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Accelerated Retirement of Fuel-Inefficient Vehicles Through Incentives for the Purchase of Fuel-Efficient Vehicles

January 13, 2009

Introduction

Sharp fluctuations in gasoline prices and tight household budgets are causing many consumers to rethink their vehicle preferences, while automakers are paying more attention to the fuel economy of their offerings than they have in decades. After twenty years of stagnation, federal Corporate Average Fuel Economy (CAFE) standards have been set once again on an upward trajectory, thanks to the Energy Security and Independence Act of 2007, which requires that average new car and light truck fuel economy will increase by at least 40 percent, to 35 miles per gallon or more, by 2020. The new standards offer limited near-term relief, however. It takes 15 years for half of the vehicle stock to turn over, and 30 percent of vehicles of a given model year remain on the road after 20 years. Thus the benefit of increases in fuel economy standards will not be fully realized for many years. To quicken the pace of motor vehicle fuel savings, measures should be implemented to accelerate the retirement of the most inefficient vehicles in operation today.

Incentivizing Accelerated Retirement

Turnover of the vehicle stock to more efficient vehicles could be accelerated by means of an incentive for the voluntary retirement of those with the lowest fuel economy from the pool of 230 million vehicles currently registered in the United States. For a limited period of time, the owner of an inefficient vehicle would receive, in exchange for turning over his or her vehicle for crushing, a voucher toward the purchase of an efficient vehicle or toward transit fare.

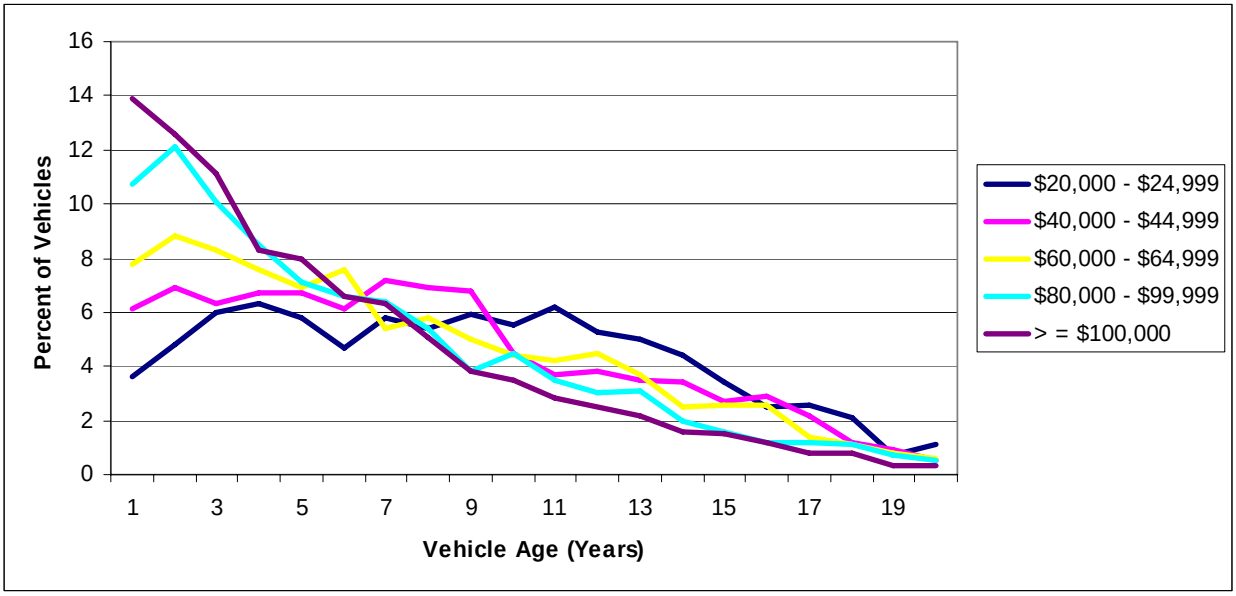
The goals of the program are twofold: to reduce fuel consumption and to provide economic relief to drivers in middle-income households. In addition to replacing the least efficient vehicles on the road (largely light trucks) with efficient vehicles, the program would increase production of fuel-efficient vehicles, thereby helping to build economies of scale and reduce the cost of advanced vehicle efficiency technologies. The credit would also make the purchase of an efficient vehicle a viable option for households seeking ways to reduce their fuel expenses.

While these two objectives are generally compatible, the relative importance placed on each can influence program design. To maximize fuel savings, the program should get as many of the highest-consuming vehicles off the road as possible, and replace them with vehicles as fuel-efficient as possible. The long-term impact of the program would be greatest if the program could accelerate the penetration of efficiency technologies into the marketplace.

To maximize the economic relief provided by the program, application of vouchers toward purchase of used vehicles, as well as new vehicles, should be permitted. Over 70 percent of

vehicle sales are of used vehicles.[1] Moreover, moderate income households are less likely than high income households to purchase new vehicles.[2] The broader trends of vehicle age as it relates to household income are illustrated in Figure 1, which shows, for example, that while 47 percent of vehicles in households with incomes of over $100,000 are less than four years old, the same is true of only 26 percent of vehicles in households earning $40,000 - $45,000.

Figure 1 – Vehicle Age Distribution by Household Income



Data Source: 2001 National Household Travel Survey

Program specifications

In order to evaluate the impact of an accelerated retirement program, we specify one such program in detail. The program would be in effect for the four-year period 2009–2012. A vehicle to be retired would have to be currently registered and in drivable condition, and have a fuel economy, as certified for the vehicle when new, of less than 18 miles per gallon.[3] Upon turning the vehicle over to a dealer, dismantler, or scrap processor who can ensure the vehicle will be crushed, the owner would receive a voucher that could be applied toward transit fare or toward purchase of a replacement vehicle having a fuel economy that exceeds the CAFE standard for the relevant class of vehicle by at least 25 percent. Because the program prioritizes assistance to middle income households, no vehicle purchased could have an MSRP of more than $45,000.

[1] See http://www.bts.gov/publications/national_transportation_statistics/html/table_01_17.html.

[2] For example, the average household income of attendees of the Texas State Fair Auto Show was $95,000 (http://www.bigtex.com/autoshow/aboutshow/demographics/), while the median Texas household income in 2005–06 was $43,000 (http://www.census.gov/hhes/www/income/income06/statemhi2.html).

[3] Fuel economy throughout this discussion is EPA's "combined, unadjusted" value, which is about 25% higher than the combined value shown on the vehicle label at the time of sale.

The value of the voucher would be determined by the model year of the vehicle to be retired. During the first year of the program (2009), vouchers would be issued in the amounts shown in Table 1.

Table 1 – Voucher Values in 2009

	Voucher value if used for:		
	New vehicle	**Used vehicle**	**Transit fare credit**
For model year 2002 and later	$4,500	$3,000	$3,000
For model year 1999 through 2001	3,000	2,000	2,000
For model year 1998 and earlier	2,000	1,500	1,500

In each successive year of the program, the model years in Table 1 would be increased by one. Dealers, dismantlers, and scrap processors issuing vouchers would be eligible for a separate payment of $50 per vehicle to complete certification of the destruction of the retired vehicles.

Eligible vehicles

The number of vehicles on the road today rated at less than 18 miles per gallon, and consequently eligible for crushing under this program, can be estimated with historical, model-specific sales data and average vehicle "survival" rates. As shown in Table 2, we estimate there are 11 million such vehicles of model years 1990-2006, nearly all of them pickup trucks or SUVs.[4] This is about 5 percent of vehicles on the road.

[4] The U.S. DOT sales data used to develop the estimate of inefficient vehicles is for some model years incomplete or preliminary. Thus the figures shown in Table 2 may be unreliable year-by-year, but should yield a sound estimate in the aggregate.

Table 2 – Estimated Vehicle Population Eligible for Scrappage, MY 1990-2006

Model year	Vehicles under 18 mpg sold	Light truck survival rate in 2009	Vehicles under 18 mpg surviving in 2009
2006	417,395	0.993	414,473
2005	626,675	0.969	607,248
2004	1,087,154	0.941	1,023,012
2003	944,215	0.907	856,403
2002	857,512	0.869	745,178
2001	1,332,900	0.827	1,102,308
2000	977,100	0.782	764,092
1999	1,391,498	0.734	1,021,360
1998	1,286,800	0.684	880,171
1997	1,221,900	0.633	773,463
1996	915,900	0.58	531,222
1995	1,103,000	0.528	582,384
1994	1,084,600	0.477	517,354
1993	924,100	0.427	394,591
1992	733,500	0.379	277,997
1991	600,200	0.333	199,867
1990	817,300	0.29	237,017
Total	**16,321,749**		**10,928,139**

Data sources: U.S.DOT (sales) and U.S.DOE (scrappage rates)

New vehicles eligible for purchase with vouchers must have fuel economy exceeding the applicable standard by at least 25 percent. For 2009, the car standard is 27.5 miles per gallon, and the light truck standard is 23.1 miles per gallon.[5] This leads to thresholds of 34.4 miles per gallon and 28.9 miles per gallon for cars and trucks, respectively. Model year 2009 vehicles include 30 cars and 22 light truck nameplates with at least one model meeting these thresholds as well as the emissions requirement (bin 5). Eligible models for years 2005, 2007, and 2009 are shown in Tables A1–A6 in the Appendix.

Participation and cost

The owner of an inefficient vehicle is unlikely to consider crushing the vehicle unless the voucher value meets or exceeds the market value of the vehicle. Data on used vehicle values therefore can be used to put an upper bound on the number of vehicles that would be crushed under the program.

A vehicle's market value varies according to the nature of the transaction. Here we consider the trade-in value, rather than private market value, since most purchases occur through vehicle dealerships.[6] Using Kelly Blue Book (kbb.com) data from November 2008 for a suburban

[5] In December 2007, the Court struck down the U.S.DOT regulation setting light truck standards for 2009. Presumably the standards set in that regulation remain in force nonetheless, given that replacement standards have not been set.

[6] According to Kelley Blue Book: http://www.kbb.com/kbb/Advice/Step.aspx?ContentUniqueName=KBBWebContent-508.

Washington, DC zip code, we compared the trade-in values of vehicles with fuel economy under 18 miles per gallon to the voucher values for model years 1990 through 2006. These comparisons were only for a subset of vehicles, namely high-sales-volume models (sales of 10,000 or more[7]). Also, the Blue Book value depends on the condition of the vehicle; we assumed that two-thirds of vehicles were in "good" condition and one-third were in "fair" condition.[8] Table 3 shows the estimated percentage of vehicles for which the trade-in value is below the voucher value.

Table 3 – Estimated Percentage of Inefficient Vehicles with Trade-In Value less than Voucher Value

Year	Voucher applied to new vehicle	Voucher applied to used vehicle
1990	100.0%	100.0%
1991	100.0%	82.1%
1992	100.0%	100.0%
1993	100.0%	85.6%
1994	98.0%	70.5%
1995	79.5%	60.0%
1996	89.9%	66.7%
1997	69.2%	35.1%
1998	46.7%	21.1%
1999	73.5%	9.4%
2000	50.3%	11.9%
2001	29.4%	13.8%
2002	45.8%	2.1%
2003	0.0%	0.0%
2004	3.0%	0.0%
2005	0.0%	0.0%
2006	0.0%	0.0%

Source: ACEEE calculations from Kelly Blue Book data for zip code 20910, November 2008

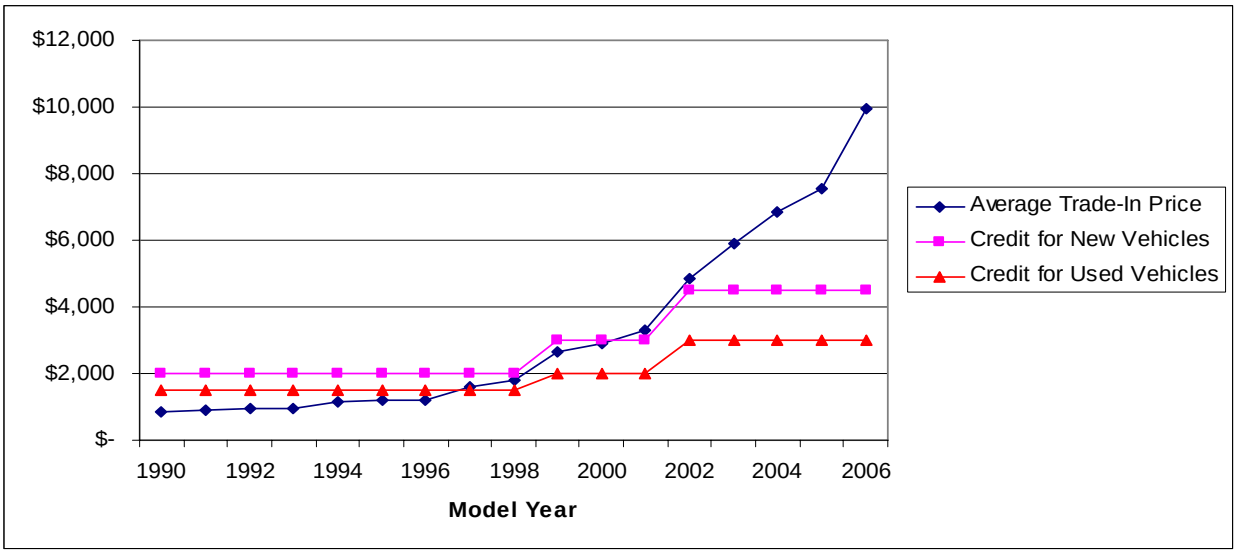
For the newer vehicles, the voucher value rarely exceeds the trade-in value. While the accelerated retirement program is intended to attract inefficient vehicles of all vintages, a program offering vouchers large enough to interest owners of typical recent model-year vehicles to crush their vehicles and replace them with efficient ones would be an extremely expensive program. Moreover, middle-income households generally own older vehicles than do more affluent households, so it is appropriate that a publicly-funded program designed primarily to assist middle-income households concentrate its resources on this older vehicle population. There are, however, additional candidates for crushing beyond those reflected in Table 3, namely those in poor condition and requiring extensive repairs, including some late model year vehicles.

[7] This captured well over half of all vehicles sold for most model years, but in one model year (1992) high-volume vehicles represented only 25% of sales of vehicles achieving less than 18 miles per gallon.

[8] Kelley Blue Book states that most vehicles are in "good" condition and fewer than 5 percent are in "excellent" condition.

Figure 2 shows graphically the relationship between estimated average trade-in value and the values of vouchers as applied to new and used vehicles.

Figure 2 – Average Trade-In Value vs. Voucher Value



The estimates of surviving vehicles by vintage in Table 2 together with the results in Table 3 allow a calculation of the approximate number of vehicles eligible for crushing and having a trade-in value below the voucher value for each model year. To develop a plausible scenario of participation in the program, we assume that 5 percent of vehicles meeting those two criteria will be crushed in the first year of the program and replaced with new, efficient vehicles. Of the remaining eligible vehicles with trade-in value below the voucher value for purchase of a used vehicle, we assume 10 percent will be crushed in the first year and replaced with used, efficient vehicles. The higher probability of a given vehicle owner purchasing a used, rather than new, vehicle is based on the fact that used vehicle sales comprise 70 percent of vehicle purchases, as noted previously. We assume also that 1 percent of vehicles with trade-in value below the voucher value for transit fare credit will be crushed. The levels 5 percent, 10 percent, and 1 percent participation are not based on data, but are simply assumptions to generate a plausible scenario for consideration by policymakers.

These assumptions lead to the conclusion that 575,124 vehicles would be crushed in the first year and replaced, at a cost of $1.1 billion, as shown in Table 4. The average voucher value in this scenario is $1,997.

Table 4 – Estimated Vehicles Crushed and Program Cost: 5%/10%/1% Participation for Purchase of New Vehicles/Used Vehicles/Transit Fare Credit

	Vehicles crushed				
Model year	**Replaced with new**	**Replaced with used**	**Voucher used for transit fare**	**Total**	**Cost**
1990	11,851	22,517	2,370	36,738	$61,031,878
1991	9,993	15,587	1,641	27,221	$45,827,493
1992	13,900	26,410	2,780	43,089	$71,584,099
1993	19,730	32,076	3,376	55,182	$92,637,731
1994	25,357	34,652	3,648	63,656	$108,162,812
1995	23,151	33,188	3,493	59,832	$101,322,854
1996	23,866	33,681	3,545	61,092	$103,570,302
1997	26,749	25,775	2,713	55,237	$96,229,935
1998	20,566	17,644	1,857	40,067	$70,384,099
1999	37,557	9,162	964	47,683	$132,924,297
2000	19,212	8,645	910	28,767	$76,746,844
2001	16,198	14,445	1,521	32,164	$80,525,092
2002	17,074	1,492	157	18,723	$81,779,494
2003	4,067	0	0	4,067	$18,303,479
2004	1,606	0	0	1,606	$7,226,001
2005	0	0	0	0	$0
2006	0	0	0	0	$0
Total	270,877	275,271	28,976	575,124	$1,148,256,410
Average voucher value					$1,997

Fuel and energy savings

Fuel savings associated with the scenario described above can be estimated using average fuel economies of the vehicles to be crushed and the vehicles to be purchased. The average fuel economy is 16.9 miles per gallon (sales-weighted) for eligible inefficient vehicles and 35 miles per gallon (unweighted, due to lack of sales data) for eligible efficient vehicles in 2009. In calculating fuel savings, it is necessary to multiply fuel economies by 0.8 to compensate for the "shortfall" of on-road fuel economy relative to fuel economy for regulatory purposes. Vehicles in the U.S. travel about 12,000 miles per year on average.[9] Older vehicles typically travel less. Because the vehicles replaced under the program will be for the most part several years old, we will assume that they are driven 8,000 miles on average.[10] This gives average annual per vehicle savings under the program:

8,000 miles x (1/16.9 miles per gallon – 1/35 miles per gallon) ÷ 0.8 = 306 gallons

[9] Based on the 2001 National Household Travel Survey; see *Transportation Energy Data Book: Edition 27,* Oak Ridge National Laboratory, 2008.

[10] A more precise estimate of the miles driven by vehicles to be crushed and by their replacements would need to consider several other factors; e.g. replacing an older, inefficient vehicle with a newer, efficient one may lead to an increase in miles driven, or to fewer miles driven on a second vehicle in the same household.

Given the estimate of vehicles crushed in Table 5, this implies a savings of 11,480 barrels of refined products (gasoline and diesel fuel) per day in 2009.[11] Assuming additional savings in the same amount each of the next three years, savings in 2012 would reach 45,920 barrels per day.

The net energy impact of accelerating a vehicle's retirement in this fashion would include not only fuel savings, but also energy saved from the production and transportation of that fuel and any extra energy consumed in vehicle production and disposal as a result of the transaction. Over the life of a vehicle, fuel consumption dominates energy use associated with the vehicle. While the breakdown varies among vehicles, the general relationship is illustrated by estimates of lifecycle energy consumption for a typical vehicle. The GREET model from Argonne National Laboratory calculates "vehicle cycle" energy consumption for a gasoline-powered vehicle with a conventional internal combustion engine to be approximately 10 percent of lifetime energy consumption.[12] Hence, if a new vehicle uses half the fuel used by the vehicle it replaces, it will take only 3.3 of the fifteen years of (average) vehicle life to offset, through fuel savings, the energy costs of producing the new vehicle. Moreover, replacement of a vehicle under the program typically will delay the owner's subsequent vehicle purchase, which in effect reduces the energy impacts of added vehicle production and disposal.

[11] The exchange of an inefficient vehicle for transit fare credit, which accounts for 5% of these savings, is assumed to save the same amount of fuel as a vehicle replacement. A participant who switches to transit in fact will save more than one who switches to a more efficient vehicle, but the program does not require that the participant be a new transit user.

[12] http://www.transportation.anl.gov/pdfs/TA/378.pdf, Figure 19.

Appendix

Table A1 – MY 2005 Cars Eligible for Purchase

Make	Model	Specifications	Emission Certification	Combined Fuel Economy
ACURA	RSX	2.0L 4, manual	Bin 5 / LEV II	35.1
CHEVROLET	COBALT	2.2L 4, manual	Bin 5 / LEV II	34.9
HONDA	ACCORD HYBRID	3.0L 6, auto	Bin 5 / ULEV II	37.5
HONDA	CIVIC GX	1.7L 4, auto [CNG]	SULEV II	37.3
HONDA	CIVIC HYBRID	1.3L 4, auto	Bin 2 / SULEV II	56.0
HONDA	CIVIC HYBRID	1.3L 4, manual	Bin 2 / SULEV II	55.7
HONDA	INSIGHT	1.0L 3, auto	Bin 5 / SULEV II	66.4
HYUNDAI	ELANTRA	2.0L 4, manual	Bin 4 / ULEV II	34.7
MAZDA	3	2.0L 4, manual	Bin 5 / SULEV II	35.6
MITSUBISHI	LANCER	2.0L 4, manual	Bin 5 / ULEV II	35.2
NISSAN	SENTRA	1.8L 4, auto	Bin 5 / SULEV II	35.7
NISSAN	SENTRA	1.8L 4, auto	Bin 5 / SULEV II	35.7
NISSAN	SENTRA	1.8L 4, manual	Bin 5 / SULEV II	36.0
PONTIAC	VIBE	1.8L 4, auto	Bin 5 / ULEV II	36.2
PONTIAC	VIBE	1.8L 4, manual	Bin 5 / ULEV II	38.4
SATURN	ION	2.2L 4, manual	Bin 5 / LEV II	34.9
TOYOTA	COROLLA	1.8L 4, auto	Bin 5 / ULEV II	39.1
TOYOTA	COROLLA	1.8L 4, manual	Bin 5 / ULEV II	41.8
TOYOTA	MATRIX	1.8L 4, auto	Bin 5 / ULEV II	36.0
TOYOTA	MATRIX	1.8L 4, manual	Bin 5 / ULEV II	38.2
TOYOTA	PRIUS	1.5L 4, auto	Bin 3 / SULEV II	65.8

Table A2 – MY 2005 Light Trucks Eligible for Purchase

Make	Model	Specifications	Emission Certification	Combined Fuel Economy
FORD	ESCAPE	2.3L 4, auto	Bin 5 / LEV II	27.1
FORD	ESCAPE	2.3L 4, manual	Bin 5 / LEV II	31.0
FORD	ESCAPE	2.3L 4, manual 4wd	Bin 5 / LEV II	27.8
FORD	ESCAPE HEV	2.3L 4, auto	Bin 4 / SULEV II	39.5
FORD	ESCAPE HEV	2.3L 4, auto 4wd	Bin 4 / SULEV II	36.7
FORD	FREESTYLE	3.0L 6, auto	Bin 5 / LEV II	26.5
HONDA	CR-V	2.4L 4, auto	Bin 5 / LEV II	29.7
HONDA	CR-V	2.4L 4, auto 4wd	Bin 5 / LEV II	28.2
HONDA	CR-V	2.4L 4, manual 4wd	Bin 5 / LEV II	26.9
HONDA	ODYSSEY	3.5L 6, auto	Bin 5 / ULEV II	26.4
JEEP	LIBERTY	2.4L 4, manual	Bin 5 / LEV II	26.6
MAZDA	TRIBUTE	2.3L 4, auto	Bin 5 / LEV II	27.1
MAZDA	TRIBUTE	2.3L 4, manual	Bin 5 / LEV II	31.0
MAZDA	TRIBUTE	2.3L 4, manual 4wd	Bin 5 / ULEV II	27.8
MERCURY	MARINER	2.3L 4, auto	Bin 5 / LEV II	27.7
SATURN	VUE	3.5L 6, auto	Bin 5 / ULEV II	26.5
SUBARU	BAJA	2.5L 4, auto awd	Bin 5 / LEV II	27.8
SUBARU	BAJA	2.5L 4, manual awd	Bin 5 / LEV II	27.5
SUBARU	FORESTER	2.5L 4, auto awd	Bin 5 / LEV II	28.9
SUBARU	FORESTER	2.5L 4, manual awd	Bin 5 / LEV II	29.6
TOYOTA	TACOMA	2.7L 4, auto	LEV II	26.9
TOYOTA	TACOMA	2.7L 4, manual	LEV II	26.7

Table A3— MY 2007 Cars Eligible for Purchase

Make	Model	Specifications	Emission Certification	Combined Fuel Economy
CHEVROLET	AVEO	1.6L 4, manual	ULEV II / Bin 5	35.5
CHEVROLET	AVEO 5	1.6L 4, manual	ULEV II / Bin 5	35.5
CHEVROLET	COBALT	2.2L 4, manual	PZEV	35.1
CHEVROLET	COBALT	2.2L 4, manual	Bin 5 / LEV II	35.1
DODGE	CALIBER	1.8L 4, manual	Bin 5	34.5
DODGE	CALIBER	1.8L 4, manual	LEV II	34.5
FORD	FOCUS	2.0L 4, manual	PZEV / Bin 3	36.0
FORD	FOCUS	2.0L 4, auto	PZEV / Bin 3	34.5
FORD	FOCUS	2.0L 4, manual	Bin 4	36.0
FORD	FOCUS	2.0L 4, auto	Bin 4	34.5
FORD	FOCUS WAGON	2.0L 4, manual	PZEV / Bin 3	36.0
FORD	FOCUS WAGON	2.0L 4, auto	PZEV / Bin 3	34.5
FORD	FOCUS WAGON	2.0L 4, manual	Bin 4	36.0
FORD	FOCUS WAGON	2.0L 4, auto	Bin 4	34.5
HONDA	ACCORD HYBRID	3.0L 6, auto	PZEV / Bin 2	36.3
HONDA	CIVIC	1.8L 4, manual	ULEV II / Bin 5	39.1
HONDA	CIVIC	1.8L 4, auto	ULEV II / Bin 5	39.0
HONDA	CIVIC GX	1.8L 4, auto [CNG]	PZEV / Bin 2	37.5
HONDA	CIVIC HYBRID	1.3L 4, auto CVT	PZEV / Bin 2	58.8
HONDA	FIT	1.5L 4, manual	Bin 5 / LEV II	41.1
HONDA	FIT	1.5L 4, auto	Bin 5 / LEV II	40.0
HONDA	FIT	1.5L 4, auto stk	Bin 5 / LEV II	39.3
HYUNDAI	ACCENT	1.6L 4, manual	ULEV II / Bin 5	38.9
HYUNDAI	ACCENT	1.6L 4, auto	ULEV II / Bin 5	36.7
HYUNDAI	ELANTRA	2.0L 4, auto	PZEV	36.9
HYUNDAI	ELANTRA	2.0L 4, auto	Bin 4 / ULEV II	36.9
HYUNDAI	ELANTRA	2.0L 4, manual	Bin 4 / ULEV II	36.3
KIA	RIO/RIO5	1.6L 4, manual	ULEV II / Bin 5	39.0
KIA	RIO/RIO5	1.6L 4, auto	ULEV II / Bin 5	38.0
KIA	SPECTRA/SPECTRA5	2.0L 4, auto	PZEV	35.0
KIA	SPECTRA/SPECTRA5	2.0L 4, auto	Bin 4 / ULEV II	35.0
MAZDA	3	2.0L 4, manual	PZEV	36.2
MAZDA	3	2.0L 4, manual	Bin 5	36.2
MINI	COOPER CONVERTIBLE	1.6L 4, manual [P]	Bin 5 / LEV II	34.4
MITSUBISHI	LANCER	2.0L 4, manual	ULEV II / Bin 5	34.9
NISSAN	ALTIMA	2.5L 4, manual	PZEV	35.0
NISSAN	ALTIMA	2.5L 4, manual	Bin 5 / LEV II	35.0
NISSAN	ALTIMA HYBRID	2.5L 4, auto CVT	PZEV	46.7
NISSAN	SENTRA	2.0L 4, auto CVT	ULEV II / Bin 5	37.1
NISSAN	SENTRA	2.0L 4, manual	ULEV II / Bin 5	35.8
NISSAN	VERSA	1.8L 4, auto CVT	ULEV II / Bin 5	37.7
NISSAN	VERSA	1.8L 4, manual	ULEV II / Bin 5	37.3
NISSAN	VERSA	1.8L 4, auto	ULEV II / Bin 5	35.9
PONTIAC	G5	2.2L 4, manual	PZEV	35.1
PONTIAC	G5	2.2L 4, manual	Bin 5 / LEV II	35.1

Make	Model	Specifications	Emission Certification	Combined Fuel Economy
PONTIAC	VIBE	1.8L 4, manual	ULEV II / Bin 5	38.4
PONTIAC	VIBE	1.8L 4, auto	ULEV II / Bin 5	36.2
SATURN	ION	2.2L 4, manual	PZEV	35.1
SATURN	ION	2.2L 4, manual	Bin 5 / LEV II	35.1
TOYOTA	CAMRY HYBRID	2.4L 4, auto CVT	PZEV / Bin 3	45.9
TOYOTA	COROLLA	1.8L 4, manual	ULEV II / Bin 5	41.8
TOYOTA	COROLLA	1.8L 4, auto	ULEV II / Bin 5	39.1
TOYOTA	MATRIX	1.8L 4, manual	ULEV II / Bin 5	38.2
TOYOTA	MATRIX	1.8L 4, auto	ULEV II / Bin 5	36.2
TOYOTA	PRIUS	1.5L 4, auto CVT	PZEV / Bin 3	65.8
TOYOTA	YARIS	1.5L 4, manual	ULEV II / Bin 5	43.0
TOYOTA	YARIS	1.5L 4, auto	ULEV II / Bin 5	42.3

Table A4 — MY 2007 Light Trucks Eligible for Purchase

Make	Model	Specifications	Emission Certification	Combined Fuel Economy
FORD	ESCAPE	2.3L 4, manual	ULEV II / Bin 5	30.3
FORD	ESCAPE	2.3L 4, manual 4wd	ULEV II / Bin 5	28.5
FORD	ESCAPE	2.3L 4, auto	Bin 5 / LEV II	28.1
FORD	ESCAPE HYBRID	2.3L 4, auto CVT	PZEV / Bin 3	40.6
FORD	ESCAPE HYBRID	2.3L 4, auto CVT 4wd	PZEV / Bin 3	36.5
FORD	RANGER	2.3L 4, manual	ULEV II	30.3
FORD	RANGER	2.3L 4, manual	Bin 5	30.3
HONDA	CR-V	2.4L 4, auto	ULEV II / Bin 5	29.9
HONDA	CR-V	2.4L 4, auto 4wd	ULEV II / Bin 5	28.5
HONDA	ELEMENT	2.4L 4, auto	Bin 5 / LEV II	28.3
HYUNDAI	TUCSON	2.0L 4, manual	ULEV II / Bin 5	28.9
HYUNDAI	TUCSON	2.0L 4, auto	ULEV II / Bin 5	28.2
JEEP	COMPASS	2.4L 4, manual 4wd	ULEV II	31.6
JEEP	COMPASS	2.4L 4, manual 4wd	Bin 5	31.6
JEEP	COMPASS	2.4L 4, auto CVT 4wd	ULEV II	29.1
JEEP	COMPASS	2.4L 4, auto CVT	Bin 5	30.0
JEEP	COMPASS	2.4L 4, auto CVT 4wd	Bin 5	29.1
JEEP	PATRIOT	2.4L 4, manual 4wd	Bin 5	31.6
JEEP	PATRIOT	2.4L 4, auto CVT 4wd	Bin 5	29.1
KIA	SPORTAGE	2.0L 4, manual	ULEV II / Bin 5	28.9
KIA	SPORTAGE	2.0L 4, auto	ULEV II / Bin 5	28.1
LEXUS	RX 400h	3.3L 6, auto CVT [P]	SULEV II / Bin 3	35.0
LEXUS	RX 400h	3.3L 6, auto CVT 4wd [P]	SULEV II / Bin 3	34.3
MAZDA	B2300	2.3L 4, manual	ULEV II	30.3
MAZDA	B2300	2.3L 4, manual	Bin 5	30.3
MERCURY	MARINER	2.3L 4, auto	Bin 5 / LEV II	28.1
MERCURY	MARINER HYBRID	2.3L 4, auto CVT 4wd	PZEV / Bin 3	36.5
SATURN	VUE	2.2L 4, manual	Bin 5 / LEV II	30.3
SATURN	VUE	2.2L 4, auto	Bin 5 / LEV II	29.8
SATURN	VUE HYBRID	2.4L 4, auto	Bin 5 / LEV II	34.0
SUBARU	FORESTER 2.5 X / SPORTS 2.5 X (incl. PREM)	2.5L 4, auto Awd	PZEV	28.8
SUBARU	FORESTER 2.5 X / SPORTS 2.5 X (incl. PREM)	2.5L 4, manual Awd	PZEV	28.7
SUBARU	FORESTER 2.5 X / SPORTS 2.5 X (incl. PREM)	2.5L 4, auto Awd	Bin 5 / LEV II	28.8
SUBARU	FORESTER 2.5 X / SPORTS 2.5 X (incl. PREM)	2.5L 4, manual Awd	Bin 5 / LEV II	28.7
SUBARU	FORESTER 2.5 X L.L.BEAN	2.5L 4, auto Awd	PZEV	28.8
SUBARU	FORESTER 2.5 X L.L.BEAN	2.5L 4, auto Awd	Bin 5 / LEV II	28.8
TOYOTA	HIGHLANDER HYBRID	3.3L 6, auto CVT	SULEV II / Bin 3	35.0
TOYOTA	HIGHLANDER HYBRID	3.3L 6, auto CVT 4wd	SULEV II / Bin 3	34.3
TOYOTA	RAV4	2.4L 4, auto	ULEV II / Bin 5	30.5

Make	Model	Specifications	Emission Certification	Combined Fuel Economy
TOYOTA	RAV4	2.4L 4, auto 4wd	ULEV II / Bin 5	29.0
TOYOTA	RAV4	3.5L 6, auto	ULEV II / Bin 5	28.9
TOYOTA	RAV4	3.5L 6, auto 4wd	ULEV II / Bin 5	27.9
TOYOTA	TACOMA	2.7L 4, manual	Bin 5 / LEV II	29.4
TOYOTA	TACOMA	2.7L 4, manual	Bin 5 / LEV II	29.4

Table A5 –MY 2009 Cars Eligible for Purchase

Make	Model	Specifications	Emission Certification	Combined Fuel Economy
CHEVROLET	AVEO	1.6L 4, manual	Bin 4/5	39.7
CHEVROLET	AVEO	1.6L 4, auto	Bin 4/5	37.5
CHEVROLET	AVEO 5	1.6L 4, manual	Bin 4/5	39.7
CHEVROLET	AVEO 5	1.6L 4, auto	Bin 4/5	37.5
CHEVROLET	COBALT	2.2L 4, auto	SULEV II / Bin 5	35.9
CHEVROLET	COBALT XFE	2.2L 4, manual	SULEV II / Bin 5	39.3
CHEVROLET	MALIBU HYBRID	2.4L 4, auto	Bin 5 / LEV II	38.6
DODGE	CALIBER	1.8L 4, manual	Bin 5 / LEV II	35.3
FORD	FOCUS FWD	2.0L 4, manual	SULEV II / Bin 3	37.0
FORD	FOCUS FWD	2.0L 4, manual	Bin 4	36.0
HONDA	CIVIC	1.8L 4, manual	ULEV II / Bin 5	39.2
HONDA	CIVIC	1.8L 4, auto	ULEV II / Bin 5	39.1
HONDA	CIVIC	1.8L 4, auto [CNG]	ULEV II / Bin 5	37.5
HONDA	CIVIC HYBRID	1.3L 4, auto	PZEV / Bin 2	58.8
HONDA	FIT	1.5L 4, auto	ULEV II / Bin 5	41.3
HONDA	FIT	1.5L 4, auto	ULEV II / Bin 5	39.8
HONDA	FIT	1.5L 4, manual	ULEV II / Bin 5	39.5
HYUNDAI	ACCENT	1.6L 4, manual	Bin 5	39.5
HYUNDAI	ACCENT	1.6L 4, auto	ULEV II / Bin 5	38.9
HYUNDAI	ELANTRA	2.0L 4, auto	SULEV II	36.8
HYUNDAI	ELANTRA	2.0L 4, manual	ULEV II / Bin 5	36.3
HYUNDAI	ELANTRA TOURING	2.0L 4, auto	ULEV II / Bin 5	34.5
HYUNDAI	ELANTRA TOURING	2.0L 4, manual	ULEV II / Bin 5	34.5
KIA	RIO	1.6L 4, manual	ULEV II / Bin 5	40.0
KIA	RIO	1.6L 4, auto	ULEV II / Bin 5	39.4
KIA	SPECTRA	2.0L 4, auto	ULEV II / Bin 5	35.3
MAZDA	MAZDA3	2.0L 4, manual	SULEV II / Bin 5	36.0
MERCEDES-BENZ	E320 BLUETEC	3.0L 6, auto [D]	Bin 5	34.7
MINI	MINI CLUBMAN	1.6L 4, manual [P]	ULEV II / Bin 5	42.5
MINI	MINI CLUBMAN	1.6L 4, auto [P]	ULEV II / Bin 5	38.4
MINI	MINI CLUBMAN S	1.6L 4, manual [P]	ULEV II / Bin 5	38.8
MINI	MINI CLUBMAN S	1.6L 4, auto [P]	ULEV II / Bin 5	35.0
MINI	MINI COOPER	1.6L 4, manual [P]	ULEV II / Bin 5	42.5
MINI	MINI COOPER	1.6L 4, auto [P]	ULEV II / Bin 5	38.4
MINI	MINI COOPER S	1.6L 4, manual [P]	ULEV II / Bin 5	38.8
MINI	MINI COOPER S	1.6L 4, auto [P]	ULEV II / Bin 5	35.0
MINI	MINI JOHN COOPER WORKS	1.6L 4, manual [P]	Bin 5 / LEV II	38.8
MINI	MINI JOHN COOPER WORKS CLUBM	1.6L 4, manual [P]	Bin 5 / LEV II	38.8
MINI	MINI JOHN COOPER WORKS CONV	1.6L 4, manual [P]	Bin 5 / LEV II	38.8
NISSAN	ALTIMA	2.5L 4, manual	PZEV	34.9
NISSAN	ALTIMA COUPE	2.5L 4, manual	PZEV	34.9
NISSAN	ALTIMA HYBRID	2.5L 4, auto	PZEV	46.7

Make	Model	Specifications	Emission Certification	Combined Fuel Economy
NISSAN	SENTRA	2.5L 4, auto	Bin 5 / LEV II	34.7
NISSAN	VERSA	1.8L 4, auto	ULEV II / Bin 5	38.9
NISSAN	VERSA	1.8L 4, manual	ULEV II / Bin 5	37.3
NISSAN	VERSA	1.8L 4, auto	ULEV II / Bin 5	35.8
PONTIAC	G3/WAVE	1.6L 4, manual	ULEV II / Bin 5	39.7
PONTIAC	G3/WAVE	1.6L 4, auto	Bin 5	37.5
PONTIAC	G3/WAVE 5	1.6L 4, manual	Bin 5	39.7
PONTIAC	G3/WAVE 5	1.6L 4, auto	Bin 4/5	37.5
PONTIAC	G5	2.2L 4, manual	SULEV II / Bin 5	39.3
PONTIAC	G5	2.2L 4, auto	Bin 5 / LEV II	35.9
PONTIAC	G5 GT	2.2L 4, manual	SULEV II / Bin 5	39.3
PONTIAC	G5 GT	2.2L 4, auto	Bin 5 / LEV II	35.9
PONTIAC	G5 XFE	2.2L 4, manual	SULEV II / Bin 5	39.3
PONTIAC	VIBE	1.8L 4, manual	ULEV II / Bin 5	37.9
PONTIAC	VIBE	1.8L 4, auto	ULEV II / Bin 5	37.1
SATURN	ASTRA 2D HATCHBACK	1.8L 4, manual	ULEV II / Bin 5	36.0
SATURN	ASTRA 2D HATCHBACK	1.8L 4, auto	ULEV II / Bin 5	35.2
SATURN	ASTRA 4DR HATCHBACK	1.8L 4, manual	ULEV II / Bin 5	36.0
SATURN	ASTRA 4DR HATCHBACK	1.8L 4, auto	ULEV II / Bin 5	35.2
SATURN	AURA HYBRID	2.4L 3, auto	Bin 5 / LEV II	38.6
TOYOTA	CAMRY HYBRID	2.4L 4, auto	PZEV / Bin 3	45.9
TOYOTA	COROLLA	1.8L 4, auto	ULEV II / Bin 5	40.3
TOYOTA	COROLLA	1.8L 4, manual	ULEV II / Bin 5	39.7
TOYOTA	COROLLA MATRIX	1.8L 4, manual	ULEV II / Bin 5	37.8
TOYOTA	COROLLA MATRIX	1.8L 4, auto	ULEV II / Bin 5	36.9
TOYOTA	PRIUS	1.5L 4, auto	PZEV / Bin 3	65.8
TOYOTA	SCION XD	1.8L 4, manual	LEV II / Bin 8	39.3
TOYOTA	SCION XD	1.8L 4, auto	LEV II / Bin 8	37.9
TOYOTA	YARIS	1.5L 4, manual	ULEV II/ Bin 5	42.7
TOYOTA	YARIS	1.5L 4, auto	ULEV II / Bin 5	41.9
VOLKSWAGEN	JETTA	2.0L 4, manual [D]	Bin 5	45.5
VOLKSWAGEN	JETTA	2.0L 4, auto [D]	Bin 5	45.0
VOLKSWAGEN	JETTA SPORTWAGEN	2.0L 4, manual [D]	PZEV	45.5
VOLKSWAGEN	JETTA SPORTWAGEN	2.0L 4, auto [D]	PZEV	45.0

Table A6 –MY 2009 light trucks eligible for purchase

Make	Model	Specifications	Emission Certification	Combined Fuel Economy
CHEVROLET	HHR FWD	2.2L 4, manual	Bin 4	34.1
CHEVROLET	HHR FWD	2.4L 4, manual	Bin 5	32.6
CHEVROLET	HHR FWD	2.2L 4, auto	Bin 4	32.5
CHEVROLET	HHR FWD	2.4L 4, auto	Bin 5	32.1
CHEVROLET	HHR FWD	2.0L 4, manual	Bin 5 / LEV II	31.5
CHEVROLET	HHR FWD	2.0L 4, auto	Bin 5 / LEV II	29.6
CHEVROLET	HHR PANEL FWD	2.2L 4, manual	Bin 4	34.1
CHEVROLET	HHR PANEL FWD	2.4L 4, manual	Bin 5	32.6
CHEVROLET	HHR PANEL FWD	2.2L 4, auto	Bin 4	32.5
CHEVROLET	HHR PANEL FWD	2.4L 4, auto	Bin 5	32.1
CHEVROLET	HHR PANEL FWD	2.0L 4, manual	Bin 5 / LEV II	31.5
CHEVROLET	HHR PANEL FWD	2.0L 4, auto	Bin 5 / LEV II	29.6
CHRYSLER	PT CRUISER	2.4L 4, manual	Bin 5 / LEV II	30.3
FORD	ESCAPE FWD	2.5L 4, manual	ULEV II / Bin 5	32.2
FORD	ESCAPE FWD	2.5L 4, auto	ULEV II / Bin 5	30.4
FORD	ESCAPE HYBRID 4WD	2.5L 4, auto	SULEV II / Bin 3	37.3
FORD	ESCAPE HYBRID FWD	2.5L 4, auto	SULEV II / Bin 3	44.2
FORD	RANGER 2WD	2.3L 4, manual	Bin 5	30.3
HONDA	CR-V 2WD	2.4L 4, auto	ULEV II / Bin 5	29.7
HYUNDAI	TUCSON 2WD	2.0L 4, manual	ULEV II / Bin 5	29.1
JEEP	COMPASS 2WD	2.4L 4, manual	ULEV II / Bin 5	33.1
JEEP	COMPASS 2WD	2.0L 4, auto	ULEV II / Bin 5	32.4
JEEP	COMPASS 2WD	2.4L 4, auto	SULEV II / Bin 5	30.0
JEEP	COMPASS 4WD	2.4L 4, manual	ULEV II / Bin 5	32.5
JEEP	COMPASS 4WD	2.4L 4, auto	ULEV II / Bin 5	29.1
JEEP	PATRIOT 2WD	2.4L 4, manual	ULEV II / Bin 5	33.1
JEEP	PATRIOT 2WD	2.0L 4, auto	SULEV II / Bin 5	32.4
JEEP	PATRIOT 2WD	2.4L 4, auto	SULEV II / Bin 5	30.0
JEEP	PATRIOT 4WD	2.4L 4, manual	ULEV II / Bin 5	32.5
JEEP	PATRIOT 4WD	2.4L 4, auto	ULEV II / Bin 5	29.1
JEEP	PATRIOT 4WD	2.4L 4, auto	ULEV II / Bin 5	29.1
KIA	SPORTAGE 2WD	2.0L 4, manual	ULEV II / Bin 5	29.0
MAZDA	B2300 2WD	2.3L 4, manual	ULEV II / Bin 5	30.3
MAZDA	TRIBUTE FWD	2.5L 4, manual	ULEV II / Bin 5	32.2
MAZDA	TRIBUTE FWD	2.5L 4, auto	ULEV II / Bin 5	30.4
MAZDA	TRIBUTE HYBRID 2WD	2.5L 4, auto	SULEV II / Bin 3	44.2
MAZDA	TRIBUTE HYBRID 4WD	2.5L 4, auto	SULEV II / Bin 3	37.3
MERCURY	MARINER FWD	2.5L 4, auto	ULEV II / Bin 5	30.4
MERCURY	MARINER HYBRID 4WD	2.5L 4, auto	SULEV II / Bin 3	37.3
MERCURY	MARINER HYBRID FWD	2.5L 4, auto	SULEV II / Bin 3	44.2
NISSAN	ROGUE AWD	2.5L 4, auto	Bin 5 / LEV II	30.6
NISSAN	ROGUE FWD	2.5L 4, auto	Bin 5 / LEV II	32.3
SATURN	VUE HYBRID	2.4L 4, auto	Bin 4/5	36.7
SUBARU	FORESTER AWD	2.5L 4, auto	Bin 5 / LEV II	29.2
SUBARU	FORESTER AWD	2.5L 4, manual	Bin 5 / LEV II	29.1

Make	Model	Specifications	Emission Certification	Combined Fuel Economy
SUBARU	OUTBACK WAGON AWD	2.5L 4, auto	Bin 5 / LEV II	29.2
SUBARU	OUTBACK WAGON AWD	2.5L 4, manual	Bin 5 / LEV II	29.1
TOYOTA	HIGHLANDER HYBRID 4WD	3.3L 6, auto	SULEV II / Bin 3	35.2
TOYOTA	RAV4 2WD	2.5L 4, auto	ULEV II / Bin 5	31.8
TOYOTA	RAV4 2WD	3.5L 6, auto	ULEV II / Bin 5	28.9
TOYOTA	RAV4 4WD	2.5L 4, auto	Bin 5 / LEV II	31.0
TOYOTA	TOYOTA TACOMA 2WD	2.7L 4, auto	ULEV II / Bin 5	29.5