cruise-controle, airconditioning en ABS worden steeds minder optioneel.
Al die zaken maken de auto zwaarder. Gelukkig hebben de fabrikanten van motoren ook niet stil gezeten. Zij maken hun motoren steeds efficiënter in hun verbruik. Ondanks het toegenomen gewicht is het gemiddelde brandstofverbruik sinds 1990 dan ook nauwelijks gewijzigd.

Ed. van Gelder

1e: http://www.nuzakelijk.nl/20080919/voorpagina/sloopsubsidie-voor-oude-autos-den-haag/

Sloopsubsidie voor oude auto's Den Haag

Uitgegeven: 19 september 2008 15:32. Laatst gewijzigd: 19 september 2008 15:35

AMSTERDAM - Inwoners van Den Haag die een auto uit 1991 of ouder laten slopen kunnen vanaf 1 oktober een subsidie van duizend euro tegemoet zien. De regeling dient om de uitstoot van stikstofoxiden en fijnstof terug te dringen, meldt de gemeente op zijn website.
In de Hofstad rijden ongeveer 18.000 auto's rond die in aanmerking komen voor de regeling . De aanvrager moet wel minimaal twee jaar bij de gemeente Den Haag als inwoner staan ingeschreven. Ook moet de auto minimaal twee jaar in het bezit van de betreffende persoon zijn en de APK nog minimaal drie maanden geldig zijn.De gemeente Amsterdam kondigde eerder ook al zo'n sloopregeling aan, terwijl minister Eurlings van Verkeer en Waterstaat afgelopen voorjaar een onderzoek aankondigde naar de milieueffecten van een eventuele landelijke regeling.De autobranchevereningingen Rai en Bovag zeggen deze lokale plannen te steunen, maar zien het liefst een landelijke regeling, 'zodat de regels overal hetzelfde zijn en iedereen wordt gestimuleerd voor een schonere auto te kiezen'.

1f: http://www.domain-b.com/industry/automobiles/general/20090221_uk_auto.html

UK auto body wants scrappage scheme to boost new car sales news

21 February 2009: The Society of Motor Manufacturers and Traders (SMMT) in the UK has stressed the need for an urgent scrappage scheme to breathe life back into the car market. Paul Everitt, the chief executive of the SMMT, said, "It is vital that car buyers are given the confidence to buy now and a scrappage incentive scheme is a clear signal which has already proved successful in other EU member states. The UK government must align with Europe and take immediate action to protect its automotive sector." Everitt's comments come in the week that BMW laid off 850 works at its Mini plant in Oxfordshire.

A number of European Union member states already have car-scrapping programme in place. Scrappage schemes recently introduced in France and Germany are estimated to generate between 200,000 and 400,000 replacement vehicles. In Germany, drivers who trade in cars that are more than nine years old will receive €2,500 (£2,200), while motorists in France receive €1,000. Spain has also recently introduced a similar scheme and the car industry expects hundreds of thousands of new cars to be be bought as a replacement for the scrapped vehicles. In January, the UK government announced that it was considering introducing a 'scrappage' incentive scheme for motorists, designed to help stimulate the ailing car market and accelerate the transition to less-polluting vehicles. Business secretary Peter Mandelson said that in addition to providing the car industry with low-interest loans to help fund the development of low-carbon vehicles, the government was looking at schemes to help drive demand for such vehicles during the recession. "Last week, we committed to guarantees and loans that should help the UK's vital automotive sector draw down more than £2 billion in investment...in its vital transition to low-carbon vehicles," he said. "We are also working to find ways to help the finance arm of the car sector keep providing the credit that keeps the industry moving. I am also looking at other countries' experience with scrappage schemes," he said.

The SMMT believes that the introduction of this scheme in the country will help up to 250,000 cars and 30,000 vans go through a similar scheme in the next one and half years. The move will also reduce carbon dioxide emissions by taking older, more polluting vehicles off the road, it added. A proposal detailing a scrappage scheme for the UK was submitted by the SMMT to Lord Mandelson's Department for Business earlier this month. The scheme proposed allowing cars and vans more than nine years old to be scrapped in return for a £2,000 cash incentive towards a new or nearly new vehicle. Meanwhile, car manufacturers, the opposition Conservative party and the automobile association have urged the government to help the motor industry after figures showed car production slumped again last month. Unless the government chalked out some urgent measures, the car manufacturers face closure or a cut in production, union leaders warned.

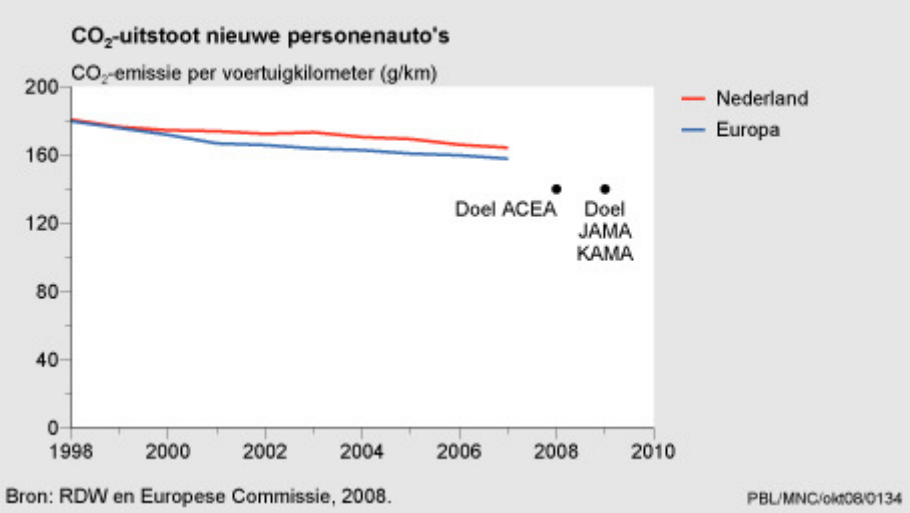
Dismal sales data for January
SMMT data shows that about 61,404 cars were produced in the UK in January 2009, down by 58.7 per cent compared with January 2008. Domestic car production fell 72.3 per cent to 10,132 vehicles. Commercial vehicle production totalled 8,351 units - a 59.9 per cent fall on January 2008. However, the export market reveals good numbers. Out of the cars made last month, exports accounted for a record 83.5 per cent. Many UK car manufacturers had cut jobs, gave extended Christmas holidays, or reduced workers' hours. Ford is to offer voluntary retirement for up to 850 UK workers, while Bentley announced three-day week in October and longer Christmas break. It is also closing Crewe plant for seven weeks from March, and has announced 220 job losses and 10 per cent pay cut. GM (Vauxhall) extended Christmas closure and 40-day shutdown. Honda announced four-month shutdown between February and May. Jaguar Land Rover go for a series of one-day shutdowns and production cuts plus 1,000 redundancies. Mini announced Christmas shutdown extended by 10 days. It also allowed 300 agency staff go and one week shutdown for February. From March, plant will have a five-day week, and a further 850 jobs will be cut. Nissan says 1,200 redundancies, and one shift on each line stopped until April 2009. The data shows grim situation across the industry. However, Mandelson declined to comment, and urged people to 'stop feeding the rumours'.

Czech European Union affairs minister Alexandr Vondra called on the commission earlier to come forward with proposals for a Europe-wide scrapping programme to boost consumer demand for new cars. The European car industry currently employs 12 million people – six per cent of all jobs in the EU. Mr Verheugen said EU car production was shrinking rapidly, with 2 million cars waiting for customers at the moment in Europe. Environmentalists, however, are likely to be lukewarm about the scheme unless the incentives are structured to ensure motorists do upgrade to genuinely lower-carbon vehicles and that net carbon gains are delivered by scrapping older vehicles.

1g: http://www.milieuennatuurcompendium.nl/indicatoren/nl0134-Koolstofdioxide-emissie-per-voertuigkilometer-voor-personenauto%27s.html?i=9-20

CO_2-emissie per voertuigkilometer van nieuwe personenauto's, 1998-2007

De gemiddelde nieuwe personenauto in Nederland is in de afgelopen jaren slechts beperkt zuiniger geworden. Hierdoor wordt mogelijk niet tijdig voldaan aan de Europese doelstelling voor het terugdringen van de gemiddelde CO_2-uitstoot van nieuwe personenauto's.



CO_2-uitstoot van nieuwe personenauto's daalt relatief langzaam
De gemiddelde nieuwe personenauto die in de afgelopen jaren in de EU is verkocht, is slechts beperkt zuiniger geworden. De gemiddelde CO_2-uitstoot per kilometer - die rechtstreeks afhankelijk is van het brandstofverbruik - is hierdoor ook maar beperkt afgenomen. Op basis van de trend van de afgelopen jaren lijkt de doelstelling voor de gemiddelde CO_2-uitstoot van nieuwe personenauto's, een gemiddelde uitstoot van 140 gram CO_2 per kilometer (g CO_2/km) in 2008 niet gehaald te worden. Uit cijfers van T&E (2008) blijkt dat de gemiddelde CO_2-uitstoot in 2007 in de EU 158 g/km bedroeg. De gemiddelde personenauto is hiermee nauwelijks zuiniger geworden ten opzichte van 2006, toen die CO_2-uitstoot 160 g/km bedroeg.

In Nederland is in de afgelopen jaren eveneens sprake van een dalende trend in de gemiddelde CO_2-uitstoot van nieuwe personenauto's, maar deze trend blijft enigszins achter bij de Europese ontwikkeling. Uit verkoopgegevens van de RDW blijkt dat de gemiddelde CO_2-uitstoot van nieuwe personenauto's in Nederland in 2007 circa 164 g/km bedroeg. Dit is een lichte afname ten opzichte van 2006, toen de gemiddelde CO_2-uitstoot van de Nederlandse nieuwverkopen 166 g/km bedroeg.

De CO_2-emissiewaarden hebben betrekking op de CO_2-uitstoot die gemeten is tijdens de Europese typekeuring van personenauto's. In de praktijk liggen zowel het brandstofverbruik als de CO_2-emissies iets hoger, bijvoorbeeld door een minder zuinige rijstijl en/of een hoger gewicht van het voertuig (door extra inzittenden en/of bagage) dan tijdens de typekeuring.

Trend naar grotere en zwaardere voertuigen zet door
De relatief beperkte afname van het brandstofverbruik en de CO_2-uitstoot van nieuwe personenauto's kan deels verklaard worden door een toename van het gewicht en het motorvermogen, die het brandstofverbruik - en daarmee de CO_2-uitstoot - verhogen. Het gemiddelde gewicht van een nieuwe personenauto is in Nederland de afgelopen tien jaar bijvoorbeeld met circa 12% toegenomen, terwijl het gemiddelde vermogen in dezelfde periode met 22% is toegenomen. Een deel van de door de auto-industrie behaalde 'technische winst', bijvoorbeeld door de ontwikkeling van zuinigere motoren of verbeteringen van de aerodynamica van de auto's, is hierdoor teniet gedaan.

De toename van het gemiddelde gewicht en vermogen van nieuwe personenauto's wordt deels veroorzaakt door de toegenomen verkoop van grotere autotypen (MuConsult, 2006). Het gemiddelde gewicht en vermogen van auto's binnen de verschillende grootteklassen neemt echter ook toe. Dit is onder meer het gevolg van de steeds uitgebreidere toepassing van technologieën als airbags in nieuwe personenauto's. Maar ook de concurrentie tussen autofabrikanten en de behoefte van veel consumenten aan meer prestaties en comfort dragen er aan bij dat nieuwe auto's op dit vlak steeds meer te bieden hebben.

Doelstellingen CO_2-uitstoot nieuwe personenauto's
Doelstelling van de EU is om de gemiddelde CO_2-uitstoot van nieuwe personenauto's in 2012 terug te dringen tot 120 g/km. Om dit doel te bereiken heeft de Europese Commissie in 1998 en 1999 convenanten gesloten met de koepelorganisaties van de Europese (ACEA), Japanse (JAMA) en Koreaanse (KAMA) autofabrikanten. In deze convenanten heeft de auto-industrie zichzelf ten doel gesteld om de gemiddelde CO_2-uitstoot van nieuwe personenauto's terug te brengen tot 140 g/km in 2008 (ACEA) en 2009 (JAMA en KAMA). Dit zou een afname betekenen van circa 25% ten opzichte van het niveau van 1995. Gezamenlijk vertegenwoordigen de drie koepelorganisaties meer dan 95% van de Europese markt voor personenauto's.
Europese Commissie komt met voorstel voor normering CO_2-uitstoot

De doelstelling van 140 g/km is geen resultaatverplichting. Wel heeft de Europese Commissie bij het sluiten van de convenanten aangegeven met regelgeving te komen indien de doelen niet tijdig gehaald (dreigen te) worden. De beperkte vooruitgang die in de afgelopen jaren is geboekt, brengt het bereiken van de Europese doelstelling voor 2012 in gevaar. De Europese Commissie heeft daarom eind 2007 een voorstel gepubliceerd voor normering van de CO_2-uitstoot van nieuwe personenauto's. Volgens dit voorstel moet iedere fabrikant (of groep van fabrikanten) ervoor zorg dragen dat de gemiddelde CO_2-uitstoot van zijn nieuwverkopen vanaf 2012 niet hoger ligt dan zijn specifieke doelstelling. Deze doelstelling is afhankelijk van het gemiddelde gewicht van zijn nieuwverkopen, maar bedraagt gemiddeld over alle fabrikanten 130 g CO_2/km. Over het voorstel wordt nog onderhandeld binnen de EU.

De resterende reductie van 10 g CO_2/km die nodig is om de doelstelling van 120 g/km te halen, moet met aanvullende technologische maatregelen gerealiseerd worden. De Europese Commissie noemt daarvoor onder meer het gebruik van efficiëntere klimaatsystemen (airco's), vermindering van de rolweerstand van banden en de uitrusting van nieuwe auto's met controlesystemen voor de bandenspanning (Europese Commissie, 2007).
Nederland intensiveert beleid om verkoop zuinige auto's te bevorderen
De convenanten tussen de EU en de auto-industrie vormen één van de drie pijlers van het Europese beleid om de CO_2-uitstoot van nieuwe personenauto's terug te dringen. De andere twee pijlers zijn het fiscaal stimuleren van de verkoop van zuinige auto's en het beter informeren van de consument over het brandstofverbruik en de CO_2-uitstoot van nieuwe auto's via labels in de showroom. Deze laatste pijler heeft geleid tot de ontwikkeling van het Nederlandse energielabel voor personenauto's. De tweede pijler is in Nederland ingevoerd via de bonus/malus regeling op de aanschafbelasting (BPM) die gekoppeld is aan de energielabels.

Energielabels voor personenauto's, 2000-2007
Het Nederlandse beleid om de verkopen van zuinige auto's te bevorderen en van onzuinige auto's te ontmoedigen is in 2008 geïntensiveerd. De bonus- en malusbedragen in de BPM-differentiatie zijn bijvoorbeeld verhoogd. Daarnaast is een additionele BPM-toeslag ingevoerd voor relatief onzuinige auto's en zijn de MRB en de fiscale bijtelling voor zeer zuinige auto's verlaagd.

De intensivering van het Nederlandse beleid lijkt effect te sorteren. Uit voorlopige verkoopcijfers voor de eerste helft van 2008 blijkt dat de gemiddelde CO_2-uitstoot van nieuwe personenauto's in deze periode circa 4% lager lag dan in de eerste helft van 2007 (159 g/km vs. 166 g/km). In tegenstelling tot de trend in voorgaande jaren zijn ook het gemiddelde gewicht en vermogen van de nieuwverkopen licht gedaald. Dit heeft bijgedragen aan de relatief sterke afname van de CO_2-uitstoot. Overigens zullen ook de sterk gestegen brandstofprijzen hieraan bijgedragen hebben.

Het Nederlandse kabinet heeft in het Belastingplan 2009 (Financiën, 2008) ten slotte een verdere intensivering aangekondigd van het CO_2-beleid voor personenauto's. De MRB voor zeer zuinige auto's moet volgens het plan nogmaals gehalveerd worden en er moet in de fiscale bijtelling een derde categorie geïntroduceerd worden van relatief zuinige auto's. De komende jaren moet de grondslag van de aanschafbelasting voor personenauto's bovendien gewijzigd worden van catalogusprijs naar CO_2-uitstoot. Nederland zou daarmee het eerste land in de EU worden dat de aanschafbelasting van personenauto's volledig baseert op de CO_2-uitstoot.

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1h: http://www.cijfernieuws.nl/w1.htm

WEGENBELASTING SUPER ZUINIGE AUTO'S WEER GEHALVEERD

Om de aanschaf van zeer zuinige auto's, zoals de Toyota Prius, te stimuleren wordt de aanschaf niet alleen goedkoper, maar ook de vaste lasten. De wegenbelasting wordt voor deze categorie auto's in 2009 nogmaals gehalveerd.
De overheid beschouwt als zeer zuinige auto's, benzineauto's die 110 gram CO_2 of minder per kilometer uitstoten en dieselauto's die 95 gram CO_2 of minder per kilometer uitstoten. Momenteel voldoen slechts 7 auto's aan deze zeer strenge eisen, namelijk de Citroen C1, Toyota Aygo, Peugeot 107, Daihatsu Cuore, Honda Civic Hybrid, Toyota Prius en de Smart fortwo.

1i: http://www.spitsnieuws.nl/archives/binnenland/2009/04/slooppremie_is_inderdaad_niks.html

Slooppremie is inderdaad niks

Bezitters van een personenauto die een nieuwer en schoner exemplaar aanschaffen, kunnen op een slooppremie rekenen van 750 of 1000 euro. Voor oude bestelauto's geldt een premie van 1000 of 1750 euro.
Milieuminister Jacqueline Cramer en de autobranche zijn het eens geworden over zo'n sloopregeling. Zij bezegelden de deal vrijdag op de AutoRAI in Amsterdam.

Schoneluchtpremie
De PvdA-bewindsvrouw had het over een „schoneluchtpremie", omdat de nadruk ligt op het terugdringen van de uitstoot van schadelijke stoffen zoals fijn stof en stikstofoxiden, niet zozeer op die van CO2.

Springen
De autobranche zit te springen om een sloopregeling. De verkoop van auto's keldert door de recessie. De premie zou het voor mensen aantrekkelijker moeten maken om hun wagen in te ruilen voor een nieuwer exemplaar. De partijen verwachten dat 100.000 oude auto's en bestelauto's worden ingeruild. Vorige week liet het kabinet weten als onderdeel van het crisispakket 65 miljoen euro uit te trekken voor een sloopregeling. De branche en andere organisaties zoals verladersorganisatie EVO begonnen te morren dat het te weinig was.

65 miljoen
De overheidsbijdrage blijft 65 miljoen euro. RAI Vereniging, Bovag en AutoRecycling Nederland (ARN) dragen 20 miljoen bij uit het fonds van ARN. Dat fonds wordt 'gevoed' door de verwijderingsbijdrage (45 euro voor een personenauto) die kopers betalen. De autobranche heeft daarnaast nog 10 miljoen euro achter de hand.

De slooppremieregeling gaat zo snel mogelijk van start en eindigt als het budget op is, aldus Cramers ministerie. Volgende week gaat een website (nationaleslooprregeling.nl) in de lucht met informatie voor de consument.
Voor personenauto's op benzine van voor 1990 bedraagt de premie 750 euro, voor wagens uit de bouwjaren 1990 tot en met 1995 geldt een premie van 1000 euro. Dieselauto's van voor 2000 leveren ook 1000 euro op. Bestelauto's brengen afhankelijk van het gewicht tot 1750 euro op.

1j: http://www.nu.nl/economie/1968319/sloopregeling-stimuleert-verkoop.html

Sloopregeling stimuleert verkoop

AMSTERDAM, 23 mei 2009
De sloopregeling voor vervuilende auto's stimuleert de autoverkoop. Bijna een kwart van de eigenaren van oude auto's denkt erover om een nieuwe auto te kopen als de regeling ingaat. Dat blijkt uit een onderzoek van TNS-Nipo in opdracht van RTL Nieuws. Woensdag maakte milieuminister Jacqueline Cramer (PvdA) bekend dat de sloopregeling nog voor het einde van deze maand ingaat.Een precieze datum werd hierbij niet bekendgemaakt. De regeling houdt in dat autobezitters 750 tot duizend euro krijgen als ze hun oude, vervuilende auto laten slopen en een nieuw, schoner exemplaar kopen. Voor oude dieselbestelauto's kunnen mensen zelfs duizend tot 1750 euro krijgen. Uit het onderzoek blijkt dat 23 procent van de bezitters van oude auto's wel wat ziet in de regeling. Een op de drie van deze autobezitters vindt de aangeboden slooppremie te laag.