Vehicle Comparison Strategy:

Eligibility for a High Occupancy Vehicle (HOV) Facility Exemption Based on the Energy-Effiecient Provision of the 2005 Transportation Act

Draft Technical Support Document

United States
Environmental Protection
Agency

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Compliance and Innovative Strategies Division
Office of Transportation and Air Quality
U.S. Environmental Protection Agency

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Chapter 1: Background on the Safe, Accountable, Flexible Efficient Transportation Equity Act: A Legacy for Users

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), also known as the 2005 Transportation Act, was enacted on August 10, 2005. SAFETEA-LU, which is codified at 23 United States Code (U.S.C.) 166, concerns the Federal surface transportation programs for highways, highway safety, and transit for a 5-year period covering 2005-2009. Certain provisions of 23 U.S.C. 166 addresses the High Occupancy Vehicle (HOV) facility programs that some states have in place.

In general, for vehicles to operate in HOV facilities, they must have two or more occupants per vehicle. 23 U.S.C. 166 provides some exemptions to this occupancy requirement for "inherently low emitting" vehicles and other "low emission and energy-efficient" vehicles. Thus, 23 U.S.C. 166 allows, but does not require, a new occupancy exemption for the use of "low emission and energy-efficient" vehicles that do not meet the minimum occupancy requirement in (HOV) facilities. States with existing HOV facilities may optionally adopt this exemption. If they choose to adopt the HOV occupancy exemption for low emission and energy-efficient vehicles, states must commit to update the eligibility and definition of low emission and energy-efficient vehicles to be consistent and comply with the methodology that we to present in the Final Rulemaking. Per 23 U.S.C. 166, the exemption for the use of low emission and energy-efficient vehicles in HOV facilities expires September 30, 2009.

23 U.S.C. 166 directs EPA to provide a rulemaking establishing the criteria required to certify, or designate, a vehicle as a low emission and energy-efficient vehicle

that may be eligible for use in HOV facilities. 23 U.S.C. 166 defines a low emission vehicle as one that is certified to EPA's Tier 2 emissions standards. In the Preamble to the Notice of Proposed Rulemaking (NPRM), we propose to further refine the definition of a low emission vehicle as one that must comply with Tier 2 Bin 5 or better (Bins 5, 4, 3, 2 and 1). 23 U.S.C. 166 defines an energy-efficient vehicle as one operating on an alternative fuel (as discussed in the Preamble to the NPRM), or one that is:

> "...to have achieved not less than a 50-percent increase in city fuel economy or not less than a 25-percent increase in combined city/highway fuel economy…relative to a comparable vehicle that is an internal combustion gasoline fueled vehicle (other than a vehicle that has propulsion energy from onboard hybrid sources)."[1]

23 U.S.C. 166 also directs EPA to establish guidelines and procedures for making the vehicle comparisons and performance calculations needed to determine an energy-efficient vehicle.

This Draft Technical Support Document describes the various vehicle comparison strategies which were considered for purposes of certifying an energy-efficient vehicle based on the prescribed fuel economy percent increase. Ultimately, one comparison strategy is recommended to be codified through the Federal rulemaking process, and this comparison strategy is described in further detail in this document.

Chapter 2: Discussion of Potential Vehicle Comparison Strategies

[1] 23 U.S.C. 166 (f)(3)(B)(i).

As discussed in the previous section, 23 U.S.C. 166 defines an energy-efficient vehicle as one operating on an alternative fuel or one that achieves a 50-percent or better increase in city fuel economy or a 25-percent increase in combined city/highway fuel economy relative to a comparable gasoline-fueled vehicle, excluding hybrids, as a basis of comparison. This Draft Technical Support Document explains the process we used to 1) select a vehicle comparison strategy, 2) define what is considered to be a comparable gasoline-fueled vehicle, and 3) describe the guidelines and procedures needed to perform the calculations for comparing fuel economy values.

23 U.S.C. 166 provided some guidance that indicates the desired outcome of EPA's analyses (e.g., would not degrade HOV facilities, would provide incentives for purchase and use of hybrid and other energy efficient vehicles). 23 U.S.C. 166 also provided EPA with some guidance on a "comparable" vehicle, by referencing 49 U.S.C 32908(b), Fuel Economy Labeling Requirements and Contents. Today's HOV proposal for making fuel economy comparisons and performance calculations is in accordance with 49 U.S.C 32908(b) because the fundamental fuel economy values that form the basis of comparison are obtained from the same tests as those used for fuel economy labeling purposes. The city fuel economy and combined city-highway fuel economy comparisons that are specified in 23 U.S.C. 166 are based on the same city and city-highway fuel economy that is determined by EPA regulations in the Code of Federal Regulations (CFR) under 40 CFR Part 600. This assures that automobile manufacturers would not need to perform additional fuel economy tests for the purpose of determining if their vehicles would qualify for HOV facility exemptions.

Furthermore, we determined three goals for a desirable fuel economy comparison methodology. First, the method should not result in a large number of vehicles qualifying for the exemption to prevent HOV lane degradation. Second, the method should be based on data and/or a method for analyzing data that is readily available to the public or to the state administering HOV facility requirements. Third, the vehicles that would qualify should be construed by a reasonable person as being truly "energy efficient" per the intent of Congress. We considered a variety of methods, and analyzed whether or not they met the above three goals. The following methods are discussed in detail below:

1. Hybrid-to-Gasoline Vehicle Comparison
2. Inertia Weight Class
3. Hybrid-to-“Best in Class” Vehicle Comparison

2.1 Hybrid-to-Gasoline Vehicle Comparison Method

2.1.1 How does EPA propose to develop baseline fuel economy values for the hybrid-to-gasoline vehicle comparison methodology?

In this method, hybrid vehicles would be compared to their gasoline namesake counterparts (e.g. the Ford Escape Hybrid would be compared to the Ford Escape gasoline model).

However, there are some hybrids that do not have similar gasoline counterparts (e.g. the Honda Insight and the Toyota Prius). For those vehicles, EPA is proposing that the comparison be based on gasoline vehicles within the same comparable class as used EPA’s annual Fuel Economy Guide, which is jointly published by EPA and DOE. The median unadjusted fuel economy of all the gasoline vehicles in that class would be determined, and then compared against the hybrid's fuel economy. This comparison

would be done separately for each model year. For example, the Honda Insight is classified as a “two-seater”. For each model year, we would identify all of the “two-seater” gasoline vehicles and determine the median unadjusted city and unadjusted combined city-highway fuel economy values. These fuel economy values would form the baseline fuel economy values to be used for the Honda Insight comparison. As fuel economy can vary from year to year, these comparisons must be made separately for each model year.

2.1.2. How is the comparison determined, based on a percent increase in vehicle fuel economy value?

We are proposing the following process for making a fuel economy comparison using the hybrid-to-gasoline vehicle comparison methodology:

1) Determine the list of all hybrid vehicles (separately for each model year) emission-certified by EPA prior to September 30, 2009.

2) For hybrid vehicles with a similar gasoline counterpart, compare the unadjusted city and unadjusted combined city-highway fuel economy values to the similar gasoline counterpart.

3) For hybrid vehicles with no similar gasoline counterpart, calculate the median unadjusted city and/or unadjusted combined city-highway fuel economy values for all gasoline vehicles in the same EPA comparable vehicle class and compare the hybrid vehicle fuel economy values to the median unadjusted city fuel economy value and the unadjusted city-highway value for the comparison gasoline vehicle.

4) Evaluate the results according to the following criteria:

- If the candidate hybrid vehicle's city fuel economy is 50 percent grater that the city fuel economy value of its gasoline counterpart then the vehicle would qualify as energy-efficient;
- If the candidate hybrid vehicle's combined city-highway fuel economy is 25 percent greater than the combined city/fuel economy of its gasoline counter part, then the vehicle would qualify as energy-efficient; or
- Conversely, if the hybrid vehicles do not meet either of these required fuel economy thresholds relative to their gasoline counterparts, then the vehicle would not qualify as energy-efficient.

Based on the low emission and energy-efficient vehicle criteria using the hybrid-to-gasoline vehicle comparison methodology described above, the potential lists of vehicles eligible for an HOV occupancy exemption are shown in Chapter 3 below.

2.2 Inertia Weight Class Method

2.2.1 Overview

The inertia weight classes used in this methodology are taken from the Alternative Motor Vehicle Tax Credit portion of the Energy Policy Act of 2005 (2005 Energy Act).[2] The 2005 Energy Act specifies 14 of these classes, categorized separately for passenger cars and light trucks, as follows: 1500/1750, 2000, 2250, 2500, 2750, 3000, 3500, 4000, 4500, 5000, 5500, 6000, 6500, and 7000/8500 lbs. In addition to being referred to in the 2005 Energy Act, these same inertia weight classes are also codified by EPA regulations at 40 CFR 86.129-94. EPA defines inertia weight

[2] Energy Policy Act of 2005 [Public Law 109-58, August 8, 2005].

class as the class into which a vehicle is grouped for testing purposes based on its loaded vehicle weight (nominal empty vehicle weight plus 300 pounds (lbs.) used for cars and for light-duty trucks up through 6000 lbs. gross vehicle weight rating (GVWR)) or adjusted loaded vehicle weight (average of nominal empty weight and GVWR used for light-duty trucks greater than 6000 lbs. GVWR).

The 2005 Energy Act also designates associated baseline "2002 model year" city fuel economy values, based on a sales-weighted harmonic average of the unadjusted city fuel economy for the vehicle type (car or truck) for the purposes of tax credit generation. We believe it would be appropriate to apply this same method for purposes of determining vehicles that would qualify for HOV exemptions, since the Transportation Act and 2005 Energy Act both intend to offer incentives to increase the sales and use of energy-efficient vehicles, including hybrid and diesel technologies.[3] 23 U.S.C. 166 offers a commuting incentive, that is, the use of HOV facilities, for vehicles that do not meet the minimum occupancy requirement and the 2005 Energy Act offers a motor vehicle tax credit based on fuel economy, technology, and inertia weight. However, regardless of this consistent rationale, the inertia weight class methodology does not necessarily mean that a vehicle that is eligible for a tax credit would also eligible for an HOV occupancy exemption or vice versa.

While the 2005 Energy Act provides baseline city fuel economy values, which we are proposing to adopt for the city fuel economy provision in 23 U.S.C. 166, 23 U.S.C. 166 also provides criteria for a combined city/highway fuel economy. We developed the 2002 baseline values for the combined city/highway fuel economy for each inertia weight class and vehicle type utilizing the same method - a sales-weighted harmonic

[3] 23 U.S.C. 166 (f)(5)(B)(c).

average - as the baseline city fuel economy values. These values were then considered the baseline fuel economy values for a comparable gasoline vehicle.

Inertia weight classes are also codified by EPA regulations at 40 CFR 86.129-94. Inertia weight class is the class into which a vehicle is grouped for testing purposes based on its loaded vehicle weight (nominal empty vehicle weight plus 300 lbs. used for cars and for light-duty trucks up through 6000 lbs. GVWR) or adjusted loaded vehicle weight (average of nominal empty weight and GVWR used for light-duty trucks greater than 6000 lbs. GVWR).

It should be noted that while a vehicle would have the same inertia weight for the purposes of applying for tax credits and an HOV occupancy exemption, the same vehicle may not be eligible for both. Other factors that would influence a vehicle's potential for a tax credit and an HOV occupancy exemption include: availability of tax credit based on an imposed cap of 60,000 vehicles per manufacturer; the vehicle's emission certification; the availability of HOV facilities within a state; and the stringency of a State's HOV occupancy exemption given that the statute allows states the option to make the fuel economy provisions codified by EPA more stringent.

2.2.2 Baseline Fuel Economy

The 2005 Energy Act designates baseline city fuel economy values in miles per gallon (mpg) separately for cars and trucks. These values are defined for each inertia weight class to which a vehicle's fuel economy value is compared to determine eligibility for the tax credit. These baseline city fuel economy values are the sales-weighted harmonic averages of unadjusted city fuel economy for all model year 2002 vehicles within each inertia weight class. The use of an unadjusted fuel economy value, besides

being the precedent set by the 2005 Energy Act as well as the Fuel Economy Trends Report, is important; the other option would be to utilize the adjusted fuel economy values, also known as the fuel economy label values. A Notice of Proposed Rulemaking[4] was recently issued that proposes changes to the methodology for adjusting the fuel economy label values; the adjusted fuel economy label values are displayed on vehicles at the time of sale and used in the Fuel Economy Guide and Green Vehicle Guide. Thus, it is likely that the adjustment calculations would change during the period of the HOV exemption program. Therefore, a methodology based on an adjusted value would have to be recalculated. The unadjusted fuel economy values would remain unchanged by the proposed rulemaking and would be the preferable option as a basis of comparison for the purposes of this proposal.

Since the baseline city fuel economy values are based on the 2002 model year in the 2005 Energy Act, these values are being proposed as the baseline for comparison for each model year until the end of the HOV exemption program on September 30, 2009. We believe that it is technically sound to apply the 2002 model year as an ongoing baseline since the data are based on gasoline-only vehicles, which have maintained a nearly consistent fuel economy over the years. For example, as noted in the Executive Summary of the Fuel Economy Trends Report for 1975 through 2004 model years:

> "Model year 2004 light-duty vehicles are estimated to average 20.8 miles per gallon (MPG). The MY2004 average is within the 20.6 to 20.9 mpg range that has occurred for the past eight years."[5]

[4] 71 FR 5426, February 9, 2006.
[5] Hellman, 2004.

While the example given applies specifically to model year 2004 vehicles, it also notes that the average has not changed much in the past eight years except for light truck fuel economy, which has increased for two years. This increase is likely due, at least in part, to higher light-truck CAFE standards Overall, fuel economy has been influenced by marginal changes in gasoline technology prior to the introduction of hybrid technology; this time period includes the 2002 data and shows that this model year would be relevant as a point of comparison for subsequent model years.

It is also preferable to use one model year as the ongoing baseline to avoid having to annually recalculate the baseline and to provide certainty for manufacturers, auto dealers, the public, and HOV administrators. Since the baseline is based on sales data, it is difficult to calculate a sales-weighted average early in a model year as data cannot be finalized until after the end of the model year. The benefits of an updated baseline are minimal since fuel economy has remained steady, and the administrative burden and loss of certainty are not worth minimal gains in accuracy. Finally, since the baseline fuel economy values are listed in the 2005 Energy Act as a basis of comparison, these numbers are considered codified and their use provides certainty with minimal loss of accuracy over the relatively short lifetime of the HOV exemption for energy-efficient vehicles.

2.2.2.1 Baseline City Fuel Economy

The baseline city fuel economy is generated from gasoline-only vehicles, excluding hybrids, from the 2002 model year. Thus the baseline city fuel economy values represent of a comparable gasoline vehicle within the same inertia weight class

as the candidate vehicle being compared. The baseline city fuel economy values, as listed in the 2005 Energy Act, are in Table 2-1, below.

Table 2-1: 2002 Baseline City Fuel Economy

Inertia Weight (lbs.)	Passenger Automobiles (mpg)	Light Trucks (mpg)
1500 or 1750	45.2	39.4
2000	39.6	35.2
2250	35.2	31.8
2500	31.7	29.0
2750	28.8	26.8
3000	26.4	24.9
3500	22.6	21.8
4000	19.8	19.4
4500	17.6	17.6
5000	15.9	16.1
5500	14.4	14.8
6000	13.2	13.7
6500	12.2	12.8
7000 to 8500	11.3	12.1

Reference: Energy Policy Act of 2005 (Public Law 109-58, August 8, 2005)

2.2.2.2 Baseline Combined City/Highway Fuel Economy

While 23 U.S.C. 166 prescribes fuel economy eligibility requirements based on the city and the combined city/highway fuel economy values, the 2005 Energy Act eligibility requirements for fuel economy are based solely on city fuel economy values. Today's proposal, therefore, must designate baseline fuel economy values for both city and combined city/highway fuel economy values. As a result, we calculated the sales-weighted harmonic average of the unadjusted combined city/highway fuel economy values for each inertia weight class separately for cars and trucks, again using the 2002 model year as the baseline.

Before performing the baseline fuel economy calculations for combined city/highway, we used the data set obtained for the 2002 model year to recalculate the city fuel economy baseline to ensure that the data and methodology for the proposal were consistent with the data and methodology used to calculate values presented in

the 2005 Energy Act. The calculated values for city fuel economy were near matches to those of the 2005 Energy Act, and hence we deemed the calculations appropriate for the purposes of calculating the baseline combined city/highway fuel economy values.

To perform the baseline calculations, we first separated the vehicles to remove any hybrids and any vehicles not fueled by gasoline, i.e., alternative fuels and diesel. Once we limited the vehicle population to conventional gasoline-fueled vehicles only, we further separated it into cars and trucks and then by inertia weight class, as listed below in Table 2-2. Finally, we calculated a sales-weighted harmonic average of the combined city/highway fuel economy for each inertia weight class within the data set using Equations 3-1 and 3-2, listed below. Equation 3-2 was used to calculate the sales-weighted harmonic average of fuel economy, mimicking how the baseline city fuel economy was determined.

Table 2-2: Inertia Weight Classes

Inertia Weight (lbs.)
1500 or 1750
2000
2250
2500
2750
3000
3500
4000
4500
5000
5500
6000
6500
7000 to 8500

Equation 2-1. Combined (City/highway) Fuel Consumption

$$\text{Combined City/Highway Fuel Consumption} = \frac{1}{\text{Unadjusted Combined Fuel Economy}}$$

Equation 2-2. Combined (City/highway) Sales Weighted Fuel Economy

$$\text{Sales - weighted Unadjusted Combined Fuel Economy} = \frac{\sum \text{Sales}}{\sum \left(\text{Sales} \times \text{Combined Fuel Consumption}\right)}$$

For both cars and trucks, some inertia weight classes were not represented by the given data set, and thus the associated combined city/highway fuel economy values for the missing inertia weight classes had to be extrapolated. We extrapolated the combined city/highway fuel economy values by plotting the combined city/highway fuel economy values against their associated inertia weight class. Using spreadsheet software, we fit a curve to the data, shown in Figures 2-1 and 2-2, shown below, and determined Equations 2-3 and 2-4, shown below, from the curves. Based on Equations 2-3 and 2-4, we calculated the combined city/highway values for all inertia weight classes to fit the curve. The resulting values for the baseline combined city/highway fuel economy are displayed in Table 2-3, shown below.

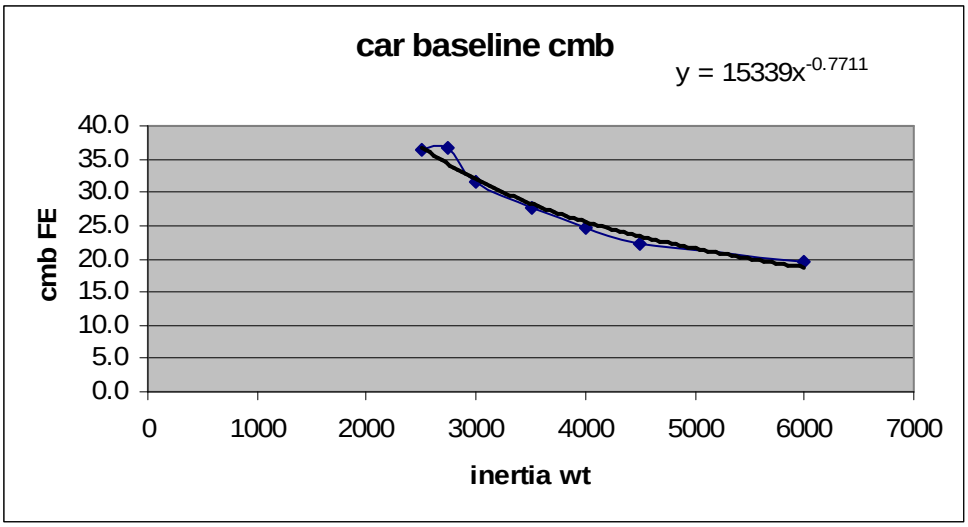

Figure 2-1. Determination of Baseline Combined Fuel Economy Values for Cars

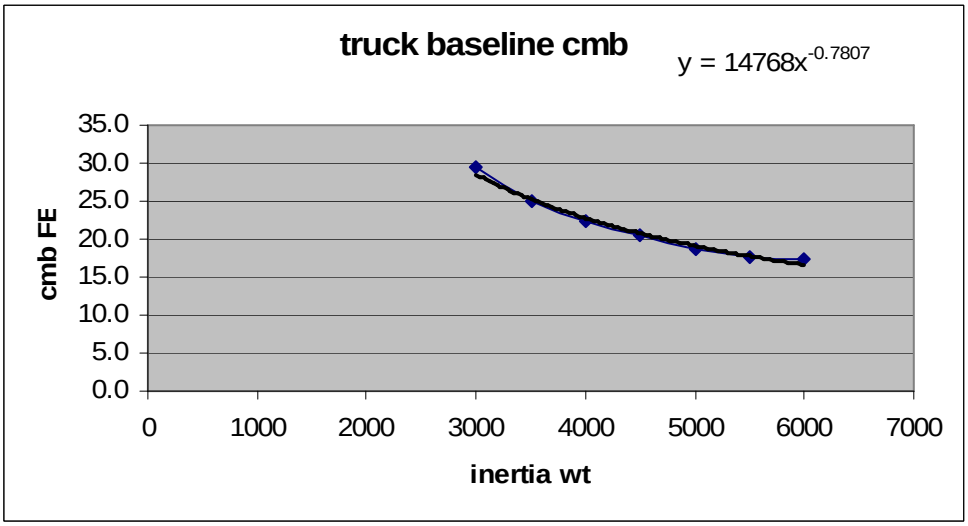

Figure 2-2. Determination of Baseline Combined Fuel Economy Values for Trucks

Equation 2-3. Baseline Combined City/Highway Fuel Economy for Light-Duty Vehicles

$$\text{Baseline Combined Fuel Economy} = 15339 \times \left(\text{Inertia Weight Class}^{-0.7711}\right)$$

Equation 2-4. Baseline Combined City/highway Fuel Economy for Light-Duty Trucks

$$\text{Baseline Combined Fuel Economy} = 14768 \times \left(\text{Inertia Weight Class}^{-0.7807}\right)$$

Table 2-3: 2002 Baseline Combined City/highway Fuel Economy

Inertia Weight (lbs.)	Passenger Automobiles (mpg)	Light Trucks (mpg)
1500 or 1750	48.4	43.4
2000	43.7	39.1
2250	39.9	35.7
2500	36.8	32.9
2750	34.2	30.5
3000	32.0	28.5
3500	28.4	25.3
4000	25.6	22.8
4500	23.4	20.8
5000	21.6	19.1
5500	20.0	17.8
6000	18.7	16.6
6500	17.6	15.6
7000 to 8500	16.6	14.7

2.2.3 Vehicle Comparison Strategy for Inertia Weight

Using the pre-defined inertia weight classes and baseline city fuel economy values from the 2005 Energy Act and the extrapolated baseline combined city/highway fuel economy values, fuel economy comparisons can be made to evaluate whether a candidate vehicle meets the established fuel economy percent increase criteria, 50-percent or better increase in city fuel economy or 25-percent or better increase in combined city/highway fuel economy.

We used Equation 2-4, shown below to calculate the percent increase in unadjusted fuel economy for all vehicles, according to their vehicle type, inertia weight class, and the associated baseline city and combined city/highway fuel economy values.

Equation 2-4: Percent Increase

$$\text{Percent Increase} = \frac{(\text{Unadjusted FE} - \text{2002 Baseline FE})}{\text{2002 Baseline FE}} \times 100$$

***FE = fuel economy**

After calculating the percent increase for the unadjusted city and unadjusted combined city/highway fuel economy values for each vehicle within its associated inertia weight class, we applied the following criteria:

1. If the percent increase for unadjusted city fuel economy was 50 percent or better, at a minimum, then the vehicle would qualify as energy-efficient; or

2. If the percent increase for unadjusted combined city/highway fuel economy was 25 percent or better, at a minimum, then the vehicle would qualify as energy-efficient; or

3. If the percent increase for unadjusted city fuel economy was less than 50 percent and the percent increase for unadjusted combined city/highway fuel economy is less than 25 percent, then the vehicle would not qualify as energy-efficient.

Thus, all vehicles meeting Criteria 1 and 2 would be classified as "energy-efficient." The minimum thresholds to qualify in miles per gallon are presented in Tables 2-4 and 2-5, shown below for the unadjusted city and unadjusted combine city/highway fuel economy values. It should be noted that to be eligible for an HOV exemption, a vehicle would have to meet the criteria for both energy-efficient and low emission, and low emission vehicles are being proposed as those meeting the Federal Tier 2 Bin 5 or cleaner (i.e. Bins 5, 4, 3, 2, and 1) emission standards, or comparable California Low Emission Vehicle-II (LEV-II) emission standards that are as or more stringent (i.e. LEV-II, ULEV-II, SULEV-II, PZEV, and ZEV for passenger cars - light-duty vehicles and light-

duty trucks, including most sport utility vehicles and most large pickup trucks - up to 8500 lbs. GVWR).

Table 2-4. EPA Minimum Eligibility Thresholds for Unadjusted City Fuel Economy

Inertia Weight (lbs.)	Passenger Automobiles (mpg)	Light Trucks (mpg)
1500 or 1750	67.8	59.1
2000	59.4	52.8
2250	52.8	47.7
2500	47.6	43.5
2750	43.2	40.2
3000	39.6	37.4
3500	33.9	32.7
4000	29.7	29.1
4500	26.4	26.4
5000	23.9	24.2
5500	21.6	22.2
6000	19.8	20.6
6500	18.3	19.2
7000 to 8500	17.0	18.2

Table 2-5. EPA Minimum Eligibility Thresholds for Unadjusted Combined City/Highway Fuel Economy

Inertia Weight (lbs.)	Passenger Automobiles (mpg)	Light Trucks (mpg)
1500 or 1750	60.5	54.2
2000	54.6	48.9
2250	49.9	44.6
2500	46.0	41.1
2750	42.7	38.1
3000	39.9	35.6
3500	35.5	31.6
4000	32.0	28.5
4500	29.2	26.0
5000	26.9	23.9
5500	25.0	22.2
6000	23.4	20.7
6500	22.0	19.5
7000 to 8500	20.8	18.4

In addition to the criteria described above, we believe that an additional criterion is necessary to determine if a vehicle is fuel efficient. The proposed inertia weight class method, or any of the other methods considered, result in lists of potentially qualifying vehicles that include a few models that fail to achieve the level of the Corporate Average Fuel Economy standard. Thus we are proposing an additional comparison criterion, to be used as a "floor" to prevent the inclusion of vehicles which may be fuel efficient relative to others in the same inertia weight class. In order for a vehicle to qualify as fuel efficient, it must also have a combined fuel economy that is higher than 25 percent above the applicable CAFE car or truck standard (Table 2-6). We believe that this additional criterion is in keeping with the Transportation Act requirement that the combined fuel economy be 25 percent better than a comparable gasoline vehicle.

Table 2-6. CAFE Standards for Cars and Trucks

	CAFE Standard	**25 percent of the CAFE Standard**
All cars	27.5 mpg	34.4 mpg
2005 trucks	21.0 mpg	26.3 mpg
2006 trucks	21.6 mpg	27.0 mpg
2007 trucks	22.2 mpg	27.8 mpg
2008 trucks	22.5 mpg	28.1 mpg

2.2.4. List of Eligible Vehicles Using Inertia Weight Methodology

The vehicles that would be eligible for HOV exemption using the inertial weight methodology are shown in Tables 2.7 and 2.8 below.

Table 2.7. List of Eligible Federally Certified Low Emission and Energy-Efficient Vehicles Generated Using the Inertia Weight Methodology

MY	Mfr	Vehicle Model	Engine Family	Tran	Int Wgt (lbs)	Tier 2 Std	Unadj City FE (mpg)	City FE Inc Over Base-line (%)	Unadj Cmb FE (mpg)	Cmb FE Inc Over Base-line (%)
CARS										
2003	Honda	Civic Hybrid	3HNXV0 1.36CV	AV	3000	B5	52.6	99	56.0	75
2003	Honda	Civic Hybrid	3HNXV0 1.36CV	M5	3000	B5	50.0	89	55.7	74
2003	Honda	Insight	3HNXV0 1.0PCE	AV	2250	B5	62.8	78	66.4	66
2004	Honda	Civic Hybrid	4HNXV0 1.37CP	AV	3000	B5	52.6	99	56.0	75
2004	Honda	Civic Hybrid	4HNXV0 1.37CP	M5	3000	B5	50.0	89	55.7	74
2004	Honda	Insight	4HNXV0 1.0NCE	AV	2250	B5	62.8	78	66.4	66
2004	Toyota	Prius	4TYXV0 1.5MC1	AV	3000	B3	66.6	152	65.8	106
2005	Honda	Accord Hybrid	5HNXV0 3.01B4	L5	3500	B5	32.2	42	37.5	32
2005	Honda	Civic Hybrid	5HNXV0 1.3YCV	AV	3000	B2	52.6	99	56.0	75
2005	Honda	Civic Hybrid	5HNXV0 1.3YCV	M5	3000	B2	50.0	89	55.7	74
2005	Honda	Insight	5HNXV0 1.0XCE	AV	2250	B5	62.8	78	66.4	66
2005	Toyota	Prius	5TYXV0 1.5MC1	AV	3000	B3	66.6	152	65.8	106%
2006	Honda	Civic Hybrid	6HNXV0 1.3XCP	AV	3000	B2	54.6	107	58.8	84
2006	Honda	Insight	6HNXV0 1.0VK5	AV	2250	B5	62.8	78	66.4	66
2006	Toyota	Prius	6TYXV0 1.5MC1	AV	3000	B3	66.6	152	65.8	106

2007	Honda	Accord Hybrid	7HNXV0 3.0ZMC	L5	4000	B2	31.3	58	36.3	42
2007	Honda	Civic Hybrid	7HNXV0 1.3JCP	AV	3000	B2	54.6	107	58.8	84
2007	Toyota	Camry Hybrid	7TYXV0 2.4HC1	AV	4000	B3	44.2	123	45.9	79
2007	Toyota	Prius	7TYXV0 1.5HC1	AV	3000	B3	66.6	152	65.8	106
TRUCKS										
2005	Ford	Escape Hybrid 2WD	5FMXT0 2.31EE	AV	4000	B4	39.6	104	39.5	74
2005	Ford	Escape Hybrid 4WD	5FMXT0 2.31EE	AV	4000	B4	36.6	89	36.7	61
2005	Honda	Odyssey 2WD	5HNXT0 3.5AB4	L5	4500	B5	21.7	23	26.4	27
2006	Ford	Escape Hybrid 4WD	6FMXT0 2.32EE	AV	4000	B4	36.6	89	36.7	61
2006	Ford	Escape Hybrid FWD	6FMXT0 2.32EE	AV	4000	B4	39.6	104	39.5	74
2006	Lexus	RX 400H 2WD	6TYXT03 .3CC1	AV	4500	B3	36.8	109	36.2	74
2006	Lexus	RX 400H 4WD	6TYXT03 .3CC1	AV	4500	B3	34.3	95	34.3	65
2006	Lexus	Tribute Hybrid 4WD	6FMXT0 2.32EE	AV	4000	B4	36.6	89	36.7	61
2006	Mercury	Mariner Hybrid 4WD	6FMXT0 2.32EE	AV	4000	B4	36.6	89	36.7	61
2006	Toyota	Highlander Hybrid 2WD	6TYXT03 .3CC1	AV	4500	B3	36.8	109	36.2	74
2006	Toyota	Highlander Hybrid 4WD	6TYXT03 .3CC1	AV	4500	B3	34.3	95	34.3	65
2006	Toyota	RAV4 2WD	6TYXT03 .5PEM	L5	4000	B5	24.4	26	28.9	27
2006	Toyota	RAV4 4WD	6TYXT02 .4PEM	L4	4000	B5	25.5	31	29.2	28
2007	Ford	Escape Hybrid 2WD	7FMXT0 2.32ZE	AV	4000	B3	35.8	85	36.5	60
2007	Ford	Escape Hybrid FWD	7FMXT0 2.32ZE	AV	4000	B3	41.1	112	40.6	78

2007	Honda	CR-V 4WD	7HNXT0 2.4FKR	L5	4000	B5	24.5	27	28.5	25
2007	Lexus	RX 400H 2WD	7TYXT03 .3CC1	AV	4500	B3	35.7	103	35.0	69
2007	Lexus	RX 400H 4WD	7TYXT03 .3CC1	AV	4500	B3	34.3	9585	34.3	65
2007	Mercury	Mariner Hybrid 4WD	7FMXT0 2.32ZE	AV	4000	B3	35.8	85	36.5	60
2007	Saturn	Vue Hybrid	7GMXT0 2.4130	L4	3500	B5	29.8	37	34.0	35
2007	Toyota	Highlander Hybrid 2WD	7TYXT03 .3CC1	AV	4500	B3	35.7	103	35.0	69
2007	Toyota	Highlander Hybrid 4WD	7TYXT03 .3CC1	AV	4500	B3	34.3	95	35.3	65
2007	Toyota	RAV4 2WD	7TYXT03 .5BEM	L5	4000	B5	24.4	26	28.9	27
2007	Toyota	RAV4 4WD	7TYXT02 .4BEM	L4	4000	B5	25.3	31	29.0	27
2007	Toyota	Tacoma 2WD	7TYXT02 .7AEM	M5	4000	B5	25.8	33	29.4	29
DEDICATED ALTERNATIVE FUEL (CNG) VEHICLES										
2003	Honda	Civic - CNG	3HNXV0 1.73W3	N/A		B2	DEDICATED ALTERNATIVE FUEL (CNG) VEHICLE			
2004	Honda	Civic – CNG	4HNXV0 1.74W0	N/A		B2	DEDICATED ALTERNATIVE FUEL (CNG) VEHICLE			
2005	Honda	Civic - CNG	5HNXV0 1.7BF3	N/A		B2	DEDICATED ALTERNATIVE FUEL (CNG) VEHICLE			
2003	Ford	Crown Victoria - CNG	3FMXV0 4.6VP5	N/A		B3	DEDICATED ALTERNATIVE FUEL (CNG) VEHICLE			
2004	Ford	Crown Victoria - CNG	4FMXV0 4.6VP5	N/A		B3	DEDICATED ALTERNATIVE FUEL (CNG) VEHICLE			

Unless noted as a dedicated alternative fuel vehicle, all of the listed vehicles operate on gasoline, and some may also be flexible-fuel vehicles.
MY = Model Year
Mfr = Manufacturer
Tran = Transmission type
Int Wgt = Inertia Weight Class
Std = Standard
Unadj = Unadjusted
FE = Fuel Economy
Inc = Increase
Cmb = Combined city-highway
B = Bin

Table 2.8 List of Eligible California Certified Low Emission and Energy-Efficient Vehicles Generated Using the Inertia Weight Methodology

MY	Mfr	Vehicle Model	Engine Family	Tran	Int Wgt (lbs)	LEV- II Std	Unadj City FE (mpg)	City FE Inc Over Base-line (%)	Unadj Cmb FE (mpg)	Cmb FE Inc Over Base-line (%)
CARS										
2003	Honda	Civic Hybrid	3HNXV0 1.36CV	AV	3000	S2	52.6	99	56.0	75
2003	Honda	Civic Hybrid	3HNXV0 1.36CV	M5	3000	S2	50.0	89	55.7	74
2003	Honda	Insight	3HNXV0 1.0PCE	AV	2250	S2	62.8	78	66.4	66
2004	Honda	Civic Hybrid	4HNXV0 1.37CP	AV	3000	S2	52.6	99	56.0	75
2004	Honda	Civic Hybrid	4HNXV0 1.37CP	M5	3000	S2	50.0	89	55.7	74
2004	Honda	Insight	4HNXV0 1.0NCE	AV	2250	S2	62.8	78	66.4	66
2004	Toyota	Prius	4TYXV01 .5MC1	AV	3000	S2	66.6	152	65.8	106
2005	Honda	Accord Hybrid	5HNXV0 3.01B4	L5	3500	U2	32.2	42	37.5	32
2005	Honda	Civic Hybrid	5HNXV0 1.3YCV	AV	3000	S2	52.6	99	56.0	75
2005	Honda	Civic Hybrid	5HNXV0 1.3YCV	M5	3000	S2	50.0	89	55.7	74
2005	Honda	Insight	5HNXV0 1.0XCE	AV	2250	S2	62.8	78	66.4	66
2005	Toyota	Prius	5TYXV01 .5MC1	AV	3000	S2	66.6	152	65.8	106
2006	Honda	Civic Hybrid	6HNXV0 1.3XCP	AV	3000	S2	54.6	107	58.8	84
2006	Honda	Insight	6HNXV0 1.0VK5	AV	2250	S2	62.8	78	66.4	66
2006	Toyota	Prius	6TYXV01 .5MC1	AV	3000	S2	66.6	152	65.8	106
2007	Honda	Accord Hybrid	7HNXV0 3.0ZMC	L5	4000	S2	31.3	58	36.3	42
2007	Honda	Civic Hybrid	7HNXV0 1.3JCP	AV	3000	S2	54.6	107	58.8	84
2007	Toyota	Camry Hybrid	7TYXV02 .4HC1	AV	4000	S2	44.2	123	45.9	79
2007	Toyota	Prius	7TYXV01 .5HC1	AV	3000	S2	66.6	152	65.8	106

MY	Mfr	Vehicle Model	Engine Family	Tran	Int Wgt (lbs)	LEV- II Std	Unadj City FE (mpg)	City FE Inc Over Base-line (%)	Unadj Cmb FE (mpg)	Cmb FE Inc Over Base-line (%)
TRUCKS										
2005	Ford	Escape Hybrid 2WD	5FMXT0 2.31EE	AV	4000	S2	39.6	104	39.5	74
2005	Ford	Escape Hybrid 4WD	5FMXT0 2.31EE	AV	4000	S2	36.6	89	36.7	61
2005	Honda	Odyssey 2WD	5HNXT0 3.5AB4	L5	4500	U2	21.7	23	26.4	27
2006	Ford	Escape Hybrid 4WD	6FMXT0 2.32EE	AV	4000	S2	36.6	89	36.7	61
2006	Ford	Escape Hybrid FWD	6FMXT0 2.32EE	AV	4000	S2	39.6	104	39.5	74
2006	Lexus	RX 400H 2WD	6TYXT03 .3CC1	AV	4500	S2	36.8	109	36.2	74
2006	Lexus	RX 400H 4WD	6TYXT03 .3CC1	AV	4500	S2	34.3	95	34.3	65
2006	Mazda	Tribute Hybrid 4WD	6FMXT0 2.32EE	AV	4000	S2	36.6	89	36.7	61
2006	Mercury	Mariner Hybrid 4WD	6FMXT0 2.32EE	AV	4000	S2	36.6	89	36.7	61
2006	Toyota	Highlander Hybrid 2WD	6TYXT03 .3CC1	AV	4500	S2	36.8	109	36.2	74
2006	Toyota	Highlander Hybrid 4WD	6TYXT03 .3CC1	AV	4500	S2	34.3	95	34.3	65
2006	Toyota	RAV4 2WD	6TYXT03 .5PEM	L5	4000	U2	24.4	26	28.9	27
2006	Toyota	RAV4 4WD	6TYXT02 .4PEM	L4	4000	U2	25.5	31	29.2	28
2007	Ford	Escape Hybrid	7FMXT0 2.32ZE	AV	4000	S2	35.8	85	36.5	60
2007	Ford	Escape Hybrid	7FMXT0 2.32ZE	AV	4000	S2	41.1	112	40.6	78
2007	Honda	CR-V 4WD	7HNXT0 2.4FKR	L5	4000	U2	24.5	27	28.5	25

MY	Mfr	Vehicle Model	Engine Family	Tran	Int Wgt (lbs)	LEV- II Std	Unadj City FE (mpg)	City FE Inc Over Base-line (%)	Unadj Cmb FE (mpg)	Cmb FE Inc Over Base-line (%)
2007	Lexus	RX 400H 2WD	7TYXT03 .3CC1	AV	4500	S2	35.7	103	35	69
2007	Lexus	RX 400H 4WD	7TYXT03 .3CC1	AV	4500	S2	34.3	95	34.3	65
2007	Mercury	Mariner Hybrid	7FMXT0 2.32ZE	AV	4000	S2	35.8	85	36.5	60
2007	Saturn	Vue Hybrid	7GMXT0 2.4130	L4	3500	L2	29.8	37	34.0	35
2007	Toyota	Highlander Hybrid 2WD	7TYXT03 .3CC1	AV	4500	S2	35.7	103	35	69
2007	Toyota	Highlander Hybrid 4WD	7TYXT03 .3CC1	AV	4500	S2	34.3	95	34.3	65
2007	Toyota	RAV4 2WD	7TYXT03 .5BEM	L5	4000	U2	24.4	26	28.9	27
2007	Toyota	RAV4 4WD	7TYXT02 .4BEM	L4	4000	U2	25.3	31	29	27
2007	Toyota	Tacoma 2WD	7TYXT02 .7AEM	M5	4000	M2	25.8	33	29.4	29
DEDICATED ALTERNATIVE FUEL (CNG) VEHICLES										
2004	Honda	Civic – CNG	4HNXV0 1.74W2	N/A		S2	DEDICATED ALTERNATIVE FUEL (CNG) VEHICLE			
2005	Honda	Civic - CNG	5HNXV0 1.7BF4	N/A		S2	DEDICATED ALTERNATIVE FUEL (CNG) VEHICLE			

Unless noted as a dedicated alternative fuel vehicle, all of the listed vehicles operate on gasoline, and some may also be flexible-fuel vehicles.
MY = Model Year
Mfr = Manufacturer
Tran = Transmission
Int Wgt = Inertia Weight Class
Std = Standard
Unadj = Unadjusted
FE = Fuel Economy
Inc = Increase
Cmb = Combined city-highway
S2 = SULEVII
U2 = ULEVII

2.3 Hybrid-to-"Best in Class" Method

EPA also considered defining a "comparable vehicle" as the vehicle with the best fuel economy of a particular class of vehicles as defined by EPA's annual Fuel Economy Guide, which is jointly published by EPA and DOE. This approach is not a fuel

and technology neutral approach, meaning that it only considers hybrid vehicles. No gasoline, diesel, or flexible-fuel would be considered for an HOV facilities exemption using this methodology.

For the “best in class” methodology, the following process would be used for making a fuel economy comparison:

1) Sort the list of all hybrid vehicles (all model years certified for sale prior to September 30, 2009) by the vehicle classes defined in EPA’s annual Fuel Economy Guide for each model year. The vehicle classes are defined in the Fuel Economy Guide as follows: Two-seater, Minicompact Vehicle, Subcompact Vehicle, Compact Vehicle, Midsize Vehicle, Large Vehicle, Small Station Wagon, Midsize Station Wagon, Large Station Wagon, Small Pickup Truck, Standard Pickup Truck, Passenger Van, Cargo Van, Minivan, Sport Utility Vehicle (SUV), and Special Purpose Vehicle.

2) For each model year and each vehicle class, determine which gasoline vehicle has the highest unadjusted city and unadjusted city-highway combined fuel economy values. For example, for the 2006 model year, the compact vehicle with the highest unadjusted city and unadjusted combined city-highway fuel economy values is the Toyota Corolla. The Toyota Corolla would be the comparison vehicle for any 2006 hybrid vehicle that is classified as a compact car. In this case, the 2006 Honda Civic hybrid is the only hybrid classified as a compact car. See Table 2.8 below for a complete list of comparison vehicles.

Table 2.8 Vehicles with highest unadjusted city fuel economy values and unadjusted combined city-highway fuel economy vehicles by Fuel Economy Guide Class

Model	Hybrid	Comparison Gasoline	Fuel Economy

Year	Make/Model	Make/Model	Guide Class
2003	Honda Insight	Toyota MR2	Two-seater
2003	Honda Civic Hybrid	Honda Civic	Compact
2004	Honda Insight	Toyota MR2	Two-seater
2004	Honda Civic Hybrid	Honda Civic	Compact
2004	Toyota Prius	Hyundai Elantra	Midsize
2005	Honda Insight	Toyota MR2	Two-seater
2005	Honda Civic Hybrid	Honda Civic	Compact
2005	Toyota Prius	Hyundai Elantra	Midsize
2005	Honda Accord Hybrid	Hyundai Elantra	Midsize
2005	Ford Escape Hybrid 2WD	Toyota RAV4 2WD	SUV
2005	Ford Escape Hybrid 4WD	Toyota RAV4 2WD	SUV
2006	Honda Insight	Mazda MX-5	Two-seater
2006	Honda Civic Hybrid	Toyota Corolla	Compact
2006	Toyota Prius	Hyundai Elantra	Midsize
2006	Honda Accord Hybrid	Hyundai Elantra	Midsize
2006	Ford Escape Hybrid FWD	Toyota RAV4 2WD	SUV
2006	Ford Escape Hybrid 4WD	Toyota RAV4 2WD	SUV
2006	Lexus RX 400H 2WD	Toyota RAV4 2WD	SUV
2006	Lexus RX 400H 2WD	Toyota RAV4 2WD	SUV
2006	Mazda Tribute Hybrid	Toyota RAV4 2WD	SUV
2006	Mercury Mariner Hybrid	Toyota RAV4 2WD	SUV
2006	Toyota Highlander Hybrid 2WD	Toyota RAV4 2WD	SUV
2006	Toyota Highlander Hybrid 2WD	Toyota RAV4 2WD	SUV
2007	Honda Insight	Toyota Corolla	Compact
2007	Honda Civic Hybrid	Toyota Corolla	Compact
2007	Lexus GS 450H	Toyota Corolla	Compact
2007	Toyota Prius	Nissan Versa	Midsize
2007	Honda Accord Hybrid	Jeep Patriot 4WD	SUV
2007	Ford Escape Hybrid FWD	Jeep Patriot 4WD	SUV
2007	Ford Escape Hybrid 4WD	Jeep Patriot 4WD	SUV
2007	Lexus RX 400H 2WD	Jeep Patriot 4WD	SUV
2007	Lexus RX 400H 2WD	Jeep Patriot 4WD	SUV
2007	Mercury Mariner Hybrid	Jeep Patriot 4WD	SUV
2007	Toyota Highlander Hybrid 2WD	Jeep Patriot 4WD	SUV
2007	Toyota Highlander Hybrid 2WD	Jeep Patriot 4WD	SUV

3) Compare the hybrid vehicle fuel unadjusted economy values to the unadjusted city fuel economy value and the unadjusted city-highway fuel economy value for the comparison gasoline vehicle.

4) Evaluate the results according to the following criteria:

- If the percent increase for city fuel economy is greater than 50 percent over the baseline city fuel economy for the given specific vehicle, then the vehicle would qualify as energy-efficient;

- If the percent increase for combined city-highway fuel economy is greater than 25 percent over the baseline combined city-highway fuel economy for the given specific vehicle, then the vehicle would qualify as energy-efficient; or
- Conversely, if the candidate vehicle's fuel economy does not meet these required thresholds when compared to the baseline fuel economy for that class of vehicle, then the vehicle would not qualify as energy-efficient.

The vehicles that would be eligible for HOV exemption using the inertial weight methodology are shown in Tables 2.9 and 2.10 below.

Table 2.9. List of Eligible Federally Certified Low Emission and Energy-Efficient Vehicles Generated Using the Hybrid-to-"Best in Class" Methodology

MY	Mfr	Vehicle Model	Engine Family	Tran	Fuel Economy Guide Class	Tier 2 Std	Unadj City FE (mpg)	City FE Inc Over Base-line (%)	Unadj Cmb FE (mpg)	Cmb FE Inc Over Base-line (%)
CARS										
2003	Honda	Insight	3HNXV0 1.0PCE	AV	Two-seater	B5	62.8	132	66.4	124
2004	Honda	Insight	4HNXV0 1.0NCE	AV	Two-seater	B5	62.8	131	66.4	120
2004	Toyota	Prius	4TYXV0 1.5MC1	AV	Midsize	B3	66.6	121	65.8	87
2005	Honda	Insight	5HNXV0 1.0XCE	AV	Two-seater	B5	62.8	116	66.4	98
2005	Toyota	Prius	5TYXV0 1.5MC1	AV	Midsize	B3	66.6	124	65.8	90
2006	Honda	Civic Hybrid	6HNXV0 1.3XCP	AV	Compact	B2	54.6	53	58.8	41
2006	Honda	Insight	6HNXV0 1.0VK5	AV	Two-seater	B5	62.8	129	66.4	112
2006	Toyota	Prius	6TYXV0 1.5MC1	AV	Midsize	B3	66.6	124	65.8	90
2007	Honda	Civic Hybrid	7HNXV0 1.3JCP	AV	Compact	B2	54.6	53	58.8	41
2007	Toyota	Prius	7TYXV0 1.5HC1	AV	Midsize	B3	66.6	101	65.8	76
TRUCKS										
2005	Ford	Escape Hybrid 2WD	5FMXT0 2.31EE	AV	SUV	B4	39.6	46	39.5	28
2006	Ford	Escape Hybrid FWD	6FMXT0 2.32EE	AV	SUV	B4	39.6	48	39.5	28
2007	Ford	Escape Hybrid FWD	7FMXT0 2.32ZE	AV	SUV	B3	41.1	46	40.6	29
DEDICATED ALTERNATIVE FUEL (CNG) VEHICLES										
2003	Honda	Civic - CNG	3HNXV0 1.73W3	N/A		B2	DEDICATED ALTERNATIVE FUEL (CNG) VEHICLE			
2004	Honda	Civic – CNG	4HNXV0 1.74W0	N/A		B2	DEDICATED ALTERNATIVE FUEL (CNG) VEHICLE			
2005	Honda	Civic - CNG	5HNXV0 1.7BF3	N/A		B2	DEDICATED ALTERNATIVE FUEL (CNG) VEHICLE			
2003	Ford	Crown Victoria - CNG	3FMXV0 4.6VP5	N/A		B3	DEDICATED ALTERNATIVE FUEL (CNG) VEHICLE			
2004	Ford	Crown Victoria - CNG	4FMXV0 4.6VP5	N/A		B3	DEDICATED ALTERNATIVE FUEL (CNG) VEHICLE			

Unless noted as a dedicated alternative fuel vehicle, all of the listed vehicles operate on gasoline, and some may also be flexible-fuel vehicles.
MY = Model Year
Mfr = Manufacturer
Tran = Transmission type
Std = Standard
Unadj = Unadjusted
FE = Fuel Economy
Inc = Increase
Cmb = Combined city-highway
B = Bin

Table 2.10 List of Eligible California-Certified Low Emission and Energy-Efficient Vehicles Generated Using the Hybrid-to-"Best in Class" Methodology

MY	Mfr	Vehicle Model	Engine Family	Tran	Fuel Economy Guide Class	LEV- II Std	Unadj City FE (mpg)	City FE Inc Over Base-line (%)	Unadj Cmb FE (mpg)	Cmb FE Inc Over Base-line (%)
CARS										
2003	Honda	Civic Hybrid	3HNXV01 .36CV	AV	Compact	S2	52.6	52	56.0	45
2003	Honda	Civic Hybrid	3HNXV01 .36CV	M5	Compact	S2	50.0	59	55.7	46
2003	Honda	Insight	3HNXV01 .0PCE	AV	Two-seater	S2	62.8	249	66.4	201
2004	Honda	Civic Hybrid	4HNXV01 .37CP	AV	Compact	S2	52.6	50	56.0	41
2004	Honda	Civic Hybrid	4HNXV01 .37CP	M5	Compact	S2	50.0	42	55.7	40
2004	Honda	Insight	4HNXV01 .0NCE	AV	Two-seater	S2	62.8	214	66.4	177
2004	Toyota	Prius	4TYXV01. 5MC1	AV	Midsize	S2	66.6	200	65.8	139
2005	Honda	Civic Hybrid	5HNXV01 .3YCV	AV	Midsize	S2	52.6	50	56.0	41
2005	Honda	Civic Hybrid	5HNXV01 .3YCV	M5	Compact	S2	50.0	42	55.7	40
2005	Honda	Insight	5HNXV01 .0XCE	AV	Compact	S2	62.8	224	66.4	185
2005	Honda	Accord Hybrid	5HNXV03 .01B4	L5	Midsize	S2	32.2	37	37.48	32
2005	Toyota	Prius	5TYXV01. 5MC1	AV	Two-seater	S2	66.6	201	65.8	140
2006	Honda	Civic Hybrid	6HNXV01 .3XCP	AV	Midsize	S2	54.6	62	58.8	51
2006	Honda	Insight	6HNXV01 .0VK5	AV	Compact	S2	62.8	211	66.4	173
2006	Toyota	Prius	6TYXV01. 5MC1	AV	Two-seater	S2	66.6	200	65.8	144
2007	Honda	Accord Hybrid	7HNXV03 .0ZMC	L5	Midsize	S2	31.3	37	36.3	31
2007	Honda	Civic Hybrid	7HNXV01 .3JCP	AV	Midsize	S2	54.6	67	58.8	51
2007	Toyota	Camry Hybrid	7TYXV02. 4HC1	AV	Midsize	S2	44.2	66	45.9	44

MY	Mfr	Vehicle Model	Engine Family	Tran	Fuel Economy Guide Class	LEV- II Std	Unadj City FE (mpg)	City FE Inc Over Base-line (%)	Unadj Cmb FE (mpg)	Cmb FE Inc Over Base-line (%)
2007	Toyota	Prius	7TYXV01.5HC1	AV	Midsize	S2	66.6	210	65.8	154
TRUCKS										
2005	Ford	Escape Hybrid 2WD	5FMXT02.31EE	AV	4000	S2	39.6	65	39.5	46
2005	Ford	Escape Hybrid 4WD	5FMXT02.31EE	AV	4000	S2	36.6	78	36.7	57
2006	Ford	Escape Hybrid 4WD	6FMXT02.32EE	AV	SUV	S2	36.6	59	36.7	41
2006	Ford	Escape Hybrid FWD	6FMXT02.32EE	AV	SUV	S2	39.6	59	39.5	42
2006	Lexus	RX 400H 2WD	6TYXT03.3CC1	AV	SUV	S2	36.8	141	36.2	96
2006	Lexus	RX 400H 4WD	6TYXT03.3CC1	AV	SUV	S2	34.3	124	34.3	86
2006	Mazda	Tribute Hybrid 4WD	6FMXT02.32EE	AV	SUV	S2	36.6	59	36.7	41
2006	Mercury	Mariner Hybrid 4WD	6FMXT02.32EE	AV	SUV	S2	36.6	75	36.7	53
2006	Toyota	Highlander Hybrid 2WD	6TYXT03.3CC1	AV	SUV	S2	36.8	72	36.2	45
2006	Toyota	Highlander Hybrid 4WD	6TYXT03.3CC1	AV	SUV	S2	34.3	67	34.3	42
2007	Ford	Escape Hybrid 4WD	7FMXT02.32ZE	AV	SUV	S2	35.8	55	36.5	39
2007	Ford	Escape Hybrid FWD	7FMXT02.32ZE	AV	SUV	S2	41.1	64	40.6	45
2007	Lexus	RX 400H 2WD	7TYXT03.3CC1	AV	SUV	S2	35.7	135	35	95
2007	Lexus	RX 400H 4WD	7TYXT03.3CC1	AV	SUV	S2	34.3	126	34.3	91
2007	Mercury	Mariner Hybrid	7FMXT02.32ZE	AV	SUV	S2	35.8	55	36.5	39

MY	Mfr	Vehicle Model	Engine Family	Tran	Fuel Economy Guide Class	LEV- II Std	Unadj City FE (mpg)	City FE Inc Over Base-line (%)	Unadj Cmb FE (mpg)	Cmb FE Inc Over Base-line (%)
2007	Toyota	Highlander Hybrid 2WD	7TYXT03.3CC1	AV	SUV	S2	35.7	103	35	69
2007	Toyota	Highlander Hybrid 4WD	7TYXT03.3CC1	AV	SUV	S2	34.3	52	34.3	32
DEDICATED ALTERNATIVE FUEL (CNG) VEHICLES										
2004	Honda	Civic – CNG	4HNXV01.74W2	N/A		S2	DEDICATED ALTERNATIVE FUEL (CNG) VEHICLE			
2005	Honda	Civic - CNG	5HNXV01.7BF4	N/A		S2	DEDICATED ALTERNATIVE FUEL (CNG) VEHICLE			

Unless noted as a dedicated alternative fuel vehicle, all of the listed vehicles operate on gasoline, and some may also be flexible-fuel vehicles.
MY = Model Year
Mfr = Manufacturer
Tran = Transmission
Std = Standard
Unadj = Unadjusted
FE = Fuel Economy
Inc = Increase
Cmb = Combined city-highway
S2 = SULEVII
U2 = ULEVII

2.4 Final Recommendation

Based on the above discussion, EPA is proposing the Hybrid-to-gasoline vehicle comparison methodology.

Chapter 3: List of Eligible Vehicles Based on the Hybrid-to-Gasoline Comparison Methodology

As described in previous chapters, the hybrid-to-gasoline comparison vehicle comparison method is being proposed as the methodology for designating a comparable gasoline vehicle for purposes of this proposal.

Using the hybrid-to-gasoline vehicle comparison method as the comparison strategy, we would annually generate a list of eligible vehicles based on the Federal

criteria and make it available to the Department of Transportation (DOT), who is primarily responsible for implementing HOV facilities and these associated exemptions. The federal list of eligible vehicles is based on the statutory criteria for fuel economy percent increases, but 23 U.S.C. 166 also provides an allowance to individual States that may implement this exemption to increase the stringency of the designated fuel economy increase percentages, using the described methodology and resulting baselines as the basis for comparisons. As a result, the vehicles that the EPA lists as eligible may not be eligible in all states.

The potential federal list of vehicles eligible for an HOV occupancy exemption based on the emissions and fuel economy criteria is shown below in Table 3-1 and the potential list of vehicles based on California emission certification for the low emission criteria is shown below in Table 3-2. This list is only a proposed list and may change when the final rule is issued. Vehicles for model years 2008-2009 will be added to the list once they are available for use. Moreover, since states have the option to increase the stringency of the designated fuel economy percent increase values, an individual state's list may differ from these lists.

Table 3-1. Proposed List of Eligible Federally Certified Low Emission and Energy-Efficient Vehicles

MY	Mfr	Vehicle Model	Engine Family	Tran	Fuel Economy Guide Class	Tier 2 Std	Unadj City FE (mpg)	City FE Inc Over Base-line (%)	Unadj Cmb FE (mpg)	Cmb FE Inc Over Base-line (%)
CARS										
2003	Honda	Civic Hybrid	3HNXV0 1.36CV	AV	Compact	B5	52.6	52	56.0	75
2003	Honda	Civic Hybrid	3HNXV0 1.36CV	M5	Compact	B5	50.0	59	55.7	74

2003	Honda	Insight	3HNXV0 1.0PCE	AV	Two-seater	B5	62.8	249	66.4	66
2004	Honda	Civic Hybrid	4HNXV0 1.37CP	AV	Compact	B5	52.6	50	56.0	75
2004	Honda	Civic Hybrid	4HNXV0 1.37CP	M5	Compact	B5	50.0	42	55.7	74
2004	Honda	Insight	4HNXV0 1.0NCE	AV	Two-seater	B5	62.8	214	66.4	66
2004	Toyota	Prius	4TYXV0 1.5MC1	AV	Midsize	B3	66.6	200	65.8	106
2005	Honda	Civic Hybrid	5HNXV0 1.3YCV	AV	Compact	B2	52.6	50	56.0	41
2005	Honda	Civic Hybrid	5HNXV0 1.3YCV	M5	Compact	B2	50.0	42	55.7	40
2005	Honda	Insight	5HNXV0 1.0XCE	AV	Two-seater	B5	62.8	224	66.4	185
2005	Honda	Accord Hybrid	5HNXV0 3.01B4	L5	Midsize	B5	32.2	37	37.48	32
2005	Toyota	Prius	5TYXV0 1.5MC1	AV	Midsize	B3	66.6	201	65.8	140
2006	Honda	Civic Hybrid	6HNXV0 1.3XCP	AV	Compact	B2	54.6	62	58.8	51
2006	Honda	Insight	6HNXV0 1.0VK5	AV	Two-seater	B5	62.8	211	66.4	173
2006	Toyota	Prius	6TYXV0 1.5MC1	AV	Midsize	B3	66.6	200	65.8	144
2007	Honda	Accord Hybrid	7HNXV0 3.0ZMC	L5	Midsize	B2	31.3	37	36.3	31
2007	Honda	Civic Hybrid	7HNXV0 1.3JCP	AV	Compact	B2	54.6	67	58.8	51
2007	Toyota	Camry Hybrid	7TYXV0 2.4HC1	AV	Midsize	B3	44.2	66	45.9	44
2007	Toyota	Prius	7TYXV0 1.5HC1	AV	Midsize	B3	66.6	210	65.8	154
TRUCKS										
2005	Ford	Escape Hybrid 2WD	5FMXT0 2.31EE	AV	SUV	B4	39.6	65	39.5	46
2005	Ford	Escape Hybrid 4WD	5FMXT0 2.31EE	AV	SUV	B4	36.6	78	36.7	57
2006	Ford	Escape Hybrid 4WD	6FMXT0 2.32EE	AV	SUV	B4	36.6	59	36.7	41

2006	Ford	Escape Hybrid FWD	6FMXT0 2.32EE	AV	SUV	B4	39.6	59	39.5	42
2006	Lexus	RX 400H 2WD	6TYXT0 3.3CC1	AV	SUV	B3	36.8	141	36.2	96
2006	Lexus	RX 400H 4WD	6TYXT0 3.3CC1	AV	SUV	B3	34.3	124	34.3	86
2006	Lexus	Tribute Hybrid 4WD	6FMXT0 2.32EE	AV	SUV	B4	36.6	59	36.7	41
2006	Mercury	Mariner Hybrid 4WD	6FMXT0 2.32EE	AV	SUV	B4	36.6	75	36.7	53
2006	Toyota	Highlander Hybrid 2WD	6TYXT0 3.3CC1	AV	SUV	B3	36.8	72	36.2	45
2006	Toyota	Highlander Hybrid 4WD	6TYXT0 3.3CC1	AV	SUV	B3	34.3	67	34.3	42
2007	Ford	Escape Hybrid 2WD	7FMXT0 2.32ZE	AV	SUV	B3	35.8	55	36.5	39
2007	Ford	Escape Hybrid FWD	7FMXT0 2.32ZE	AV	SUV	B3	41.1	64	40.6	45
2007	Lexus	RX 400H 2WD	7TYXT0 3.3CC1	AV	SUV	B3	35.7	135	35.0	95
2007	Lexus	RX 400H 4WD	7TYXT0 3.3CC1	AV	SUV	B3	34.3	126	34.3	91
2007	Mercury	Mariner Hybrid 4WD	7FMXT0 2.32ZE	AV	SUV	B3	35.8	55	36.5	39
2007	Toyota	Highlander Hybrid 2WD	7TYXT0 3.3CC1	AV	SUV	B3	35.7	67	35.0	40
2007	Toyota	Highlander Hybrid 4WD	7TYXT0 3.3CC1	AV	SUV	B3	34.3	52	34.3	32
DEDICATED ALTERNATIVE FUEL (CNG) VEHICLES										
2003	Honda	Civic - CNG	3HNXV0 1.73W3	N/A		B2	DEDICATED ALTERNATIVE FUEL (CNG) VEHICLE			
2004	Honda	Civic – CNG	4HNXV0 1.74W0	N/A		B2	DEDICATED ALTERNATIVE FUEL (CNG) VEHICLE			
2005	Honda	Civic - CNG	5HNXV0 1.7BF3	N/A		B2	DEDICATED ALTERNATIVE FUEL (CNG) VEHICLE			
2003	Ford	Crown Victoria - CNG	3FMXV0 4.6VP5	N/A		B3	DEDICATED ALTERNATIVE FUEL (CNG) VEHICLE			
2004	Ford	Crown Victoria - CNG	4FMXV0 4.6VP5	N/A		B3	DEDICATED ALTERNATIVE FUEL (CNG) VEHICLE			

Unless noted as a dedicated alternative fuel vehicle, all of the listed vehicles operate on gasoline, and some may also be flexible-fuel vehicles.
MY = Model Year
Mfr = Manufacturer
Tran = Transmission type
Int Wgt = Inertia Weight Class
Std = Standard
Unadj = Unadjusted
FE = Fuel Economy
Inc = Increase
Cmb = Combined city-highway
B = Bin

Table 3-2. Proposed List of Eligible California-Certified Low Emission and Energy-Efficient Vehicles

MY	Mfr	Vehicle Model	Engine Family	Tran	Fuel Economy Guide Class	LEV- II Std	Unadj City FE (mpg)	City FE Inc Over Base-line (%)	Unadj Cmb FE (mpg)	Cmb FE Inc Over Base-line (%)
CARS										
2003	Honda	Civic Hybrid	3HNXV01 .36CV	AV	Compact	S2	52.6	52	56.0	45
2003	Honda	Civic Hybrid	3HNXV01 .36CV	M5	Compact	S2	50.0	59	55.7	46
2003	Honda	Insight	3HNXV01 .0PCE	AV	Two-seater	S2	62.8	249	66.4	201
2004	Honda	Civic Hybrid	4HNXV01 .37CP	AV	Compact	S2	52.6	50	56.0	41
2004	Honda	Civic Hybrid	4HNXV01 .37CP	M5	Compact	S2	50.0	42	55.7	40
2004	Honda	Insight	4HNXV01 .0NCE	AV	Two-seater	S2	62.8	214	66.4	177
2004	Toyota	Prius	4TYXV01. 5MC1	AV	Midsize	S2	66.6	200	65.8	139
2005	Honda	Civic Hybrid	5HNXV01 .3YCV	AV	Midsize	S2	52.6	50	56.0	41
2005	Honda	Civic Hybrid	5HNXV01 .3YCV	M5	Compact	S2	50.0	42	55.7	40
2005	Honda	Insight	5HNXV01 .0XCE	AV	Compact	S2	62.8	224	66.4	185
2005	Honda	Accord Hybrid	5HNXV03 .01B4	L5	Midsize	S2	32.2	37	37.48	32
2005	Toyota	Prius	5TYXV01. 5MC1	AV	Two-seater	S2	66.6	201	65.8	140
2006	Honda	Civic Hybrid	6HNXV01 .3XCP	AV	Midsize	S2	54.6	62	58.8	51
2006	Honda	Insight	6HNXV01 .0VK5	AV	Compact	S2	62.8	211	66.4	173
2006	Toyota	Prius	6TYXV01. 5MC1	AV	Two-seater	S2	66.6	200	65.8	144
2007	Honda	Accord Hybrid	7HNXV03 .0ZMC	L5	Midsize	S2	31.3	37	36.3	31
2007	Honda	Civic Hybrid	7HNXV01 .3JCP	AV	Midsize	S2	54.6	67	58.8	51
2007	Toyota	Camry Hybrid	7TYXV02. 4HC1	AV	Midsize	S2	44.2	66	45.9	44
2007	Toyota	Prius	7TYXV01. 5HC1	AV	Midsize	S2	66.6	210	65.8	154

MY	Mfr	Vehicle Model	Engine Family	Tran	Fuel Economy Guide Class	LEV- II Std	Unadj City FE (mpg)	City FE Inc Over Base-line (%)	Unadj Cmb FE (mpg)	Cmb FE Inc Over Base-line (%)
TRUCKS										
2005	Ford	Escape Hybrid 2WD	5FMXT02.31EE	AV	SUV	S2	39.6	65	39.5	46
2005	Ford	Escape Hybrid 4WD	5FMXT02.31EE	AV	SUV	S2	36.6	78	36.7	57
2006	Ford	Escape Hybrid 4WD	6FMXT02.32EE	AV	SUV	S2	36.6	59	36.7	41
2006	Ford	Escape Hybrid FWD	6FMXT02.32EE	AV	SUV	S2	39.6	59	39.5	42
2006	Lexus	RX 400H 2WD	6TYXT03.3CC1	AV	SUV	S2	36.8	141	36.2	96
2006	Lexus	RX 400H 4WD	6TYXT03.3CC1	AV	SUV	S2	34.3	124	34.3	86
2006	Mazda	Tribute Hybrid 4WD	6FMXT02.32EE	AV	SUV	S2	36.6	59	36.7	41
2006	Mercury	Mariner Hybrid 4WD	6FMXT02.32EE	AV	SUV	S2	36.6	75	36.7	53
2006	Toyota	Highlander Hybrid 2WD	6TYXT03.3CC1	AV	SUV	S2	36.8	72	36.2	45
2006	Toyota	Highlander Hybrid 4WD	6TYXT03.3CC1	AV	SUV	S2	34.3	67	34.3	42
2007	Ford	Escape Hybrid 4WD	7FMXT02.32ZE	AV	SUV	S2	35.8	55	36.5	39
2007	Ford	Escape Hybrid FWD	7FMXT02.32ZE	AV	SUV	S2	41.1	64	40.6	45
2007	Lexus	RX 400H 2WD	7TYXT03.3CC1	AV	SUV	S2	35.7	135	35	95
2007	Lexus	RX 400H 4WD	7TYXT03.3CC1	AV	SUV	S2	34.3	126	34.3	91
2007	Mercury	Mariner Hybrid	7FMXT02.32ZE	AV	SUV	S2	35.8	55	36.5	39

MY	Mfr	Vehicle Model	Engine Family	Tran	Fuel Economy Guide Class	LEV- II Std	Unadj City FE (mpg)	City FE Inc Over Base-line (%)	Unadj Cmb FE (mpg)	Cmb FE Inc Over Base-line (%)
2007	Toyota	Highlander Hybrid 2WD	7TYXT03.3CC1	AV	SUV	S2	35.7	103	35	69
2007	Toyota	Highlander Hybrid 4WD	7TYXT03.3CC1	AV	SUV	S2	34.3	52	34.3	32
DEDICATED ALTERNATIVE FUEL (CNG) VEHICLES										
2004	Honda	Civic – CNG	4HNXV01.74W2	N/A		S2	DEDICATED ALTERNATIVE FUEL (CNG) VEHICLE			
2005	Honda	Civic - CNG	5HNXV01.7BF4	N/A		S2	DEDICATED ALTERNATIVE FUEL (CNG) VEHICLE			

Unless noted as a dedicated alternative fuel vehicle, all of the listed vehicles operate on gasoline, and some may also be flexible-fuel vehicles.
MY = Model Year
Mfr = Manufacturer
Tran = Transmission
Int Wgt = Inertia Weight Class
Std = Standard
Unadj = Unadjusted
FE = Fuel Economy
Inc = Increase
Cmb = Combined city-highway
S2 = SULEVII
U2 = ULEVII

References

Energy Policy Act of 2005. Public Law 109-58, August 8, 2005.

Hellman, Karl, and Robert Heavenrich. "Light-Duty Automotive Technology and Fuel Economy Trends: 1975 Through 2004" (FE Trends). EPA420-R-04-001, 2004. http://www.epa.gov/otaq/fetrends.htm

Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). Public Law 109-59, Section 1121 HOV Facilities. August 10, 2005.

U.S. Department of Transportation (DOT), Federal Highway Administration (FHWA). "Safe Accountable Flexible Efficient Transportation Equity Act: A Legacy for Users." http://www.fhwa.dot.gov/safetealu/

U.S. DOT, National Highway Traffic and Safety Administration (NHTSA). "Vehicles and Equipment." http://www.nhtsa.dot.gov/portal/site/nhtsa/menuitem.d0b5a45b55bfbe582f57529cdba046a0/

U.S. Environmental Protection Agency (EPA), Office of Transportation and Air Quality (OTAQ). "Basic Information." http://www.epa.gov/fueleconomy/basicinformation.htm

U.S. EPA, OTAQ. "Certification and Fuel Economy Information System (CFEIS)." http://www.epa.gov/otaq/cfeis.htm

U.S. EPA, OTAQ. "Green Vehicle Guide." www.epa.gov/greenvehicles

U.S. EPA, OTAQ. "Notice of Proposed Rulemaking: Revisions to Improve Calculation of Fuel Economy Estimates." 71 FR 5426, February 9, 2006. http://www.epa.gov/fueleconomy/regulations.htm#estimates

U.S. EPA, OTAQ. "Regulations and Standards." http://www.epa.gov/fueleconomy/regulations.htm#cafe