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# Hybrid Cars: Fuel Economy

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***Abstract***

With the increase in vehicle population in the United States over past decades, there has become a growing concern on the impact to our environment. Through the use of hybrid cars it is possible to greatly reduce the gasoline consumption in Massachusetts and the nation. This technology can have such an impact that by replacing 73.1 percent of the current vehicle population in the United States, with the Toyota Prius , the importation of oil from non-OPEC nations is unnecessary.

## ***Introduction***

Cars on the road today are much more fuel-efficient and have much lower emissions than the cars of yesteryear, however they are still not clean enough. In the past year two unusual cars were introduced to the market designed to be the cleanest cars built to date. They are the Honda Insight and the Toyota Prius. These two vehicles are gasoline electric hybrids that are different from both the regular gasoline powered and electric powered cars produced today. Having more of these two cars on the roads of major cities would mean reduced tailpipe emissions that would significantly lower air pollution but it would also mean a conservation of natural resources. Because these cars get significantly greater gas mileage than regular internal combustion engine vehicles, that will conserve the depleting petroleum reserves. This will be the idea behind our IQP project. We will demonstrate that in order to save the environment both in terms of reducing air pollution and in terms of conserving gasoline, people will have to trade in their gas guzzling SUV's for more "greener" forms of transportation. One group will focus on emissions and our group will focus on fuel consumption.

Our study is directed by a problem facing the future of the United States. Oil resources in the world are becoming limited and there is great need for decreasing our dependence on fossil fuels. Here are a few facts about the issue which are true for the 1999<sup>1</sup>:

- The Nation's petroleum production fell to an average of 10.7 barrels of oil per day per well.

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<sup>1</sup> <http://www..eia.doe.gov/kids/milestones/petroleum.html>

- U.S. petroleum consumption reached 19.4 million barrels per day, an all-time high.
- Of every 10 barrels of petroleum consumed in the United States, more than 4 barrels were consumed in the form of motor gasoline. The transportation sector alone accounted for two-thirds of all petroleum used in the United States.
- To meet demand, crude oil and petroleum products were imported at the rate of 10.5 million barrels per day, while exports measured 0.9 million barrels per day.
- Net imports of crude oil and petroleum products more than doubled from the 4.3 million barrels per day in 1985 to 9.6 million barrels per day. The five leading suppliers of petroleum to the United States that year were Saudi Arabia, Venezuela, Canada, Mexico, and Nigeria.

The United States imports oil from two groups of countries<sup>2</sup>:

OPEC Countries	Non-OPEC Countries
Iraq	Canada
Nigeria	Colombia
Saudi Arabia	Mexico
Venezuela	Norway
	United Kingdom

**Table 1 Origin of United States' Imported Petroleum**

OPEC stands for the Organization of the Petroleum Exporting Countries. These countries' economies are heavily reliant on oil export revenues. They therefore seek stable oil prices that are fair and reasonable for both producers and consumers of oil. This means that all the non-OPEC

<sup>2</sup> [http://www.eia.doe.gov/oil\\_gas/petroleum/pet\\_frame.html](http://www.eia.doe.gov/oil_gas/petroleum/pet_frame.html)

countries are unreliable. It would be nice to eliminate the importing from these countries.

Though it is not likely that the population of the United States will discontinue the use of gasoline as a method of automotive power, the impact of a vehicle that minimizes fuel consumption is significant.

This project will demonstrate that through the use of hybrid vehicles in place of standard combustion engines, it is possible to greatly reduce the amount of gasoline used in Massachusetts and on a larger scale that of the entire United States. It involves extensive research of the hybrid car, mainly the Toyota Prius. The reason for researching the Toyota Prius over other hybrid vehicles such as the Honda Insight, for example, is because the Toyota Prius is a Compact vehicle. We assume that the main consumer of a hybrid vehicle will be one that replaces a compact vehicle. If we replace a certain percentage of vehicles with the Toyota Prius, will we be able to eliminate any importing of petroleum to the United States?

The extensive research involved will include finding the gas mileage of certain vehicles, the average distance traveled per year by an individual, the total number of vehicles registered in Massachusetts and the United States, the total amount of gasoline used per year by a certain vehicle, and more. Through many different calculations, the result will hopefully be positive enough to show our findings to other interested people. This project could very well propose a new law concerning the use of certain vehicles on the road.

## ***Background Information***

Automakers have been looking for ways to meet increasingly stringent demands for cleaner tailpipe emissions. In the '90s, electric cars like GM's EV1 were thought to be the answer, but they are limited by poor range and the fact that they have to be "plugged in" in order to be recharged. Hydrogen-fueled fuel cell cars will some day be the ultimate evolution of the automobile, as their exhaust byproduct is essentially water vapor. But the technology for fuel cell cars is still young, and mass-produced fuel cell cars are years away.

For today and the near future, the best hope is hybrid vehicles. The Prius is a hybrid-electric vehicle, only the second such mass-produced car to be available in America (Honda's Insight was the first). Hybrid cars combine a gasoline engine with an electric motor. Since hybrids are still fueled by gasoline, they don't have to be plugged in or recharged. In the case of the Prius and Insight, the result of hybrid technology is reduced emissions and improved fuel efficiency when compared to a normal gasoline-powered car. The only fear has been that a hybrid vehicle would never be useful as a real car that real people would want to buy. With the Prius, Toyota has largely quieted those fears. Hybrids are here to stay.

While the Prius is new to the American consumer for 2001, Toyota has been selling them in Japan since December 1997. The EPA rates the Prius at 52 mpg in the city and 45 mpg on the highway, theoretically allowing over 600 miles between fill-ups. Twist the key and the engine thrums to life after a brief delay. Move the shifter lever into the drive position, and the Prius shoves off. How it does this, however, is perhaps the most intriguing method of propulsion you'll find in a car today. At low speeds and light throttle

applications, the Prius relies completely on the electric motor for acceleration. This means that when the car is accelerating gently from a stop, driving around a parking lot, or even cruising at 35 mph down a city street, it might be doing it with 100 percent electrical power. The engine, meanwhile, is completely inert. The obvious benefit to this is that if the engine isn't running, it isn't using any fuel. This attribute is a big contributor to the Prius' city EPA rating of 52 mpg. The engine is responsible for recharging the hybrid battery, and the Prius is also capable of recapturing some energy when it is coasting or braking.

Toyota's hybrid is perfectly suited for urban driving and commuting. In fact, the more congested the driving environment is, the more the Prius makes sense. With traffic at a near standstill, the Prius relied solely on its electric motor to provide all the power necessary for the stop-and-go nature of the traffic jam. The Prius is a hybrid that is actually useable. It's a hybrid for the masses. Hybrids represent the future of automotive design, and Toyota plans to have the best hybrid technology once they do become the dominant design.



## ***Project Goal***

Our goal is to determine the number of gallons of gasoline possibly saved annually in Massachusetts and in the United States if more cars on the road are replaced with hybrids. We will examine everything from the extreme scenario of replacing all vehicles with hybrids to the more realistic scenario of replacing only compact cars with hybrids and everything in between to see just how much gas can be saved.

After examining these scenarios we can then hopefully conclude the project with some very dramatic findings. To find these results, we can compare our calculations to how much crude oil the United States imports.

After all the comparisons are completed, we will then report them to the government to hopefully turn a couple of heads. A possibility exists that the United States might not require importing crude oil from other countries, which would reduce the U.S. reliance on foreign resources.

## ***Methodology***

As stated above, the goal of this project is to determine if it is possible to save a significant amount of gasoline if we replace a certain amount of automobiles on the road with the Toyota hybrid model, the Prius. If this can be accomplished, can the United States eliminate importing of oil from unreliable countries? To determine if this is possible, we can assume some scenarios of replacing a compact vehicle with the Toyota Prius, for example. If we now compare the new amount of gasoline consumed with the old amount, we can determine how much imported gasoline can be eliminated.

## **Summary**

The first step in reaching our goal is to determine what kind of data we want to gather, which would include the year, the types of vehicles, and additional distinguishing factors between vehicle platforms. The chosen categories of vehicles will be assigned percentages corresponding to the number of vehicles in that category registered on the road. The reason for determining the percentage is so we can use the same formulas for both the United States and Massachusetts.

1. Choose a specific year to work with: 1999
2. Find the total number of automobiles registered and the total number of gallons used in 1999: *see Table 2*
3. Determine the categories of vehicles that will be used:  
*Compact, Light Truck, Midsize, Mini-SUV, Minivan, Sub-Compact, and SUV*
4. Break up the categories into percentages: *see Figure 2*

5. Find the average gas mileage for each category: *see Table 3*

After finding all the information necessary for this research, we can now make some calculations. What numbers are we looking for? Our calculations must lead us to the amount of gasoline saved in 1999 by each category of automobiles. The following steps will show how this was accomplished.

6. Use the percentages to calculate the number of vehicles and the gallons used per category: *see Table 4 – Formulas 1,2*
7. Check your previous work to see how accurate your data is:  
*98% accurate – Formula 4*
8. Find the combined gas mileage for the Toyota Prius: *48.0 mpg*
9. Calculate the gallons of gas used by an individual in 1999 for each category: *see Table 5 – Formula 3*
10. Calculate the gallons of gas saved per category and also percentage saved: *see Table 6 – Formulas 5,6*

We can now use the calculated numbers to assume a series of scenarios. Since we are using a large number of categories and we have also been calculating data for both the United States and Massachusetts, we can create varying scenarios. These depicted populations will range from the ideal scenario, of a pure hybrid market, to a scenario with a smaller percentage of hybrids in use, having lesser impact.

11. Determine a group of scenarios that would show the best results and calculate the amount of a gasoline that will be saved by each scenario: *see Table 7 – Formula 7*

After calculating scenarios we must determine if the scenarios will be significant enough to even consider. In order to do this we must find the amount of gasoline the United States imports. After doing so we can work backwards with a ratio formula to calculate the most practical scenarios.

12. Find the amount of gasoline imported to the United States in 1999: *75.3 billion gallons – Formula 8*
13. Determine where the amount of imported gasoline is impacted by the scenarios and explain the results: *61.4% of all vehicles registered in the United States must be replaced with the Toyota Prius to eliminate the importing of OPEC's petroleum, or replacing 73.1% of registered vehicles could eliminate importing non-OPEC petroleum imports. – Formula 9*

## **Formulas**

This project involves a number of formulas that will be addressed in the following paragraphs. The first two formulas will involve our gathered information, the total amount of vehicles registered and the total amount of gasoline used in 1999, and apply it to our percentages to calculate the number of vehicles registered in each category and the amount of gasoline consumed by each category in 1999.

- **Vehicles** → *number of vehicles registered in a category*
- **Category Percentage** → *determined percentage of the number of cars in a particular category out of the total number of cars registered*
- **Total Vehicles** → *total number of vehicles registered in 1999*

1. 
$$\boxed{(\text{Vehicles}) = (\text{Category Percentage}) * (\text{Total Vehicles})}$$

- **Gallons Used** → *amount of gasoline consumed by a particular category in 1999*
- **Total Gallons Used** → *total amount of gasoline consumed in 1999*

2. 
$$\boxed{(\text{Total Gallons consumed by class}) = (\text{gallons used by one vehicle}) * (\# \text{ vehicles in class})}$$

These results are recorded in Table 4 and will be used in later formulas.

The average gas mileage was determined for each category. These averages are accurate because all the cars in a particular category were taken into account and the gas mileage of each vehicle in the category only

varied by one or two miles per gallon. The averages were then divided by the assumed miles an individual travels per year. The result of this calculation is the amount of gasoline consumed by an individual automobile in a particular category per year.

- **Gas Mileage** → *average gas mileage for that category (expressed in miles per gallon, MPG)*
- **Individual Gallons Used** → *amount of gasoline consumed by an individual automobile per year*

$$3. \frac{(15,000 \text{ miles})}{(\text{Gas Mileage})} = (\text{Individual Gallons Used})$$

At this point we can check to see if our method of obtaining the category percentages was accurate. The reason for this is because our method of determining the percentages was very shaky. If we verify our numbers now then the rest of our calculations will be much more reliable. To do this we can multiply the number of vehicles in each category with their corresponding individual gallons used. This would give us the amount of gasoline consumed by each category. If we compare the results with the result of Formula 2, we will get an accuracy percentage, which will tell us how accurate our method of attaining percentages was.

- **Accuracy Percentage** → *how accurate our method was in determining the percentage of cars in each category*

$$4. \frac{(\text{Vehicles}) * (\text{Individual Gallons Used})}{(\text{Gallons Used})} = (\text{Accuracy Percentage})$$

After feeling confident with the accuracy of our data, the next step is to calculate how much gasoline would be saved if we replaced a certain category of vehicles with the Toyota Prius. To do this we need to find the amount of gasoline consumed by an individual Toyota Prius per year using Formula 3. Then we subtract the result from the average gallons used by a certain category and divide it by the same number to result in the percentage of how much gasoline is saved.

- **Gasoline Percentage Saved** → *percent of gasoline saved by replacing a category of automobiles with the Toyota Prius*

$$5. \quad \frac{(\text{Individual Gallons Used}) - (312.5 \text{ gallons})}{(\text{Individual Gallons Used})} = (\text{Percentage of Class Use Saved})$$

We can now take this percentage and multiply it by the amount of gasoline a vehicle category consumes in one year (Formula 2) to result in the amount of gasoline saved if we replace the category with the Toyota Prius.

- **Gallons Saved** → *amount of gasoline saved if the category is replaced with the Toyota Prius*

$$6. \quad (\text{Gasoline Percentage Saved}) * (\text{Gallons Used}) = (\text{Gallons Saved})$$

The next step to reaching our goal is to create many scenarios to determine if our savings is significant. To do this we must choose a scenario percentage. This percentage will be the amount of vehicles in the category that will be replaced by the Toyota Prius. After multiplying the percentage of vehicles being replaced, by the gallons saved in Formula 6, we will determine the amount of gasoline saved in the scenario.

- **Scenario Percentage** → *amount of vehicles in the category that will be replaced by the Toyota Prius for the scenario*
- **Scenario Gallons Saved** → *amount of gasoline saved for the scenario*

$$7. \text{ (Scenario Percentage)} * \text{(Gallons Saved)} = \text{(Scenario Gallons Saved)}$$

We now need to find the amount of gasoline the United States imported in 1999 to see if it will fit into one of our scenarios. The consumption is given in units of barrels per day. We will use formula 8 to convert the units to a form that will fit our needs.

- **Imported  $\frac{\text{Barrels}}{\text{Day}}$**  → *amount of gasoline imported to the United States*
- **Imported Gallons** → *amount of gasoline imported to the United States converted to gallons*

$$8. \left( \text{Imported} \frac{\text{Barrels}}{\text{Day}} \right) * \left( 365 \frac{\text{Days}}{\text{Year}} \right) * \left( 19 \frac{\text{Gallons}}{\text{Barrel}} \right) = \text{(Imported Gallons)}$$

After discovering that the imported amount of gasoline does fit into one of our scenarios we can now fine-tune the scenario percentage by working backwards. We must first find the scenario percentage that results in the closest savings to the amount of imported gasoline. We then take this percentage and multiply it by the result of dividing the imported amount of gasoline by the amount of gasoline saved in the scenario. This will give us our goal. It will yield a percentage that will tell us how many vehicles of that



category or a combination of categories must be replaced by the Toyota Prius in order to eliminate the importing of gasoline from other nations.

- **Replace Percentage** → *how many vehicles of that category or a combination of categories must be replaced by the Toyota Prius in order to eliminate the importing of gasoline from other nations*

9. 
$$\text{(Scenario Percentage)} * \frac{\text{(Imported Gallons)}}{\text{(Scenario Gallons Saved)}} = \text{(Replace Percentage)}$$

## **Assumptions**

- The target platform of the Prius will be to replace a Compact vehicle
- All gathered data is correct
- All sources are reliable
- Average distance traveled per vehicle is 15,000 miles per year
- All vehicles stated are the only vehicles traveling on the road
- All vehicle classes not included in this study have such a small registered vehicle population that they may be considered negligible.
- Percentages are equivalent for both Massachusetts and the United States
- By taking a certain percentage of the amount of gasoline used, we are taking the same percentage of the amount of cars registered.

## **Analysis**

Our first step was to gather as much information about the hybrid car as possible in order to fully understand how the new technology works. This included gas mileage, size of the engine, aerodynamics of the body, and more. Locating this information involved going to many governmental websites such as the U.S. Department of Transportation Federal Highway Administration<sup>3</sup> and even Toyota's main website<sup>4</sup>. We also visited the Worcester Registry of Motor Vehicles to try and attain more granular data such as exactly how many vehicles were registered in Massachusetts and also what categories these vehicles fit into. After gathering all this information we laid everything out on the table.

### **1. Choose a specific year to work with**

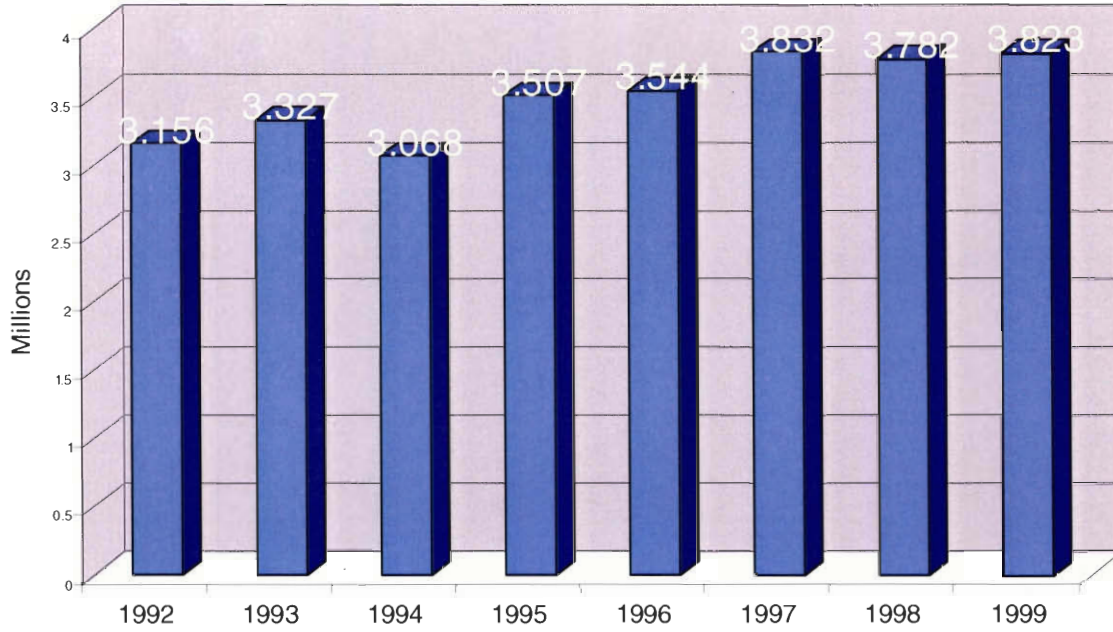
Our first goal was to choose a specific year where we should gather all of our data (gas mileage of certain vehicles, the average distance traveled per year by an individual, the total number of vehicles registered in Massachusetts and the United States, the total amount of gasoline used per year by a certain vehicle, etc.) After looking at Figure 1<sup>5</sup>, we chose 1999 data because it was the most recent year in a relatively flat trend and also it is a more recent year. The reason for choosing a year on the trend line is because this is where the amount of vehicles in Massachusetts remains around a steady number for more than two years. This is good because our conclusions will affect a bigger block than one year.

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<sup>3</sup> <http://www.fhwa.dot.gov/ohim/hs99/index.htm>

<sup>4</sup> <http://www.toyota.com/index1.html>

<sup>5</sup> <http://www.fhwa.dot.gov/ohim/hs99/index.htm>



**Figure 1 Number of Vehicles Registered in Massachusetts per Year**

2. Find the total number of automobiles registered and the total number of gallons used in 1999

From the U.S. Department of Transportation Federal Highway Administration we were able to locate these following statistics for the year 1999:

	Massachusetts	United States
Total Number of Automobiles Registered	3,822,524	132,432,044
Total Amount of Gasoline Consumed (Gallons)	2,738,288,000	132,260,590,000

**Table 2 Total Number of Vehicles Registered and Total Number of Gallons Used**

3. Determine the categories of vehicles that will be used

All cars made are put into categories or vehicle size classes. The size class for cars is determined by measuring the interior volume.<sup>6</sup> For example, a Compact vehicle is between 100 and 109 cubic feet of passenger and luggage volume. Since some of the categories have a very small number of vehicles, they will be assumed insignificant and not be taken into account.

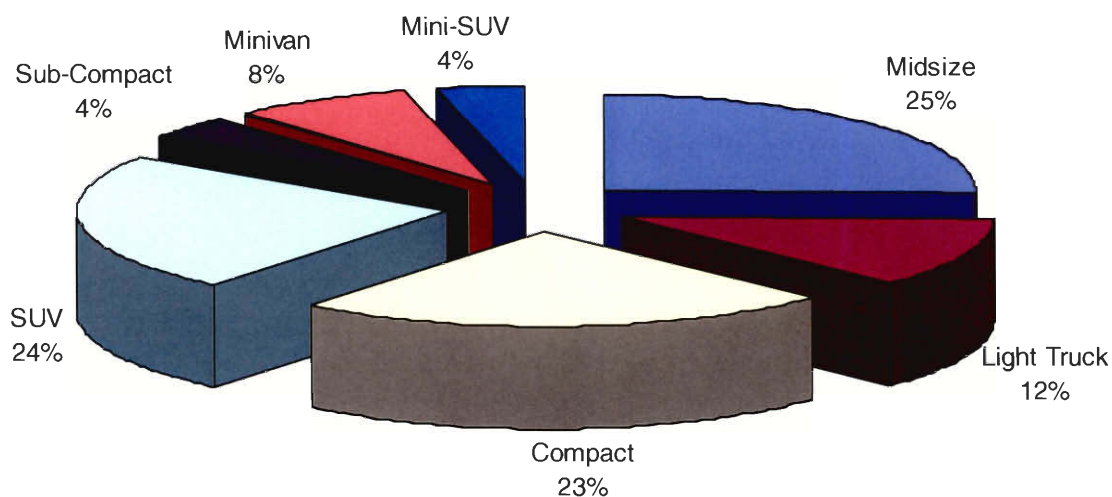
<sup>6</sup> <http://www.fueleconomy.gov/feg/info.shtml>

The categories that will be used are:

- Compact
- Light Trucks
- Midsize
- Mini-SUV
- Minivan
- Sub-Compact
- SUV

#### 4. Break up the categories into percentages

The categories will now be given percentages. There are many methods of doing this but we chose to use the top fifty most popular vehicles in the Kelly Bluebook<sup>7</sup>. This method would be highly accurate because it would include both new and used cars. We went through the fifty cars and put each car into one of the categories. After all the cars were put into categories, the amount in each category was divided by fifty to determine the category's percentage. Since the Kelly Bluebook is distributed nationwide the percentage will only be used to build equations that can be used for both Massachusetts' and the United States' calculations.



**Figure 2 Percentage Breakup of Each Category**

<sup>7</sup> <http://www.kbb.com>

5. Find the average gas mileage for each category

We then found the average gas mileage for each category. These numbers were calculated by taking the gas mileage of all the vehicles in each category and determining the average. This average is very accurate because most of the vehicles had the same gas mileage ( $\pm 3$  miles per gallon). This is due to the fact that the category of the vehicle signifies the size of the vehicle and gas mileage is greatly affected by the vehicles size. The average gas mileages were as follows:

Category	Combined Average Miles per Gallon
Compact	26.2
Light Truck	17.3
Midsize	22.2
Mini-SUV	23.2
Minivan	20.1
Sub-Compact	24.9
SUV	16.6

**Table 3 Average Gas Mileage for Each Category**

6. Use the percentages to calculate the number of vehicles and the gallons used per category

Using Formulas 1 and 3, we were able to calculate the number of cars in each category, the number of gallons used by each category and the total amount of fuel used in the United States and Massachusetts. This is done by taking the number of vehicles in each category and multiplying it by how many gallons of gasoline an individual vehicle in that same category consumes in one year. Since there is no way to determine the exact number

of miles an individual vehicle traveled in a year we assumed that the number of miles traveled by a single vehicle per year is 15,000.

The number of cars in each category had to be calculated because it was unable to be found. After visiting the Worcester Registry of Motor Vehicles we were redirected to Boston's Registry but was unable to contact anyone who could have provided us with the numbers.

The following is a chart with the results of our calculations:

Category	Massachusetts		United States	
	Number of Vehicles	Gallons Used (Millions)	Number of Vehicles	Gallons Used (Millions)
Compact	879,290	503.4	30,732,927	17,594.6
Light Truck	458,760	397.8	16,034,570	13,903.5
Midsize	955,750	645.8	33,405,355	22,571.9
Mini-SUV	152,920	98.9	5,344,857	3,455.9
Minivan	305,840	228.2	10,689,714	7,977.7
Sub-Compact	152,920	92.1	5,344,857	3,219.7
SUV	917,520	829.1	32,069,141	28,977.7
<b>TOTAL</b>	<b>3,673,638</b>	<b>2,686,089,170</b>	<b>133,621,421</b>	<b>97,701,310,490</b>

**Table 4 Number of Vehicles and Gallons Used per Category**

After finding this data, we decided to go backwards and to see if using the Kelly Bluebook to calculate percentages of categories was as accurate as we had assumed. From the U.S. Department of Transportation Federal Highway Administration we found that the total gallons of gas used in Massachusetts were 2,738,288,000 in 1999.



## 7. Check your previous work to see how accurate your data is

By doing a simple calculation we can see how accurate we were by using the Kelly Bluebook:

$$\frac{\text{Calculated Total Gallons Used}}{\text{Actual Total Gallons Used}} = \frac{2,686,089,170}{2,738,288,000} = 98\%$$

Our result of 98% shows us that it is highly accurate to use the Kelly Bluebook to determine the percentages of each category. We also checked with the other group that was working on the emissions aspect of the hybrid vehicle. Their method of determining the percentages was to count a certain number of cars and put all the cars into the categories and divide that number by the total number of vehicles counted. Their percentages were very close to ours, which tells us that all methods were extremely accurate.

## 8. Find the combined gas mileage for the Toyota Prius

After finding and calculating all the data for all the cars on the road, it was now time to locate the data needed for the Toyota Prius. After going to Toyota's website we found that the Toyota Prius is a compact vehicle and it gets a combined average gas mileage of 48.0 mpg<sup>8</sup>. Now we can calculate the number of gallons consumed by an individual driving 15,000 miles in one year using formula 3.

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<sup>8</sup> <http://prius.toyota.com/>

9. Calculate the gallons of gas used by an individual in 1999 for each category

Category	Gallons Used by an Individual
Compact	572.5
Light Truck	867.1
Midsize	675.7
Mini-SUV	646.6
Minivan	746.3
Sub-Compact	602.4
SUV	903.6
Toyota Prius	312.5

**Table 5 Gallons Used in 1999 by a Single Vehicle**

## 10. Calculate the gallons of gas saved per category

We can now start to determine how much gasoline can be saved by applying different scenarios to our data and using formulas 5 and 6. To start we considered the most ideal situation: replacing all the vehicles on the road with a Toyota Prius. Our results were as follows:

Category	Gasoline Saved	Mass.	U.S.
		Gasoline Saved (Gallons)	Gasoline Saved (Gallons)
Compact	45.4%	228,615,400	7,990,561,020
Light Truck	64.0%	254,428,296	8,892,772,522
Midsize	53.8%	347,128,400	12,132,824,936
Mini-SUV	51.7%	51,090,572	1,785,716,724
Minivan	58.0%	132,673,392	4,637,197,933
Sub-Compact	48.1%	44,331,508	1,549,474,044
SUV	65.4%	542,346,072	18,956,069,245
<b>TOTAL</b>		1,600,613,640	55,944,616,424

Table 6 Gasoline Saved in 1999 per Category

## 11. Determine a group of scenarios that would show the best results and calculate the amount of a gasoline that will be saved by each scenario

After seeing such great results we had a little fun and applied the data to a total of six scenarios. The first three deal with replacing all the vehicles with the Toyota Prius. The other three situations, not as ideal, replace just the Compact category with the Toyota Prius. This would make more sense since the Prius itself is a compact. It is more likely that someone would replace their Toyota Camry with the Prius than replacing the Prius with a

Jeep Wrangler, for example. These calculations are done using formula 7. Here are the results for our six scenarios:

Scenario	Mass.	U.S.
	Gasoline Saved (Gallons)	Gasoline Saved (Gallons)
100% of All with Prius	1,600,613,640	55,944,616,424
50% of All with Prius	800,306,820	27,972,308,212
25% of All with Prius	400,153,410	13,986,154,106
100% of Compacts with Prius	228,615,400	7,990,561,020
50% of Compacts with Prius	114,307,700	3,995,280,510
25% of Compacts with Prius	57,153,850	1,997,640,255

**Table 7 Gasoline Saved Applying Certain Scenarios**

Now that we know how much gasoline would be saved with these six scenarios, we have to figure out what those results mean. Are these results dramatic savings or are the results too small to even bother?

## 12. Find the amount of gasoline imported to the United States in 1999

According to the Energy Information Administration (EIA), the United States imported a total of 10,852,000 BBL of crude oil<sup>9</sup>. When searching through the Empire State Petroleum Association's website we came across the fact that one barrel (BBL) of crude oil is about equal to 19 gallons of gasoline. This was the last piece of the puzzle. Using formula 8 we discover that the United States imported about 75.3 billion gallons of gasoline in the year 1999. Since this amount exceeds all of our scenarios, we must break

<sup>9</sup> <http://www.eia.doe.gov/emeu/aer/txt/tab0504.htm>

down the importing countries and look at how many gallons of gasoline each country imports. The EIA gave us the information for the following table:

OPEC Countries			Non-OPEC Countries		
Countries	BBL (thousand BBL per Day)	Gallons (thousand gallons in 1999)	Countries	BBL (thousand BBL per Day)	Gallons (thousand gallons in 1999)
Iraq	725	5,027,875	Canada	1,539	10,672,965
Nigeria	657	4,556,295	Colombia	468	3,245,580
Saudi Arabia	1,478	10,229,125	United Kingdom	365	2,531,275
Venezuela	1,493	10,353,955	Norway	304	2,108,240
			Mexico	1,324	9,181,940
TOTAL		34,349,055	TOTAL		40,909,565

**Table 8 Breakup of the Amount of OPEC and Non-OPEC Imported Petroleum**

Looking at the total gallons imported by both OPEC and Non-OPEC countries, it appears that replacing a certain amount of vehicles with the Toyota Prius can eliminate either non-OPEC or OPEC importing. After applying Formula 8, we determine the following figures:

$$\text{Formula 8} \rightarrow \left( \text{Imported} \frac{\text{Barrels}}{\text{Day}} \right) * \left( 365 \frac{\text{Days}}{\text{Year}} \right) * \left( 19 \frac{\text{Gallons}}{\text{Barrel}} \right) = (\text{Imported Gallons})$$

OPEC gallons imported per year: 34,349,055,000

Non-OPEC gallons imported per year: 40,909,565,000

**13.** Determine how the amount of imported gasoline is impacted by the scenarios and explain the results

$$\text{Formula 9} \rightarrow (\text{Scenario Percentage}) * \frac{(\text{Imported Gallons})}{(\text{Scenario Gallons Saved})} = (\text{Replace Percentage})$$

*According to formula 9, if we replace **61.4%** of all the vehicles in the United States with the Toyota Prius, we will eliminate the importing of petroleum from OPEC Countries.*

*According to formula 9, if we replace **73.1%** of all the vehicles in the United States with the Toyota Prius, we will eliminate the importing of petroleum from non-OPEC Countries.*

While fewer cars in the overall registered motor vehicle population would need to be exchanged for hybrids to overcome the importation of fuel from OPEC nations, there is the potential for a large economic impact in those countries if the U.S. terminates the importation of oil. Due to the more regulated nature of the OPEC oil pricing system and the elevated economic interest for OPEC nations on their exportation of fuel, we have decided there is a larger risk to world economies if importation from them were terminated.

## ***Conclusion***

The introduction of hybrid vehicles to the vehicle market has begun a new era in automotive technology. Through the use of hybrid cars, including the Toyota Prius, there is great potential for an impact on fuel consumption in Massachusetts as well as the entire country. Through the use of this new technology, we can greatly increase the fuel efficiency of the modern automobile thus reducing our dependency on natural resources.

After proposing several situations that could occur in the vehicle populations through the increase in number of hybrid vehicles in use, it has been shown that it is numerically possible to cease the importation of crude oil from our non-OPEC contributing nations. Calculations have indicated that a substitution of 73.1% of the current vehicle population in the U.S. with hybrid vehicles will eliminate any need for the importation of oil from the countries of Canada, Columbia, Mexico, Norway and the United Kingdom. This find has the potential to reduce our dependency on oil as a resource, and will help to stretch the limited resource of crude oil that remains in the earth.

However, the possibility of halting importation of oil may not be a practical step in our future. The economy of several nations could lie in the balance, and this could have an unseen impact on the world economy as a whole. Those effects would have to be researched and weighed carefully before the termination of oil imports.

Another consideration about the hybrid technology also could test the practicality and likelihood that the hybrid vehicle will become a widely used vehicle in the masses. Currently there are few options available when

purchasing a hybrid. The hybrid vehicles are only available in the form of the Toyota Prius and Honda Insight; the compact and subcompact vehicle classes respectively. For the hybrid to have the greatest impact, there needs to be the introduction of the technology on greatly varied platforms of vehicles. Such examples include the future production of hybrid SUVs, Minivans, Light Trucks and all other vehicle classifications. These vehicles are on the horizon, but are still currently only in the concept phase of development.

While the Toyota Prius and other hybrids have the potential to conserve billions of gallons of gasoline, it is not to say that these cars are the answer to our increasing problem of depleting oil reserves on earth. The hybrid technology just has the potential to slow the rate of depletion of available petroleum.



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## ***Appendix***

- List of Top 50 Cars: Kelly Bluebook
- List of all vehicles by make and model, includes vehicle classification and combined fuel economy.



**Kelley Blue Book**  
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**Top 50  
Most Popular Cars at kbb.com**

The Kelley Blue Book site generated over **25 million** vehicle pricing reports last month. Here is a list of the **Top 50**—the new car models people are most interested in—based on the New Pricing reports generated last month.

1	Chevrolet / GMC	Pickups (Silverado & Sierra)
2	Ford	Pickups (F Series)
3	Honda	Accord
4	Toyota	Camry
5	Honda	Civic
6	Ford	Explorer
7	Nissan	Altima
8	BMW	3 Series
9	Chevrolet / GMC	Tahoe / Yukon
10	Volkswagen	Jetta
11	Toyota	Tacoma
12	Volkswagen	Passat
13	Honda	Odyssey
14	Dodge	Ram Pickups
15	Honda	CR-V
16	Toyota	Highlander
17	Ford	Escape

18	Chevrolet	TrailBlazer
19	Nissan	Maxima
20	Jeep	Grand Cherokee
21	Mercedes-Benz	C-Class
22	Chrysler / Dodge	Voyager / Caravan
23	Audi	A4
24	Ford	Mustang
25	Acura	MDX
26	Jeep	Liberty
27	BMW	5 Series
28	Toyota	4Runner
29	Nissan	Xterra
30	Hyundai	Santa Fe
31	Ford	Focus
32	Toyota	Sequoia
33	Toyota	Tundra
34	BMW	X5
35	Chevrolet / GMC	S10 / Sonoma
36	Dodge	Dakota Pickups
37	Toyota	Corolla
38	Acura	TL
39	Ford	Ranger
40	Nissan	Frontier
41	Ford	Expedition
42	Dodge	Durango
43	Subaru	Impreza

44	Chevrolet / GMC	Blazer / Jimmy
45	Toyota	RAV4
46	Nissan	Pathfinder
47	Lexus	RX 300
48	GMC	Envoy
49	Nissan	Sentra
50	Mitsubishi	Eclipse

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Class	Manufacturer	carline name	displ	cyl	trans	drv	cty	hwy	cmb	ucty	uhwy	ucmb	fl	G	T	S	2pv	2lv	4pv	4lv	hvp	niv	fcost	eng dscr	trans dscr	vpc	cls		
TWO SEATERS	ACURA	NSX	3.0	6	Auto(S4)	R	17	24	20	19.1342	30.2000	22.9121	P										1162	DOHC-VTEC	2MODE	4	1		
TWO SEATERS	ACURA	NSX	3.2	6	Manual(M6)	R	17	24	19	18.7000	30.4000	22.6171	P										1223	DOHC-VTEC		4	1		
TWO SEATERS	AUDI	TT ROADSTER	1.8	4	Manual(M5)	F	22	30	25	23.9499	37.9000	28.7043	P		T								930			5	1		
TWO SEATERS	AUDI	TT ROADSTER QUATTRO	1.8	4	Manual(M6)	4	20	28	23	22.1821	35.9077	26.7904	P		T								1011			5	1		
TWO SEATERS	BMW	Z3 COUPE	3.0	6	Manual(M5)	R	21	28	24	23.3000	36.4523	27.8164	P										970			4	1		
TWO SEATERS	BMW	Z3 COUPE	3.0	6	Auto(S5)	R	19	27	22	21.3268	34.6842	25.7976	P										1058		3MODE	4	1		
TWO SEATERS	BMW	Z3 ROADSTER	2.5	6	Manual(M5)	R	20	27	23	22.1000	34.9000	26.4684	P										1011			4	1		
TWO SEATERS	BMW	Z3 ROADSTER	2.5	6	Auto(S5)	R	19	26	22	21.3701	33.5440	25.5414	P										1058		3MODE	4	1		
TWO SEATERS	BMW	Z3 ROADSTER	3.0	6	Manual(M5)	R	21	28	24	23.3000	36.4523	27.8164	P										970			4	1		
TWO SEATERS	BMW	Z3 ROADSTER	3.0	6	Auto(S5)	R	19	25	21	20.7065	32.5370	24.7573	P										1107		3MODE	4	1		
TWO SEATERS	BMW	Z8	4.9	8	Manual(M6)	R	13	21	16	14.9485	26.5000	18.5963	P	G									1453	GUZZLER		4	1		
TWO SEATERS	CHEVROLET	CORVETTE	5.7	8	Auto(L4)	R	18	26	21	20.1000	32.9000	24.3659	P										1107		CLKUP	2	1		
TWO SEATERS	CHEVROLET	CORVETTE	5.7	8	Manual(M6)	R	19	28	22	21.3000	35.9000	26.0713	P										1058			2	1		
TWO SEATERS	DODGE	VIPER CONVERTIBLE	8.0	10	Manual(M6)	R	11	21	14	12.5000	26.4000	16.3812	P	G									1660	GUZZLER		2	1		
TWO SEATERS	DODGE	VIPER COUPE	8.0	10	Manual(M6)	R	11	21	14	12.5000	26.4000	16.3812	P	G									1660	GUZZLER		2	1		
TWO SEATERS	FERRARI	FERRARI 360 MODENA/SPIDER	3.6	8	Manual(M6)	R	11	16	13	11.9000	20.2000	14.5995	P	G									1788	GUZZLER		5	1		
TWO SEATERS	FERRARI	FERRARI 360 MODENA/SPIDER	3.6	8	Auto(S6)	R	10	16	12	11.6498	20.4980	14.4583	P	G									1937	GUZZLER	3MODE	5	1		
TWO SEATERS	FERRARI	FERRARI 550 MARANELLO/BARCHI	5.5	12	Manual(M6)	R	8	13	10	9.3989	16.7000	11.7009	P	G									2325	GUZZLER		4	1		
TWO SEATERS	HONDA	INSIGHT	1.0	3	Manual(M5)	F	61	68	64	67.3878	87.3962	75.1277	R										316		SIL	4	1		
TWO SEATERS	HONDA	S2000	2.0	4	Manual(M6)	R	20	26	22	22.3000	32.9000	26.0814	P										1058	DOHC-VTEC		4	1		
TWO SEATERS	LAMBORGHINI	DB132/144 DIABLO	6.0	12	Manual(M5)	4	10	13	11	11.4000	17.0000	13.3840	P	G									2113	GUZZLER		4	1		
TWO SEATERS	MAZDA	MX-5 MIATA	1.8	4	Auto(L4)	R	22	28	24	24.5996	35.5000	28.5436	P										970		CLKUP	4	1		
TWO SEATERS	MAZDA	MX-5 MIATA	1.8	4	Manual(M5)	R	23	28	25	25.8000	36.4000	29.6908	P										930			4	1		
TWO SEATERS	MAZDA	MX-5 MIATA	1.8	4	Manual(M6)	R	23	28	25	25.2000	35.8000	29.0738	P										930			4	1		
TWO SEATERS	MERCEDES-	SL500	5.0	8	Auto(L5)	R	16	23	19	17.9343	29.2677	21.7189	P	G				50	8				1223	GUZZLER	EMS 2MODE CL	3	1		
TWO SEATERS	MERCEDES-	SL600	6.0	12	Auto(L5)	R	13	19	15	14.3696	24.1254	17.5661	P	G				50	8				1551	GUZZLER	EMS 2MODE CL	4	1		
TWO SEATERS	MERCEDES-	SLK230 KOMPRESSOR	2.3	4	Auto(L5)	R	23	30	25	25.1255	37.8226	29.5965	P			S		48	10				930		EMS 2MODE	4	1		
TWO SEATERS	MERCEDES-	SLK230 KOMPRESSOR	2.3	4	Manual(M6)	R	20	29	23	22.3714	37.6644	27.3728	P			S		48	10				1011		EMS	4	1		
TWO SEATERS	MERCEDES-	SLK320	3.2	6	Auto(L5)	R	21	27	23	22.9000	35.0000	27.1189	P			S		48	10				1011		EMS 2MODE	3	1		
TWO SEATERS	MERCEDES-	SLK320	3.2	6	Manual(M6)	R	18	27	21	20.0617	34.5790	24.7347	P			S		48	10				1107		EMS	3	1		
TWO SEATERS	PLYMOUTH	PROWLER	3.5	6	Auto(S4)	R	17	23	19	19.0000	29.0000	22.4898	P										1223		VMODE CLKUP	4	1		
TWO SEATERS	PORSCHE	BOXSTER	2.7	6	Manual(M5)	R	19	27	22	21.5000	35.1000	26.0404	P										1058			4	1		
TWO SEATERS	PORSCHE	BOXSTER	2.7	6	Auto(S5)	R	17	25	20	19.4354	31.5430	23.4934	P										1162		2MODE	4	1		
TWO SEATERS	PORSCHE	BOXSTER S	3.2	6	Manual(M6)	R	18	26	20	19.5000	32.7000	23.8285	P										1162			4	1		
TWO SEATERS	PORSCHE	BOXSTER S	3.2	6	Auto(S5)	R	17	24	19	18.4222	30.8691	22.5058	P										1223		2MODE	4	1		
TWO SEATERS	TOYOTA	MR2	1.8	4	Manual(M5)	R	25	30	27	27.9000	38.3000	31.7838	R					46	2				749			4	1		
MINICOMPACT CARS	AUDI	TT COUPE	1.8	4	Manual(M5)	F	22	31	25	24.4704	40.0469	29.6622	P		T							65	14	930			5	2	
MINICOMPACT CARS	AUDI	TT COUPE QUATTRO	1.8	4	Manual(M5)	4	20	29	23	22.5000	36.6000	27.2186	P		T								65	11	1011			5	2
MINICOMPACT CARS	AUDI	TT COUPE QUATTRO	1.8	4	Manual(M6)	4	20	28	23	22.1821	35.9077	26.7904	P		T								65	11	1011			5	2
MINICOMPACT CARS	BMW	325CI CONVERTIBLE	2.5	6	Manual(M5)	R	19	27	22	20.8722	34.0846	25.2823	P					74	9				1058			4	2		
MINICOMPACT CARS	BMW	325CI CONVERTIBLE	2.5	6	Auto(S5)	R	19	26	21	20.7438	33.1325	24.9403	P					74	9				1107		3MODE	4	2		
MINICOMPACT CARS	BMW	330CI CONVERTIBLE	3.0	6	Manual(M5)	R	20	28	23	21.9000	35.8000	26.5365	P					74	9				1011			4	2		
MINICOMPACT CARS	BMW	330CI CONVERTIBLE	3.0	6	Auto(S5)	R	18	26	21	20.0164	32.7719	24.2668	P					74	9				1107		3MODE	4	2		
MINICOMPACT CARS	BMW	M3 CONVERTIBLE	3.2	6	Manual(M6)	R	16	23	18	17.5000	29.5431	21.4314	P	G				74	9				1293	GUZZLER		4	2		
MINICOMPACT CARS	JAGUAR	JAGUAR XK8 CONVERTIBLE	4.0	8	Auto(L5)	R	17	24	20	19.1354	31.0075	23.1186	P					70	10				1162		2MODE	4	2		
MINICOMPACT CARS	JAGUAR	JAGUAR XKR CONVERTIBLE	4.0	8	Auto(L5)	R	16	22	19	18.1432	28.7881	21.7648	P	G		S		70	10				1223	GUZZLER	2MODE	4	2		
MINICOMPACT CARS	MERCEDES-	CLK320 (CABRIOLET)	3.2	6	Auto(L5)	R	20	28	23	22.1799	35.3396	26.6448	P					76	6				1011		EMS 2MODE CL	3	2		
MINICOMPACT CARS	MERCEDES-	CLK430 (CABRIOLET)	4.3	8	Auto(L5)	R	18	24	20	19.8000	31.2000	23.6962	P					76	6				1162		EMS 2MODE CL	3	2		
MINICOMPACT CARS	MINICOMPACT CARS	MITSUBISHI ECLIPSE SPYDER	2.4	4	Manual(M5)	F	22	30	25	24.9270	38.2270	29.5541	R					75	7				810	SOHC		4	2		
MINICOMPACT CARS	MITSUBISHI	ECLIPSE SPYDER	2.4	4	Auto(S4)	F	20	27	23	22.5334	34.8786	26.8023	R					75	7				881	SOHC	2MODE CLKUP	4	2		
MINICOMPACT CARS	MITSUBISHI	ECLIPSE SPYDER	3.0	6	Manual(M5)	F	20	27	22	21.7000	34.5000	26.0491	P					75	7				1058	SOHC		4	2		



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SUBCOMPACT CARS	PONTIAC	FIREBIRD/TRANS AM	5.7	8	Auto(L4)	R	18	26	21	20.1000	32.7000	24.3163	P			84	12				1107		CLKUP	2	3	
SUBCOMPACT CARS	PONTIAC	FIREBIRD/TRANS AM	5.7	8	Manual(M6)	R	19	28	22	20.6000	35.3000	25.3505	P			84	12				1058			2	3	
SUBCOMPACT CARS	PONTIAC	SUNFIRE	2.2	4	Auto(L3)	F	23	29	26	25.8001	37.7002	30.0715	R			85	11	90	13		780		CLKUP	2	3	
SUBCOMPACT CARS	PONTIAC	SUNFIRE	2.2	4	Auto(L4)	F	23	32	27	26.1000	41.0000	31.2028	R			85	11	90	13		749		CLKUP	2	3	
SUBCOMPACT CARS	PONTIAC	SUNFIRE	2.2	4	Manual(M5)	F	22	32	26	24.7067	41.5784	30.2260	R			85	11	90	13		780		SIL	2	3	
SUBCOMPACT CARS	PONTIAC	SUNFIRE	2.4	4	Auto(L4)	F	21	28	24	23.0000	36.3000	27.5408	R			85	11	90	13		844		CLKUP	4	3	
SUBCOMPACT CARS	PONTIAC	SUNFIRE	2.4	4	Manual(M5)	F	22	32	26	24.5000	40.5000	29.7973	R			85	11	90	13		780		SIL	4	3	
SUBCOMPACT CARS	R-R MTR CAR	ROLLS ROYCE CORNICHE	6.8	8	Auto(L4)	R	11	16	13	12.6000	20.4000	15.2185	P	G					82	7		1788	GUZZLER	EMS CLKUP	2	3
SUBCOMPACT CARS	SAAB	SAAB 9-3 CONVERTIBLE	2.0	4	Auto(L4)	F	21	28	23	23.2000	35.4000	27.4584	R	T		80	13				881	B205L	2MODE CLKUP	4	3	
SUBCOMPACT CARS	SAAB	SAAB 9-3 CONVERTIBLE	2.0	4	Auto(L4)	F	21	28	24	23.4000	36.3000	27.8544	P	T		80	13				970	B205R	2MODE CLKUP	4	3	
SUBCOMPACT CARS	SAAB	SAAB 9-3 CONVERTIBLE	2.0	4	Manual(M5)	F	22	30	25	24.4000	38.7000	29.2664	P	T		80	13				930	B205R	SIL	4	3	
SUBCOMPACT CARS	SAAB	SAAB 9-3 CONVERTIBLE	2.0	4	Manual(M5)	F	21	29	24	23.8000	36.6000	28.2451	R	T		80	13				844	B205L	SIL	4	3	
SUBCOMPACT CARS	SAAB	SAAB 9-3 VIGGEN CONVERTIBLE	2.3	4	Manual(M5)	F	20	31	24	22.7000	39.4000	28.0502	P	T		80	13				970	B235R		4	3	
SUBCOMPACT CARS	SATURN	SC	1.9	4	Auto(L4)	F	26	36	29	28.7000	45.6000	34.4445	R			84	11				699	SOHC	CLKUP	8	3	
SUBCOMPACT CARS	SATURN	SC	1.9	4	Auto(L4)	F	25	35	29	27.9786	45.2908	33.7910	R			84	11				699	DOHC	CLKUP	8	3	
SUBCOMPACT CARS	SATURN	SC	1.9	4	Manual(M5)	F	28	40	33	31.6049	51.3020	38.2060	R			84	11				614	SOHC	SIL	8	3	
SUBCOMPACT CARS	SATURN	SC	1.9	4	Manual(M5)	F	27	38	31	29.9000	48.4000	36.1113	R			84	11				654	DOHC	SIL	8	3	
SUBCOMPACT CARS	SUBARU	IMPREZA AWD	2.2	4	Auto(L4)	F	23	29	25	25.4605	37.4616	29.7492	R					84	11		810		CLKUP	4	3	
SUBCOMPACT CARS	SUBARU	IMPREZA AWD	2.2	4	Manual(M5)	F	23	29	25	25.0743	37.1555	29.3720	R					84	11		810			4	3	
SUBCOMPACT CARS	SUBARU	IMPREZA AWD	2.5	4	Auto(L4)	F	23	28	25	25.2000	36.2000	29.1917	R					84	11		810		CLKUP	4	3	
SUBCOMPACT CARS	SUBARU	IMPREZA AWD	2.5	4	Manual(M5)	F	21	28	23	23.1000	35.5000	27.4081	R					84	11		881			4	3	
SUBCOMPACT CARS	SUZUKI	ESTEEM	1.6	4	Auto(L4)	F	27	34	30	30.2000	43.4000	34.9888	R					86	12		674		CLKUP	4	3	
SUBCOMPACT CARS	SUZUKI	ESTEEM	1.6	4	Manual(M5)	F	30	37	33	33.6000	47.1000	38.5755	R					86	12		614			4	3	
SUBCOMPACT CARS	SUZUKI	ESTEEM	1.8	4	Auto(L4)	F	26	33	29	28.8000	42.5000	33.6865	R					86	12		699		CLKUP	4	3	
SUBCOMPACT CARS	SUZUKI	ESTEEM	1.8	4	Manual(M5)	F	28	35	31	31.4000	44.4000	36.1650	R					86	12		654			4	3	
SUBCOMPACT CARS	SUZUKI	SWIFT	1.3	4	Auto(A3)	F	30	34	32	33.2064	44.2000	37.3915	R							77	8	632			4	3
SUBCOMPACT CARS	SUZUKI	SWIFT	1.3	4	Manual(M5)	F	36	42	39	40.4000	54.2000	45.6278	R							77	8	518		SIL	4	3
SUBCOMPACT CARS	TOYOTA	CAMRY SOLARA CONVERTIBLE	2.2	4	Auto(L4)	F	21	29	24	23.6000	36.9000	28.1689	R			90	9				844		CLKUP	4	3	
SUBCOMPACT CARS	TOYOTA	CAMRY SOLARA CONVERTIBLE	3.0	6	Auto(L4)	F	19	26	21	20.9000	33.1000	25.0558	R			90	9				964		CLKUP	4	3	
SUBCOMPACT CARS	TOYOTA	CELICA	1.8	4	Auto(L4)	F	29	36	31	31.8000	45.8000	36.8719	R							78	17	654		CLKUP	4	3
SUBCOMPACT CARS	TOYOTA	CELICA	1.8	4	Manual(M5)	F	28	33	30	30.8997	42.4000	35.1955	R							78	17	674			4	3
SUBCOMPACT CARS	TOYOTA	CELICA	1.8	4	Manual(M6)	F	23	32	26	25.7000	40.5000	30.7580	P							78	17	895			4	3
SUBCOMPACT CARS	TOYOTA	CELICA	1.8	4	Auto(S4)	F	23	30	26	25.6335	38.0990	30.0592	P							78	17	895		CLKUP	4	3
SUBCOMPACT CARS	VOLKSWAGEN	CABRIO	2.0	4	Auto(L4)	F	22	28	24	24.6376	35.8689	28.6786	R			82	8				844		CLKUP	2	3	
SUBCOMPACT CARS	VOLKSWAGEN	CABRIO	2.0	4	Manual(M5)	F	24	31	27	26.6159	39.3411	31.1500	R			82	8				749			2	3	
SUBCOMPACT CARS	VOLKSWAGEN	NEW BEETLE	1.8	4	Auto(L4)	F	23	29	25	25.2245	36.6153	29.3306	P	T						85	12	930		CLKUP	5	3
SUBCOMPACT CARS	VOLKSWAGEN	NEW BEETLE	1.8	4	Manual(M5)	F	25	31	27	27.3699	39.2601	31.6886	P	T						85	12	860			5	3
SUBCOMPACT CARS	VOLKSWAGEN	NEW BEETLE	1.9	4	Auto(L4)	F	34	44	38	37.9945	56.5504	44.5766	D	T						85	12	513		CLKUP	2	3
SUBCOMPACT CARS	VOLKSWAGEN	NEW BEETLE	1.9	4	Manual(M5)	F	42	49	45	46.4592	62.9103	52.6555	D	T						85	12	433			2	3
SUBCOMPACT CARS	VOLKSWAGEN	NEW BEETLE	2.0	4	Auto(L4)	F	22	28	24	24.6376	35.8689	28.6786	R							85	12	844		CLKUP	2	3
SUBCOMPACT CARS	VOLKSWAGEN	NEW BEETLE	2.0	4	Manual(M5)	F	24	31	27	26.6159	39.3411	31.1500	R							85	12	749			2	3
SUBCOMPACT CARS	VOLVO	C70 CONVERTIBLE	2.3	5	Auto(L5)	F	20	26	22	22.0000	33.3000	25.9649	P	T		88	8				1058		CLKUP	4	3	
SUBCOMPACT CARS	VOLVO	C70 CONVERTIBLE	2.3	5	Manual(M5)	F	21	28	23	22.8000	35.7000	27.2273	P	T		88	8				1011			4	3	
SUBCOMPACT CARS	VOLVO	C70 CONVERTIBLE	2.4	5	Auto(L5)	F	20	27	23	22.1002	34.7002	26.4167	P	T		88	8				1011		CLKUP	4	3	
COMPACT CARS	ACURA	3.2CL	3.2	6	Auto(S5)	F	19	29	23	21.3967	37.4409	26.5084	P			90	14				1011	SOHC-VTEC	2MODE	4	4	
COMPACT CARS	AUDI	A4	1.8	4	Manual(M5)	F	23	32	26	25.2000	40.6000	30.3867	P	T						88	14	895			5	4
COMPACT CARS	AUDI	A4	1.8	4	Auto(S5)	F	20	29	23	22.3007	36.5466	27.0446	P	T						88	14	1011		CLKUP	5	4
COMPACT CARS	AUDI	A4	2.8	6	Auto(S5)	F	18	26	21	19.8837	33.3481	24.2985	P							88	14	1107		CLKUP	5	4
COMPACT CARS	AUDI	A4 QUATTRO	1.8	4	Manual(M5)	F	22	30	25	24.1045	38.2739	28.9230	P	T						88	14	930			5	4
COMPACT CARS	AUDI	A4 QUATTRO	1.8	4	Auto(S5)	F	20	27	23	22.0037	34.9442	26.4037	P	T						88	14	1011		CLKUP	5	4
COMPACT CARS	AUDI	A4 QUATTRO	2.8	6	Manual(M5)	F	18	24	21	20.3335	31.1484	24.0987	P							88	14	1107			5	4
COMPACT CARS	AUDI	A4 QUATTRO	2.8	6	Auto(S5)	F	18	25	20	19.4701	32.3437	23.7183	P							88	14	1162		CLKUP	5	4



## GUIDE6-2nd

COMPACT CARS	AUDI	S4	2.7	6	Manual(M6)	4	17	24	20	19.1581	30.3600	22.9723	P	T					88	14			1162				5	4	
COMPACT CARS	AUDI	S4	2.7	6	Auto(S5)	4	17	24	20	19.2591	30.9445	23.2019	P	T					88	14			1162		CLKUP		5	4	
COMPACT CARS	BENTLEY	BENTLEY CONTINENTAL R	6.8	8	Auto(L4)	R	11	16	13	12.3908	20.0453	14.9618	P	G					89	12			1788	GUZZLER	EMS 2MODE CL		2	4	
COMPACT CARS	BMW	325I	2.5	6	Manual(M5)	R	20	29	24	22.6367	37.6419	27.5850	P						91	11			970				4	4	
COMPACT CARS	BMW	325I	2.5	6	Auto(S5)	R	19	27	22	21.2993	34.4096	25.7068	P						91	11			1058		3MODE		4	4	
COMPACT CARS	BMW	325XI	2.5	6	Manual(M5)	4	19	27	22	21.6000	34.7000	26.0205	P						91	11			1058				4	4	
COMPACT CARS	BMW	325XI	2.5	6	Auto(S5)	4	19	26	21	20.8153	32.6951	24.8840	P						91	11			1107		3MODE		4	4	
COMPACT CARS	BMW	330I	3.0	6	Manual(M5)	R	21	30	24	23.0217	37.9588	27.9756	P						91	11			970				4	4	
COMPACT CARS	BMW	330I	3.0	6	Auto(S5)	R	19	27	22	21.3268	34.6842	25.7976	P						91	11			1058		3MODE		4	4	
COMPACT CARS	BMW	330Xi	3.0	6	Manual(M5)	R	20	27	23	22.0000	34.9000	26.3894	P						91	11			1011				4	4	
COMPACT CARS	BMW	330Xi	3.0	6	Auto(S5)	R	17	25	20	19.3747	31.6921	23.4815	P						91	11			1162		3MODE		4	4	
COMPACT CARS	BMW	525I	2.5	6	Manual(M5)	R	20	29	24	22.6367	37.6419	27.5850	P						93	11			970				4	4	
COMPACT CARS	BMW	525I	2.5	6	Auto(S5)	R	19	27	22	21.2993	34.4096	25.7068	P						93	11			1058		3MODE		4	4	
COMPACT CARS	BMW	530I	3.0	6	Manual(M5)	R	21	30	24	23.0217	37.9588	27.9756	P						93	11			970				4	4	
COMPACT CARS	BMW	530I	3.0	6	Auto(S5)	R	18	26	21	20.0164	32.7719	24.2668	P						93	11			1107		3MODE		4	4	
COMPACT CARS	BMW	540I	4.4	8	Auto(L5)	R	18	24	20	20.0000	30.9000	23.7738	P						93	11			1162				4	4	
COMPACT CARS	BMW	540I	4.4	8	Manual(M6)	R	15	23	18	17.1994	29.1499	21.0902	P	G					93	11			1293	GUZZLER			4	4	
COMPACT CARS	BMW	540I	4.4	8	Auto(S5)	R	15	21	18	17.2000	26.7717	20.4979	P	G					93	11			1293	GUZZLER	3MODE		4	4	
COMPACT CARS	BMW	M5	4.9	8	Manual(M6)	R	13	21	16	14.9485	26.5000	18.5963	P	G					93	11			1453	GUZZLER			4	4	
COMPACT CARS	CHEVROLET	CAVALIER	2.2	4	Auto(L3)	F	23	29	26	25.8001	37.7003	30.0716	R					87	13	92	13	780		CLKUP		2	4		
COMPACT CARS	CHEVROLET	CAVALIER	2.2	4	Auto(L4)	F	23	32	27	26.1000	41.0000	31.2028	R					87	13	92	13	749		CLKUP		2	4		
COMPACT CARS	CHEVROLET	CAVALIER	2.2	4	Manual(M5)	F	23	33	27	25.5020	42.0214	30.9830	R					87	13	92	13	749		SIL		2	4		
COMPACT CARS	CHEVROLET	CAVALIER	2.4	4	Auto(L4)	F	21	28	24	23.0000	36.3000	27.5408	R					87	13	92	13	844		CLKUP		4	4		
COMPACT CARS	CHEVROLET	CAVALIER	2.4	4	Manual(M5)	F	22	32	26	24.5000	40.5000	29.7973	R					87	13	92	13	780		SIL		4	4		
COMPACT CARS	CHEVROLET	PRIZM	1.8	4	Auto(L3)	F	29	33	31	31.8000	42.8000	35.9588	R						88	12			654				4	4	
COMPACT CARS	CHEVROLET	PRIZM	1.8	4	Auto(L4)	F	30	40	34	33.6000	51.6000	39.8566	R						88	12			595		CLKUP		4	4	
COMPACT CARS	CHEVROLET	PRIZM	1.8	4	Manual(M5)	F	32	41	35	35.6184	52.2789	41.5815	R						88	12			579				4	4	
COMPACT CARS	CHRYSLER	SEBRING	2.4	4	Auto(L4)	F	20	27	23	22.7000	35.1000	26.9909	R					86	16			881	SOHC	CMODE CLKUP		4	4		
COMPACT CARS	CHRYSLER	SEBRING	2.4	4	Manual(M5)	F	22	30	25	24.9000	38.2000	29.5260	R					86	16			810	SOHC			4	4		
COMPACT CARS	CHRYSLER	SEBRING	3.0	6	Auto(L4)	F	19	27	22	21.3000	34.4000	25.7050	R					86	16			921	SOHC	CMODE CLKUP		4	4		
COMPACT CARS	CHRYSLER	SEBRING	3.0	6	Manual(M5)	F	20	28	23	22.6465	35.9000	27.1583	R					86	16			881	SOHC			4	4		
COMPACT CARS	CHRYSLER	SEBRING	3.0	6	Auto(S4)	F	19	27	22	21.1995	34.2493	25.5866	R					86	16			921	SOHC	2MODE CLKUP		4	4		
COMPACT CARS	CHRYSLER	SEBRING CONVERTIBLE	2.7	6	Auto(L4)	F	20	28	23	21.9000	35.4000	26.4368	R					90	11			881		CLKUP		4	4		
COMPACT CARS	CHRYSLER	SEBRING CONVERTIBLE	2.7	6	Auto(S4)	F	20	29	23	22.3000	36.6000	27.0572	R					90	11			881		VMODE CLKUP		4	4		
COMPACT CARS	DAEWOO	LANOS	1.5	4	Auto(A4)	F	24	37	28	26.5000	46.8000	32.9271	R					91	11	91	11	91	12	723	SOHC-IL4	EMS		2	4
COMPACT CARS	DAEWOO	LANOS	1.5	4	Manual(M5)	F	26	36	30	29.1000	45.8000	34.8121	R					91	11	91	11	91	12	674	SOHC-IL4			2	4
COMPACT CARS	DAEWOO	LANOS	1.6	4	Auto(A4)	F	22	32	26	24.9379	41.6595	30.4352	R					91	11	91	11	91	12	780	SOHC-IL4	EMS		2	4
COMPACT CARS	DAEWOO	LANOS	1.6	4	Manual(M5)	F	25	35	28	27.4476	44.5352	33.1757	R					91	11	91	11	91	12	723	SOHC-IL4			2	4
COMPACT CARS	DAEWOO	NUBIRA	2.0	4	Auto(A4)	F	22	31	25	24.1983	39.6499	29.3443	R						91	12	91	11	810	SOHC-IL4	EMS		2	4	
COMPACT CARS	DAEWOO	NUBIRA	2.0	4	Manual(M5)	F	22	31	25	24.5475	39.9798	29.7078	R						91	12	91	11	810	SOHC-IL4			2	4	
COMPACT CARS	DODGE	NEON (DODGE)	2.0	4	Auto(L3)	F	24	31	27	26.5476	39.2629	31.0765	R						90	13			749				4	4	
COMPACT CARS	DODGE	NEON (DODGE)	2.0	4	Manual(M5)	F	27	33	30	30.2851	42.6791	34.8376	R							90	13			674				4	4
COMPACT CARS	DODGE	STRATUS	2.4	4	Auto(L4)	F	20	27	23	22.7000	35.1000	26.9909	R					86	16			881	SOHC	CMODE CLKUP		4	4		
COMPACT CARS	DODGE	STRATUS	2.4	4	Manual(M5)	F	22	30	25	24.9000	38.2000	29.5260	R					86	16			810	SOHC			4	4		
COMPACT CARS	DODGE	STRATUS	3.0	6	Auto(L4)	F	19	27	22	21.3000	34.4000	25.7050	R					86	16			921	SOHC	CMODE CLKUP		4	4		
COMPACT CARS	DODGE	STRATUS	3.0	6	Manual(M5)	F	20	28	23	22.6465	35.9000	27.1583	R					86	16			881	SOHC			4	4		
COMPACT CARS	DODGE	STRATUS	3.0	6	Auto(S4)	F	19	27	22	21.1995	34.2493	25.5866	R					86	16			921	SOHC	2MODE CLKUP		4	4		
COMPACT CARS	FORD	ESCORT	2.0	4	Auto(L4)	F	26	35	29	28.9000	44.4000	34.2862	R							87	13			699	2.0L CVH	CLKUP		2	4
COMPACT CARS	FORD	FOCUS	2.0	4	Auto(L4)	F	25	33	28	28.1239	41.9327	33.0165	R										723	2.0L CVH	CLKUP		2	4	
COMPACT CARS	FORD	FOCUS	2.0	4	Auto(L4)	F	25	31	27	27.5188	40.1095	32.0455	R										749	2.0Z	CLKUP		4	4	
COMPACT CARS	FORD	FOCUS	2.0	4	Manual(M5)	F	28	36	31	31.5000	45.8495	36.6636	R										654	2.0L CVH			2	4	
COMPACT CARS	FORD	FOCUS	2.0	4	Manual(M5)	F	25	33	28	27.4000	42.2000	32.5346	R										723	2.0Z			4	4	



GUIDE6-2nd

COMPACT CARS	SATURN	SL	1.9	4	Auto(L4)	F	25	35	29	27.9786	45.2908	33.7910	R						91	12			699	DOHC	CLKUP	8	4
COMPACT CARS	SATURN	SL	1.9	4	Manual(M5)	F	29	40	33	32.1000	51.5000	38.6521	R						91	12			614	SOHC	SIL	8	4
COMPACT CARS	SATURN	SL	1.9	4	Manual(M5)	F	27	38	31	29.9000	48.4000	36.1113	R						91	12			654	DOHC	SIL	8	4
COMPACT CARS	SUBARU	LEGACY AWD	2.5	4	Auto(L4)	F	22	27	24	24.1469	34.3368	27.8686	R						91	12			844		CLKUP	4	4
COMPACT CARS	SUBARU	LEGACY AWD	2.5	4	Manual(M5)	F	21	28	24	23.8239	35.2678	27.8975	R						91	12			844			4	4
COMPACT CARS	TOYOTA	CAMRY CNG	2.2	4	Auto(L4)	F	22	30	25	25.0000	38.9000	29.7902	C						97	9			510		CLKUP	4	4
COMPACT CARS	TOYOTA	CAMRY SOLARA	2.2	4	Auto(L4)	F	23	32	26	25.8000	40.7000	30.8887	R						92	14			780		CLKUP	4	4
COMPACT CARS	TOYOTA	CAMRY SOLARA	2.2	4	Manual(M5)	F	24	33	27	26.3000	42.7000	31.7953	R						92	14			749			4	4
COMPACT CARS	TOYOTA	CAMRY SOLARA	3.0	6	Auto(L4)	F	20	27	22	21.7000	34.2000	25.9717	R						92	14			921		CLKUP	4	4
COMPACT CARS	TOYOTA	CAMRY SOLARA	3.0	6	Manual(M5)	F	20	27	22	21.7000	34.9000	26.1509	R						92	14			921			4	4
COMPACT CARS	TOYOTA	COROLLA	1.8	4	Auto(L3)	F	29	33	31	31.8000	42.8000	35.9588	R						88	12			654			4	4
COMPACT CARS	TOYOTA	COROLLA	1.8	4	Auto(L4)	F	30	39	34	33.5000	50.4000	39.4532	R						88	12			595		CLKUP	4	4
COMPACT CARS	TOYOTA	COROLLA	1.8	4	Manual(M5)	F	32	41	36	35.9067	51.9897	41.7135	R						88	12			563			4	4
COMPACT CARS	TOYOTA	ECHO	1.5	4	Auto(L4)	F	32	38	35	35.6000	49.1000	40.6266	R						88	14	87	14	579		CLKUP	4	4
COMPACT CARS	TOYOTA	ECHO	1.5	4	Manual(M5)	F	34	41	37	38.0893	52.3261	43.4034	R						88	14	87	14	547			4	4
COMPACT CARS	TOYOTA	PRIUS	1.5	4	Auto(AV)	F	52	45	48	57.3000	57.9000	57.5685	R						89	12			421			4	4
COMPACT CARS	VOLKSWAGEN	GOLF	1.8	4	Auto(L4)	F	23	29	25	25.2245	36.6153	29.3306	P	T							88	18	930		CLKUP	5	4
COMPACT CARS	VOLKSWAGEN	GOLF	1.8	4	Manual(M5)	F	25	31	27	27.3699	39.2601	31.6886	P	T							88	18	860			5	4
COMPACT CARS	VOLKSWAGEN	GOLF	1.9	4	Auto(L4)	F	34	44	38	37.9945	56.5504	44.5766	D	T							88	18	513		CLKUP	2	4
COMPACT CARS	VOLKSWAGEN	GOLF	1.9	4	Manual(M5)	F	42	49	45	46.4592	62.9103	52.6555	D	T							88	18	433			2	4
COMPACT CARS	VOLKSWAGEN	GOLF	2.0	4	Auto(L4)	F	22	28	24	24.6376	35.8689	28.6786	R								88	18	844		CLKUP	2	4
COMPACT CARS	VOLKSWAGEN	GOLF	2.0	4	Manual(M5)	F	24	31	27	26.6159	39.3411	31.1500	R								88	18	749			2	4
COMPACT CARS	VOLKSWAGEN	GTI	1.8	4	Auto(L4)	F	23	29	25	25.2245	36.6153	29.3306	P	T							86	18	930		CLKUP	5	4
COMPACT CARS	VOLKSWAGEN	GTI	1.8	4	Manual(M5)	F	25	31	27	27.3699	39.2601	31.6886	P	T							86	18	860			5	4
COMPACT CARS	VOLKSWAGEN	GTI	2.8	6	Manual(M5)	F	20	28	23	22.3000	36.5000	27.0325	R								86	18	881			2	4
COMPACT CARS	VOLKSWAGEN	JETTA	1.8	4	Auto(L4)	F	23	29	25	25.2245	36.6153	29.3306	P	T							87	13	930		CLKUP	5	4
COMPACT CARS	VOLKSWAGEN	JETTA	1.8	4	Manual(M5)	F	25	31	27	27.3699	39.2601	31.6886	P	T							87	13	860			5	4
COMPACT CARS	VOLKSWAGEN	JETTA	1.9	4	Auto(L4)	F	34	45	38	38.1000	57.2000	44.8374	D	T							87	13	513		CLKUP	2	4
COMPACT CARS	VOLKSWAGEN	JETTA	1.9	4	Manual(M5)	F	42	49	45	46.4592	62.9103	52.6555	D	T							87	13	433			2	4
COMPACT CARS	VOLKSWAGEN	JETTA	2.0	4	Auto(L4)	F	22	28	24	24.6376	35.8689	28.6786	R								87	13	844		CLKUP	2	4
COMPACT CARS	VOLKSWAGEN	JETTA	2.0	4	Manual(M5)	F	24	31	27	26.6159	39.3411	31.1500	R								87	13	749			2	4
COMPACT CARS	VOLKSWAGEN	JETTA	2.8	6	Auto(L4)	F	19	26	21	21.0000	33.0000	25.1087	R								87	13	964		CLKUP	2	4
COMPACT CARS	VOLKSWAGEN	JETTA	2.8	6	Manual(M5)	F	19	28	23	21.6000	36.0000	26.3415	R								87	13	881			2	4
COMPACT CARS	VOLKSWAGEN	PASSAT 4MOTION	2.8	6	Auto(S5)	F	17	24	20	19.0576	30.3493	22.8900	P								95	11	1162		CLKUP	5	4
COMPACT CARS	VOLVO	C70 COUPE	2.3	5	Auto(L5)	F	20	27	22	22.1000	34.0000	26.2315	P	T							91	13	1058		CLKUP	4	4
COMPACT CARS	VOLVO	C70 COUPE	2.3	5	Manual(M5)	F	21	28	23	23.0000	36.0000	27.4627	P	T							91	13	1011			4	4
COMPACT CARS	VOLVO	C70 COUPE	2.4	5	Auto(L5)	F	21	28	23	22.8949	35.7930	27.3260	P	T							91	13	1011		CLKUP	4	4
COMPACT CARS	VOLVO	S40	1.9	4	Auto(L5)	F	22	32	26	24.8000	40.5000	30.0404	P	T							88	13	895		CLKUP	4	4
COMPACT CARS	VOLVO	S60	2.3	5	Manual(M5)	F	21	28	23	23.0000	36.0000	27.4627	P	T							94	14	1011			4	4
COMPACT CARS	VOLVO	S60	2.3	5	Auto(S5)	F	20	27	22	22.1000	34.0000	26.2315	P	T							94	14	1058		2MODE CLKUP	4	4
COMPACT CARS	VOLVO	S60	2.4	5	Auto(L5)	F	21	28	23	22.8949	35.7930	27.3260	P	T							94	14	1011		CLKUP	4	4
COMPACT CARS	VOLVO	S60	2.4	5	Auto(L5)	F	21	28	24	23.3480	36.0182	27.7390	P								94	14	970		CLKUP	4	4
COMPACT CARS	VOLVO	S60	2.4	5	Manual(M5)	F	21	28	24	23.7000	35.4000	27.8407	P								94	14	970			4	4
COMPACT CARS	VOLVO	S60	2.4	5	Auto(S5)	F	21	28	23	22.9000	35.8000	27.3319	P	T							94	14	1011		2MODE CLKUP	4	4
MIDSIZE CARS	ACURA	3.2TL	3.2	6	Auto(S5)	F	19	29	23	21.2954	37.3689	26.4066	P								96	14	1011	SOHC-VTEC	2MODE	4	5
MIDSIZE CARS	ACURA	3.5RL	3.5	6	Auto(L4)	F	18	24	20	19.5000	30.2000	23.1987	P								96	15	1162			4	5
MIDSIZE CARS	AUDI	A6	2.8	6	Auto(S5)	F	17	25	20	19.3820	32.3000	23.6358	P								98	15	1162		CLKUP	5	5
MIDSIZE CARS	AUDI	A6 QUATTRO	2.7	6	Manual(M6)	F	17	24	20	19.1581	30.3600	22.9723	P	T							98	15	1162			5	5
MIDSIZE CARS	AUDI	A6 QUATTRO	2.7	6	Auto(S5)	F	17	24	20	19.2591	30.9445	23.2019	P	T							98	15	1162		CLKUP	5	5
MIDSIZE CARS	AUDI	A6 QUATTRO	2.8	6	Auto(S5)	F	17	24	20	18.9725	30.3847	22.8313	P								98	15	1162		CLKUP	5	5
MIDSIZE CARS	AUDI	A6 QUATTRO	4.2	8	Auto(S5)	F	17	25	20	18.9995	31.7499	23.1903	P								98	15	1162		CLKUP	5	5
MIDSIZE CARS	AUDI	A8 QUATTRO	4.2	8	Auto(S5)	F	17	25	20	18.9995	31.7499	23.1903	P								100	18	1162		CLKUP	5	5

## GUIDE6-2nd

MIDSIZE CARS	BENTLEY	BENTLEY ARNAGE	6.8	8	Auto(L4)	R	11	16	13	12.3908	20.0453	14.9618	P	G					106	12					1788	GUZZLER	EMS 2MODE CL	2	5	
MIDSIZE CARS	BMW	740I	4.4	8	Auto(L5)	R	17	23	19	18.9000	30.0000	22.6755	P						100	13					1223				4	5
MIDSIZE CARS	BMW	740I	4.4	8	Auto(S5)	R	15	21	17	16.8000	26.8000	20.1901	P	G					100	13					1367	GUZZLER	3MODE		4	5
MIDSIZE CARS	BUICK	CENTURY	3.1	6	Auto(L4)	F	20	29	23	22.7446	36.6079	27.4168	R						102	17					881		CLKUP		2	5
MIDSIZE CARS	BUICK	REGAL	3.8	6	Auto(L4)	F	20	30	23	21.7000	38.5000	27.0023	P						102	17					881		CLKUP		2	5
MIDSIZE CARS	BUICK	REGAL	3.8	6	Auto(L4)	F	18	28	22	20.3059	36.2424	25.3151	R			S			102	17					1058		CLKUP		2	5
MIDSIZE CARS	CADILLAC	CATERA	3.0	6	Auto(L4)	R	17	24	20	19.4396	30.6840	23.2783	R						99	14					1012		CLKUP		2	5
MIDSIZE CARS	CADILLAC	ELDORADO	4.6	8	Auto(L4)	F	17	27	20	18.7000	35.1000	23.6786	P				100	15							1162		CLKUP		4	5
MIDSIZE CARS	CADILLAC	SEVILLE	4.6	8	Auto(L4)	F	17	27	20	18.7000	35.1000	23.6786	P						104	15					1162		CLKUP		4	5
MIDSIZE CARS	CHEVROLET	LUMINA	3.1	6	Auto(L4)	F	20	29	23	22.7446	36.6079	27.4168	R						101	16					881		CLKUP		2	5
MIDSIZE CARS	CHEVROLET	MALIBU	3.1	6	Auto(L4)	F	20	29	23	22.7446	36.6079	27.4168	R						99	16					881		CLKUP		2	5
MIDSIZE CARS	CHEVROLET	MONTE CARLO	3.4	6	Auto(L4)	F	21	32	25	23.7000	41.0000	29.2549	R				98	16							810		CLKUP		2	5
MIDSIZE CARS	CHEVROLET	MONTE CARLO	3.8	6	Auto(L4)	F	20	30	23	21.7000	38.5000	27.0023	R				98	16							881		CLKUP		2	5
MIDSIZE CARS	CHRYSLER	SEBRING 4-DR	2.4	4	Auto(L4)	F	20	30	24	22.6024	39.0309	27.8839	R						94	16					844		CLKUP		4	5
MIDSIZE CARS	CHRYSLER	SEBRING 4-DR	2.7	6	Auto(L4)	F	20	28	23	21.9000	35.4000	26.4368	R						94	16					881		CLKUP		4	5
MIDSIZE CARS	CHRYSLER	SEBRING 4-DR	2.7	6	Auto(S4)	F	20	29	23	22.3000	36.6000	27.0572	R						94	16					881		VMODE CLKUP		4	5
MIDSIZE CARS	DAEWOO	LEGANZA	2.2	4	Auto(A4)	F	20	28	23	21.6926	35.4989	26.2945	R						100	14					881	SOHC-IL4	EMS		2	5
MIDSIZE CARS	DAEWOO	LEGANZA	2.2	4	Manual(M5)	F	20	28	23	22.2928	36.2603	26.9673	R						100	14					881	SOHC-IL4			2	5
MIDSIZE CARS	DODGE	STRATUS 4-DR	2.4	4	Auto(L4)	F	20	30	24	22.6024	39.0309	27.8839	R						94	16					844		CLKUP		4	5
MIDSIZE CARS	DODGE	STRATUS 4-DR	2.7	6	Auto(L4)	F	20	28	23	21.9000	35.4000	26.4368	R						94	16					881		CLKUP		4	5
MIDSIZE CARS	DODGE	STRATUS 4-DR	2.7	6	Auto(S4)	F	20	29	23	22.3000	36.6000	27.0572	R						94	16					881		VMODE CLKUP		4	5
MIDSIZE CARS	HONDA	ACCORD	2.3	4	Auto(L4)	F	23	30	26	25.4517	38.4316	30.0132	R				93	14	102	14					780	VTEC			4	5
MIDSIZE CARS	HONDA	ACCORD	2.3	4	Auto(L4)	F	23	30	25	25.1000	38.5000	29.7613	R				93	14	102	14					810				4	5
MIDSIZE CARS	HONDA	ACCORD	2.3	4	Manual(M5)	F	26	32	28	28.4000	40.4000	32.7817	R				93	14	102	14					723	VTEC			4	5
MIDSIZE CARS	HONDA	ACCORD	2.3	4	Manual(M5)	F	25	32	27	27.3000	40.4000	31.9641	R				93	14	102	14					749				4	5
MIDSIZE CARS	HONDA	ACCORD	3.0	6	Auto(L4)	F	20	28	23	22.3770	35.9414	26.9548	R				93	14	102	14					881	VTEC			4	5
MIDSIZE CARS	HYUNDAI	SONATA	2.4	4	Auto(L4)	F	21	28	23	22.9000	36.1000	27.4101	R						100	13					881		2MODE CLKUP		4	5
MIDSIZE CARS	HYUNDAI	SONATA	2.4	4	Manual(M5)	F	22	30	25	23.9000	37.9000	28.6649	R						100	13					810				4	5
MIDSIZE CARS	HYUNDAI	SONATA	2.5	6	Auto(L4)	F	20	27	23	22.0000	35.2000	26.4662	R						100	13					881		2MODE CLKUP		4	5
MIDSIZE CARS	HYUNDAI	SONATA	2.5	6	Manual(M5)	F	20	28	23	22.7000	36.5000	27.3539	R						100	13					881				4	5
MIDSIZE CARS	HYUNDAI	XG 300	3.0	6	Auto(L5)	F	19	27	22	20.7995	34.8000	25.3975	R						103	15					921		CLKUP		4	5
MIDSIZE CARS	INFINITI	I30	3.0	6	Auto(L4)	F	19	26	22	21.4000	33.8000	25.6315	R						102	15					921		CLKUP		4	5
MIDSIZE CARS	INFINITI	Q45	4.1	8	Auto(L4)	R	18	23	20	19.4848	29.7038	23.0538	P						97	13					1162		2MODE CLKUP		4	5
MIDSIZE CARS	JAGUAR	JAGUAR S-TYPE 3.0 LITRE	3.0	6	Auto(L5)	R	18	25	20	19.6097	32.6404	23.9041	P						99	12					1162		2MODE		4	5
MIDSIZE CARS	JAGUAR	JAGUAR S-TYPE 4.0 LITRE	4.0	8	Auto(L5)	R	17	24	20	19.1879	31.0605	23.1740	P						99	12					1162		EMS 2MODE		4	5
MIDSIZE CARS	JAGUAR	JAGUAR VANDEN PLAS	4.0	8	Auto(L5)	R	17	24	20	19.1354	31.0075	23.1186	P						102	13					1162		2MODE		4	5
MIDSIZE CARS	JAGUAR	JAGUAR VANDEN PLAS S/C	4.0	8	Auto(L5)	R	16	22	18	17.6607	27.6172	21.0807	P	G		S			102	13					1293	GUZZLER	2MODE		4	5
MIDSIZE CARS	JAGUAR	JAGUAR XJ8L	4.0	8	Auto(L5)	R	17	24	20	19.1354	31.0075	23.1186	P						102	13					1162		2MODE		4	5
MIDSIZE CARS	LEXUS	GS 300/GS 430	3.0	6	Auto(S5)	R	18	24	20	19.5965	30.8913	23.4558	P						100	15					1162		CLKUP		4	5
MIDSIZE CARS	LEXUS	GS 300/GS 430	4.3	8	Auto(L5)	R	18	23	20	20.1499	29.4492	23.4874	P						100	15					1162		CLKUP		4	5
MIDSIZE CARS	LINCOLN-ME	LS	3.0	6	Auto(L5)	R	18	25	21	20.0000	32.6000	24.2109	P						104	13					1107	3.0M	CLKUP		4	5
MIDSIZE CARS	LINCOLN-ME	LS	3.0	6	Manual(M5)	R	18	25	21	20.1000	32.4000	24.2412	P						104	13					1107	3.0M			4	5
MIDSIZE CARS	LINCOLN-ME	LS	3.0	6	Auto(S5)	R	17	24	20	18.6912	31.3499	22.8416	P						104	13					1162	3.0M	CLKUP		4	5
MIDSIZE CARS	LINCOLN-ME	LS	3.9	8	Auto(L5)	R	17	24	19	18.6000	30.4000	22.5365	P						104	13					1223	3.9L4V-N	CLKUP		4	5
MIDSIZE CARS	LINCOLN-ME	LS	3.9	8	Auto(S5)	R	17	24	19	18.3466	30.3987	22.3306	P						104	13					1223	3.9L4V-N	CLKUP		4	5
MIDSIZE CARS	LINCOLN-ME	SABLE	3.0	6	Auto(L4)	F	20	27	22	21.8000	34.8000	26.2052	R						102	16					921	3.0M	CLKUP		4	5
MIDSIZE CARS	LINCOLN-ME	SABLE	3.0	6	Auto(L4)	F	18	27	21	20.1000	34.4000	24.7252	R						102	16					964	3.0	CLKUP		2	5
MIDSIZE CARS	MAZDA	626	2.0	4	Auto(L4)	F	22	28	24	24.1000	35.4000	28.1425	R						97	14					844		CLKUP		4	5
MIDSIZE CARS	MAZDA	626	2.0	4	Manual(M5)	F	26	32	29	29.0000	41.2000	33.4584	R						97	14					699				4	5
MIDSIZE CARS	MAZDA	626	2.5	6	Auto(L4)	F	20	26	22	22.2000	33.5000	26.1728	P						97	14					1058		CLKUP		4	5
MIDSIZE CARS	MAZDA	626	2.5	6	Manual(M5)	F	21	27	23	23.3000	34.4000	27.2579	P						97	14					1011				4	5
MIDSIZE CARS	MERCEDES-	E320	3.2	6	Auto(L5)	R	20	28	23	22.6000	36.2700	27.2159	P						95	15					1011		EMS 2MODE CL		3	5

## GUIDE6-2nd

MIDSIZE CARS	MERCEDES-	E320 4MATIC	3.2	6	Auto(L5)	R	20	27	22	21.9699	34.1000	26.1570	P					95	15			1058		EMS 2MODE CL	3	5	
MIDSIZE CARS	MERCEDES-	E430	4.3	8	Auto(L5)	R	18	25	20	19.9771	31.6526	23.9530	P					95	15			1162		EMS 2MODE CL	3	5	
MIDSIZE CARS	MERCEDES-	E430 4MATIC	04.3	8	Auto(L5)	R	17	23	20	19.3000	29.6000	22.8832	P					95	15			1162		EMS 2MODE CL	3	5	
MIDSIZE CARS	MERCEDES-	E55 AMG	5.4	8	Auto(L5)	R	17	24	20	19.2000	30.5000	23.0415	P					95	15			1162		EMS 2MODE CL	3	5	
MIDSIZE CARS	MINIBISHI	DIAMANTE SEDAN	3.5	6	Auto(L4)	F	18	25	20	19.6000	31.8000	23.6899	P					101	14			1162	SOHC	CMODE CLKUP	4	5	
MIDSIZE CARS	MINIBISHI	GALANT	2.4	4	Auto(L4)	F	21	28	24	23.4288	36.1575	27.8389	R					96	14			844	SOHC	CMODE CLKUP	4	5	
MIDSIZE CARS	MINIBISHI	GALANT	3.0	6	Auto(L4)	F	20	27	22	21.9000	34.7000	26.2588	P					96	14			1058	SOHC	CMODE CLKUP	4	5	
MIDSIZE CARS	NISSAN	MAXIMA	3.0	6	Auto(L4)	F	19	26	22	21.4000	33.8000	25.6315	R					102	15			921		CLKUP	4	5	
MIDSIZE CARS	NISSAN	MAXIMA	3.0	6	Manual(M5	F	22	27	24	24.3000	35.0000	28.1762	R					102	15			844			4	5	
MIDSIZE CARS	OLDSMOBILE	AURORA	3.5	6	Auto(L4)	F	19	28	22	21.3000	35.5000	25.9756	R					104	15			921		CLKUP	4	5	
MIDSIZE CARS	OLDSMOBILE	AURORA	4.0	8	Auto(L4)	F	17	25	20	19.1000	31.7000	23.2605	P					104	15			1162		CLKUP	4	5	
MIDSIZE CARS	OLDSMOBILE	INTRIGUE	3.5	6	Auto(L4)	F	19	28	22	20.9000	35.6000	25.6698	R					102	17			921		CLKUP	4	5	
MIDSIZE CARS	PONTIAC	GRAND PRIX	3.1	6	Auto(L4)	F	20	29	23	22.7446	36.6079	27.4168	R				98	16	99	16	881		CLKUP	2	5		
MIDSIZE CARS	PONTIAC	GRAND PRIX	3.8	6	Auto(L4)	F	20	30	23	21.7000	38.5000	27.0023	R				98	16	99	16	881		CLKUP	2	5		
MIDSIZE CARS	PONTIAC	GRAND PRIX	3.8	6	Auto(L4)	F	18	28	22	20.4910	36.1498	25.4523	P		S		98	16	99	16	1058		CLKUP	2	5		
MIDSIZE CARS	R-R MTR CAR	ROLLS ROYCE SILVER SERAPH	5.4	12	Auto(L5)	R	12	16	14	13.6000	20.8000	16.1093	P	G				106	12			1660	GUZZLER	EMS CLKUP	2	5	
MIDSIZE CARS	R-R MTR CAR	ROLLS ROYCE SILVER SERAPH	6.8	8	Auto(L4)	R	11	16	13	12.4000	20.0499	14.9703	P	G				106	12			1788	GUZZLER	EMS CLKUP	2	5	
MIDSIZE CARS	SAAB	SAAB 9-3	2.0	4	Auto(L4)	F	21	28	23	23.2000	35.4000	27.4584	R			T				90	22	881	B205L	2MODE CLKUP	4	5	
MIDSIZE CARS	SAAB	SAAB 9-3	2.0	4	Auto(L4)	F	21	28	24	23.2000	36.2000	27.6718	P			T				90	22	970	B205R	2MODE CLKUP	4	5	
MIDSIZE CARS	SAAB	SAAB 9-3	2.0	4	Manual(M5	F	22	30	25	24.4000	38.7000	29.2664	P			T				90	22	930	B205R	SIL	4	5	
MIDSIZE CARS	SAAB	SAAB 9-3	2.0	4	Manual(M5	F	21	29	24	23.8000	36.6000	28.2451	R			T				90	22	844	B205L	SIL	4	5	
MIDSIZE CARS	SAAB	SAAB 9-3 VIGGEN	2.3	4	Manual(M5	F	20	31	24	22.7000	39.4000	28.0502	P			T				90	22	970	B235R		4	5	
MIDSIZE CARS	SAAB	SAAB 9-5	2.3	4	Auto(L4)	F	20	29	23	22.4000	37.6000	27.3810	R			T			99	16			881	B235E	2MODE CLKUP	4	5
MIDSIZE CARS	SAAB	SAAB 9-5	2.3	4	Auto(L4)	F	19	26	21	20.6000	33.0000	24.7921	P			T			99	16			1107	B235R	2MODE CLKUP	4	5
MIDSIZE CARS	SAAB	SAAB 9-5	2.3	4	Manual(M5	F	21	30	25	23.5000	39.1000	28.6425	R			T			99	16			810	B235E		4	5
MIDSIZE CARS	SAAB	SAAB 9-5	2.3	4	Manual(M5	F	21	28	24	23.3000	36.3000	27.7764	P			T			99	16			970	B235R		4	5
MIDSIZE CARS	SAAB	SAAB 9-5	3.0	6	Auto(L4)	F	19	26	21	20.6000	33.3000	24.8679	P			T			99	16			1107	B308E	2MODE	4	5
MIDSIZE CARS	SATURN	L100/200	2.2	4	Auto(L4)	F	24	33	27	26.5000	42.4000	31.8797	R			T			97	18			749		CLKUP	2	5
MIDSIZE CARS	SATURN	L100/200	2.2	4	Manual(M5	F	25	33	28	27.3000	41.8000	32.3498	R			T			97	18			723		SIL	2	5
MIDSIZE CARS	SATURN	L300	3.0	6	Auto(L4)	F	20	26	22	22.2000	33.6000	26.2002	R			T			97	18			921		CLKUP	2	5
MIDSIZE CARS	TOYOTA	CAMRY	2.2	4	Auto(L4)	F	23	32	26	25.8000	40.7000	30.8887	R			T			97	14			780		CLKUP	4	5
MIDSIZE CARS	TOYOTA	CAMRY	2.2	4	Manual(M5	F	24	33	27	26.3000	42.7000	31.7953	R			T			97	14			749			4	5
MIDSIZE CARS	TOYOTA	CAMRY	3.0	6	Auto(L4)	F	20	27	22	21.7000	34.2000	25.9717	R			T			97	14			921		CLKUP	4	5
MIDSIZE CARS	TOYOTA	CAMRY	3.0	6	Manual(M5	F	20	27	22	21.7000	34.9000	26.1509	R			T			97	14			921			4	5
MIDSIZE CARS	VOLKSWAGEN	PASSAT	1.8	4	Manual(M5	F	22	31	25	24.8000	39.4000	29.7630	P			T			95	15			930			5	5
MIDSIZE CARS	VOLKSWAGEN	PASSAT	1.8	4	Auto(S5)	F	20	28	23	22.0308	36.4900	26.8117	P			T			95	15			1011		CLKUP	5	5
MIDSIZE CARS	VOLKSWAGEN	PASSAT	2.8	6	Manual(M5	F	20	29	23	22.0000	36.8000	26.8613	P			T			95	15			1011			5	5
MIDSIZE CARS	VOLKSWAGEN	PASSAT	2.8	6	Auto(S5)	F	18	26	21	19.9440	33.4994	24.3841	P			T			95	15			1107		CLKUP	5	5
MIDSIZE CARS	VOLVO	S80/S80 EXECUTIVE	2.8	6	Auto(S4)	F	19	26	21	20.7000	33.2000	24.9226	P			T			99	15			1107		2MODE CLKUP	4	5
MIDSIZE CARS	VOLVO	S80/S80 EXECUTIVE	2.9	6	Auto(L4)	F	19	27	22	21.5992	34.3992	25.9433	P			T			99	15			1058		CLKUP	4	5
LARGE CARS	AUDI	A8 L	4.2	8	Auto(S5)	F	17	25	20	18.9995	31.6987	23.1780	P			T			104	18			1162		CLKUP	5	6
LARGE CARS	BMW	740IL	4.4	8	Auto(L5)	R	17	23	19	18.8991	29.9982	22.6744	P			T			107	13			1223			4	6
LARGE CARS	BMW	750IL	5.4	12	Auto(L5)	R	13	20	16	14.7000	25.4000	18.1385	P	G				107	13			1453	GUZZLER		2	6	
LARGE CARS	BUICK	LESABRE	3.8	6	Auto(L4)	F	19	30	23	21.3000	38.0000	26.5508	R			T			108	18			881		CLKUP	2	6
LARGE CARS	BUICK	LESABRE	3.8	6	Auto(L4)	F	19	30	23	21.3000	38.0000	26.5508	R			T			108	18			881		CLKUP	2	6
LARGE CARS	BUICK	PARK AVENUE	3.8	6	Auto(L4)	F	19	30	23	21.3000	38.0000	26.5508	R			T			111	19			881		CLKUP	2	6
LARGE CARS	BUICK	PARK AVENUE	3.8	6	Auto(L4)	F	19	30	23	21.3000	38.0000	26.5508	R			T			111	19			881		CLKUP	2	6
LARGE CARS	BUICK	PARK AVENUE	3.8	6	Auto(L4)	F	18	28	22	20.3059	36.2424	25.3151	P			S			111	19			1058		CLKUP	2	6
LARGE CARS	CADILLAC	DEVILLE	4.6	8	Auto(L4)	F	17	27	20	18.7000	35.1000	23.6786	P			T			115	19			1162		CLKUP	4	6
LARGE CARS	CHEVROLET	IMPALA	3.4	6	Auto(L4)	F	21	32	25	23.7000	41.0000	29.2549	R			T			105	18			810		CLKUP	2	6
LARGE CARS	CHEVROLET	IMPALA	3.8	6	Auto(L4)	F	20	30	23	21.6980	38.4975	27.0001	R			T			105	18			881		CLKUP	2	6
LARGE CARS	CHRYSLER	300M	3.5	6	Auto(S4)	F	18	26	21	19.9000	33.0000	24.2280	R			T			105	17			964		VMODE CLKUP	4	6



## GUIDE6-2nd

LARGE CARS	CHRYSLER	CONCORDE	2.7	6	Auto(L4)	F	20	28	23	21.9000	35.4000	26.4368	R					107	19			881		CLKUP	4	6
LARGE CARS	CHRYSLER	CONCORDE	3.2	6	Auto(L4)	F	19	27	22	20.8000	34.8000	25.3979	R					107	19			921		CLKUP	4	6
LARGE CARS	CHRYSLER	LHS	3.5	6	Auto(L4)	F	18	26	21	19.9000	33.2000	24.2763	R					107	19			964		CLKUP	4	6
LARGE CARS	DODGE	INTREPID	2.7	6	Auto(L4)	F	20	28	23	21.9000	35.4000	26.4368	R					104	18			881		CLKUP	4	6
LARGE CARS	DODGE	INTREPID	2.7	6	Auto(S4)	F	20	29	23	22.3000	36.6000	27.0572	R					104	18			881		VMODE CLKUP	4	6
LARGE CARS	DODGE	INTREPID	3.2	6	Auto(S4)	F	19	27	21	20.6000	34.2000	25.0897	R					104	18			964		VMODE CLKUP	4	6
LARGE CARS	DODGE	INTREPID	3.5	6	Auto(S4)	F	18	26	21	19.9000	33.0000	24.2280	R					104	18			964		VMODE CLKUP	4	6
LARGE CARS	FORD	CROWN VICTORIA	4.6	8	Auto(L4)	R	18	25	20	19.7000	32.3000	23.8945	R					111	21			1012	4.6N	CLKUP	2	6
LARGE CARS	FORD	CROWN VICTORIA	4.6	8	Auto(L4)	R	15	23	18	16.7000	29.3000	20.7072	C					111	21			709	4.6NG	CLKUP	2	6
LARGE CARS	FORD	TAURUS	3.0	6	Auto(L4)	F	20	27	22	21.8000	34.8000	26.2052	R					105	17			921	3.0M	CLKUP	4	6
LARGE CARS	FORD	TAURUS	3.0	6	Auto(L4)	F	18	27	21	20.1000	34.4000	24.7252	R					105	17			964	3.0	CLKUP	2	6
LARGE CARS	LEXUS	LS 430	4.3	8	Auto(L5)	R	18	25	21	20.3995	31.4446	24.2293	P					107	16			1107		2MODE 2LKUP	4	6
LARGE CARS	LINCOLN-ME	CONTINENTAL	4.6	8	Auto(L4)	F	17	25	20	19.2000	32.3000	23.4865	P					101	19			1162	4.6W	CLKUP	4	6
LARGE CARS	LINCOLN-ME	GRAND MARQUIS	4.6	8	Auto(L4)	R	18	25	20	19.7000	32.3000	23.8945	R					109	21			1012	4.6N	CLKUP	2	6
LARGE CARS	LINCOLN-ME	TOWN CAR	4.6	8	Auto(L4)	R	18	25	20	19.5549	32.0889	23.7251	R					112	21			1012	4.6N	CLKUP	2	6
LARGE CARS	MERCEDES-	S430	4.3	8	Auto(L5)	R	18	25	20	19.6468	32.3277	23.8582	P					106	15			1162		EMS 2MODE CL	3	6
LARGE CARS	MERCEDES-	S500	5.0	8	Auto(L5)	R	16	23	19	17.9186	29.4155	21.7427	P G					106	15			1223	GUZZLER	EMS 2MODE CL	3	6
LARGE CARS	MERCEDES-	S600	5.8	12	Auto(L5)	R	15	23	18	17.1184	29.7436	21.1602	P G					106	15			1293	GUZZLER	EMS 2MODE CL	3	6
LARGE CARS	PONTIAC	BONNEVILLE	3.8	6	Auto(L4)	F	19	30	23	21.3000	38.0000	26.5508	R					104	18			881		CLKUP	2	6
LARGE CARS	PONTIAC	BONNEVILLE	3.8	6	Auto(L4)	F	19	30	23	21.3000	38.0000	26.5508	R					104	18			881		CLKUP	2	6
LARGE CARS	PONTIAC	BONNEVILLE	3.8	6	Auto(L4)	F	18	28	22	20.3059	36.2424	25.3151	P			S		104	18			1058		CLKUP	2	6
LARGE CARS	R-R MTR CA	ROLLS ROYCE PARK WARD	5.4	12	Auto(L5)	R	12	16	14	13.6000	20.8000	16.1093	P G					120	12			1660	GUZZLER	EMS CLKUP	2	6
LARGE CARS	TOYOTA	AVALON	3.0	6	Auto(L4)	F	21	29	24	23.0324	37.4000	27.8462	R					106	16			844		CLKUP	4	6
SMALL STATION WAGONS	AUDI	A4 AVANT QUATTRO	1.8	4	Manual(M5)	4	22	30	25	24.1045	38.2739	28.9230	P			T		89	31			930			5	7
SMALL STATION WAGONS	AUDI	A4 AVANT QUATTRO	1.8	4	Auto(S5)	4	20	27	23	22.0037	34.9442	26.4037	P			T		89	31			1011		CLKUP	5	7
SMALL STATION WAGONS	AUDI	A4 AVANT QUATTRO	2.8	6	Manual(M5)	4	18	24	21	20.3335	31.1484	24.0987	P					89	31			1107			5	7
SMALL STATION WAGONS	AUDI	A4 AVANT QUATTRO	2.8	6	Auto(S5)	4	17	24	20	18.9725	30.3847	22.8313	P					89	31			1162		CLKUP	5	7
SMALL STATION WAGONS	AUDI	S4 AVANT	2.7	6	Manual(M6)	4	17	24	20	19.1581	30.3600	22.9723	P			T		89	31			1162			5	7
SMALL STATION WAGONS	AUDI	S4 AVANT	2.7	6	Auto(S5)	4	17	24	20	19.2591	30.9445	23.2019	P			T		89	31			1162		CLKUP	5	7
SMALL STATION WAGONS	BMW	325I SPORT WAGON	2.5	6	Manual(M5)	R	20	29	24	22.6367	37.6419	27.5850	P					91	26			970			4	7
SMALL STATION WAGONS	BMW	325I SPORT WAGON	2.5	6	Auto(S5)	R	19	27	22	21.2993	34.4096	25.7068	P					91	26			1058		3MODE	4	7
SMALL STATION WAGONS	BMW	325XI SPORT WAGON	2.5	6	Manual(M5)	4	19	26	22	21.1000	33.7000	25.3682	P					91	26			1058			4	7
SMALL STATION WAGONS	BMW	325XI SPORT WAGON	2.5	6	Auto(S5)	4	19	26	21	20.8153	32.6951	24.8840	P					91	26			1107		3MODE	4	7
SMALL STATION WAGONS	BMW	525I SPORT WAGON	2.5	6	Manual(M5)	R	19	27	22	20.8722	34.0846	25.2823	P					97	33			1058			4	7
SMALL STATION WAGONS	BMW	525I SPORT WAGON	2.5	6	Auto(S5)	R	19	26	21	20.7438	33.1325	24.9403	P					97	33			1107		3MODE	4	7
SMALL STATION WAGONS	BMW	540I SPORT WAGON	4.4	8	Auto(S5)	R	15	21	18	17.2000	26.7717	20.4979	P G					97	33			1293	GUZZLER	3MODE	4	7
SMALL STATION WAGONS	DAEWOO	NUBIRA STATION WAGON	2.0	4	Auto(A4)	F	22	31	25	24.1983	39.6499	29.3443	R					93	19			810	SOHC-IL4	EMS	2	7
SMALL STATION WAGONS	DAEWOO	NUBIRA STATION WAGON	2.0	4	Manual(M5)	F	22	31	25	24.5475	39.9798	29.7078	R					93	19			810	SOHC-IL4		2	7
SMALL STATION WAGONS	SATURN	SW	1.9	4	Auto(L4)	F	26	36	29	28.7000	45.6000	34.4445	R					90	25			699	SOHC	CLKUP	8	7
SMALL STATION WAGONS	SATURN	SW	1.9	4	Auto(L4)	F	25	35	29	27.9786	45.2908	33.7910	R					90	25			699	DOHC	CLKUP	8	7
SMALL STATION WAGONS	SATURN	SW	1.9	4	Manual(M5)	F	27	38	31	29.9000	48.4000	36.1113	R					90	25			654	DOHC	SIL	8	7
SMALL STATION WAGONS	SUBARU	IMPREZA WAGON AWD	2.2	4	Auto(L4)	4	23	29	25	25.4605	37.4616	29.7492	R					85	25			810		CLKUP	4	7
SMALL STATION WAGONS	SUBARU	IMPREZA WAGON AWD	2.2	4	Manual(M5)	4	23	29	25	25.0743	37.1555	29.3720	R					85	25			810			4	7
SMALL STATION WAGONS	SUZUKI	ESTEEM WAGON	1.8	4	Auto(L4)	F	26	33	29	28.8000	42.5000	33.6865	R					86	24			699		CLKUP	4	7
SMALL STATION WAGONS	SUZUKI	ESTEEM WAGON	1.8	4	Manual(M5)	F	27	34	30	30.1000	43.9000	35.0594	R					86	24			674			4	7
SMALL STATION WAGONS	VOLVO	V40	1.9	4	Auto(L5)	F	22	32	26	24.8000	40.5000	30.0404	P			T				89	33	895		CLKUP	4	7
MIDSIZE STATION WAGON	AUDI	A6 AVANT QUATTRO	2.8	6	Auto(S5)	4	17	24	20	18.9725	30.3847	22.8313	P					99	36			1162		CLKUP	5	8
MIDSIZE STATION WAGON	FORD	FOCUS STATION WAGON	2.0	4	Auto(L4)	F	25	33	28	27.9903	41.6900	32.8476	R									723	2.0L CVH	CLKUP	2	8
MIDSIZE STATION WAGON	FORD	FOCUS STATION WAGON	2.0	4	Auto(L4)	F	25	31	27	27.5180	40.1101	32.0451	R									749	2.0Z	CLKUP	4	8
MIDSIZE STATION WAGON	FORD	FOCUS STATION WAGON	2.0	4	Manual(M5)	F	28	36	31	31.5000	45.8495	36.6636	R									654	2.0L CVH		2	8
MIDSIZE STATION WAGON	FORD	FOCUS STATION WAGON	2.0	4	Manual(M5)	F	25	33	28	27.4000	42.2000	32.5346	R									723	2.0Z		4	8
MIDSIZE STATION WAGON	FORD	TAURUS WAGON	3.0	6	Auto(L4)	F	19	26	21	20.6000	32.8493	24.7537	R					104	39			964	3.0M	CLKUP	4	8

## GUIDE6-2nd

MIDSIZE STATION WAGON	FORD	TAURUS WAGON	3.0	6	Auto(L4)	F	18	26	21	19.6000	33.3000	24.0531	R					104	39			964	3.0	CLKUP	2	8	
MIDSIZE STATION WAGON	FORD	TAURUS WAGON	3.0	6	Auto(L4)	F	18	26	21	19.8000	33.2000	24.1943	R					104	39			964	3.0L-FFV	CLKUP	2	8	
MIDSIZE STATION WAGON	FORD	TAURUS WAGON	3.0	6	Auto(L4)	F	14	20	16	15.1000	25.2000	18.4227	E					104	39			1500	3.0L-FFV	CLKUP	2	8	
MIDSIZE STATION WAGON	LEXUS	RX 300 4WD	3.0	6	Auto(L4)	F	18	22	20	20.0000	28.7000	23.1592	R							104	32	1012		CLKUP	4	8	
MIDSIZE STATION WAGON	LEXUS	RX300 2WD	3.0	6	Auto(L4)	F	19	23	20	20.6000	29.8000	23.9236	R							104	32	1012		CLKUP	4	8	
MIDSIZE STATION WAGON	LINCOLN-ME	SABLE WAGON	3.0	6	Auto(L4)	F	19	26	21	20.6000	32.8493	24.7537	R					104	39			964	3.0M	CLKUP	4	8	
MIDSIZE STATION WAGON	LINCOLN-ME	SABLE WAGON	3.0	6	Auto(L4)	F	18	26	21	19.6000	33.3000	24.0531	R					104	39			964	3.0	CLKUP	2	8	
MIDSIZE STATION WAGON	MERCEDES-	E320 (WAGON)	3.2	6	Auto(L5)	R	20	28	22	21.6795	35.4154	26.2633	P					98	44			1058		EMS 2MODE CL	3	8	
MIDSIZE STATION WAGON	MERCEDES-	E320 4MATIC (WAGON)	3.2	6	Auto(L5)	F	20	27	22	21.6798	34.1867	25.9523	P					98	44			1058		EMS 2MODE CL	3	8	
MIDSIZE STATION WAGON	SAAB	SAAB 9-5 WAGON	2.3	4	Auto(L4)	F	19	26	22	21.2000	33.4000	25.3701	R	T				100	37			921	B235E	2MODE CLKUP	4	8	
MIDSIZE STATION WAGON	SAAB	SAAB 9-5 WAGON	2.3	4	Auto(L4)	F	19	25	21	21.2000	32.3000	25.0782	P	T				100	37			1107	B235R	2MODE CLKUP	4	8	
MIDSIZE STATION WAGON	SAAB	SAAB 9-5 WAGON	2.3	4	Manual(M5)	F	21	28	23	22.8000	35.9000	27.2795	R	T				100	37			881	B235E		4	8	
MIDSIZE STATION WAGON	SAAB	SAAB 9-5 WAGON	2.3	4	Manual(M5)	F	20	27	22	22.2000	34.1000	26.3357	P	T				100	37			1058	B235R		4	8	
MIDSIZE STATION WAGON	SAAB	SAAB 9-5 WAGON	3.0	6	Auto(L4)	F	18	26	21	20.4000	33.5000	24.7564	P	T				100	37			1107	B308E	2MODE	4	8	
MIDSIZE STATION WAGON	SATURN	LW200	2.2	4	Auto(L4)	F	24	32	27	26.3985	41.0998	31.4629	R					98	34			749		CLKUP	2	8	
MIDSIZE STATION WAGON	SATURN	LW300	3.0	6	Auto(L4)	F	20	26	22	22.2000	33.6000	26.2002	R					98	34			921		CLKUP	2	8	
MIDSIZE STATION WAGON	SUBARU	LEGACY WAGON AWD	2.5	4	Auto(L4)	F	22	27	24	23.9720	34.5173	27.7930	R					96	34			844		CLKUP	4	8	
MIDSIZE STATION WAGON	SUBARU	LEGACY WAGON AWD	2.5	4	Manual(M5)	F	21	28	24	23.8239	35.2678	27.8975	R					96	34			844			4	8	
MIDSIZE STATION WAGON	SUBARU	LEGACY WAGON AWD	3.0	6	Auto(L4)	F	20	27	23	22.6000	34.2000	26.6708	P					96	34			1011		CLKUP	4	8	
MIDSIZE STATION WAGON	VOLKSWAG	PASSAT WAGON	1.8	4	Manual(M5)	F	22	31	25	24.8000	39.4000	29.7630	P	T				97	39			930			5	8	
MIDSIZE STATION WAGON	VOLKSWAG	PASSAT WAGON	1.8	4	Auto(S5)	F	20	28	23	22.0308	36.4900	26.8117	P	T				97	39			1011		CLKUP	5	8	
MIDSIZE STATION WAGON	VOLKSWAG	PASSAT WAGON	2.8	6	Manual(M5)	F	20	29	23	22.0000	36.8000	26.8613	P					97	39			1011			5	8	
MIDSIZE STATION WAGON	VOLKSWAG	PASSAT WAGON	2.8	6	Auto(S5)	F	18	26	21	19.9440	33.4994	24.3841	P					97	39			1107		CLKUP	5	8	
MIDSIZE STATION WAGON	VOLKSWAG	PASSAT WAGON 4MOTION	2.8	6	Auto(S5)	F	17	24	20	19.0576	30.3493	22.8900	P					97	36			1162		CLKUP	5	8	
MIDSIZE STATION WAGON	VOLVO	V70	2.3	5	Manual(M5)	F	21	28	23	22.8000	35.7000	27.2273	P	T						98	36	1011				4	8
MIDSIZE STATION WAGON	VOLVO	V70	2.3	5	Auto(S5)	F	20	26	22	22.0000	33.3000	25.9649	P	T						98	36	1058		2MODE CLKUP	4	8	
MIDSIZE STATION WAGON	VOLVO	V70	2.4	5	Auto(L5)	F	21	28	24	23.3480	36.0182	27.7390	P							98	36	970		CLKUP	4	8	
MIDSIZE STATION WAGON	VOLVO	V70	2.4	5	Auto(L5)	F	20	27	23	22.1002	34.7002	26.4167	P	T						98	36	1011		CLKUP	4	8	
MIDSIZE STATION WAGON	VOLVO	V70	2.4	5	Manual(M5)	F	21	28	24	23.7000	35.4000	27.8407	P							98	36	970				4	8
MIDSIZE STATION WAGON	VOLVO	V70	2.4	5	Auto(S5)	F	20	27	23	22.1000	34.7000	26.4165	P	T						98	36	1011		2MODE CLKUP	4	8	
MIDSIZE STATION WAGON	VOLVO	V70AWD	2.4	5	Auto(S5)	F	18	25	21	20.4712	31.8427	24.3909	P	T						98	36	1107		2MODE CLKUP	4	8	
SMALL PICKUP TRUCKS 2	CHEVROLET	S10 PICKUP 2WD	2.2	4	Auto(L4)	R	19	25	21	20.6889	32.5878	24.7567	R									964	FLEX FUEL	CLKUP	2	10	
SMALL PICKUP TRUCKS 2	CHEVROLET	S10 PICKUP 2WD	2.2	4	Manual(M5)	R	22	28	24	24.4000	35.5000	28.3953	R									844	FLEX FUEL	SIL	2	10	
SMALL PICKUP TRUCKS 2	CHEVROLET	S10 PICKUP 2WD	4.3	6	Auto(L4)	R	17	22	19	18.9446	28.4447	22.2955	R									1065		CLKUP	2	10	
SMALL PICKUP TRUCKS 2	CHEVROLET	S10 PICKUP 2WD	4.3	6	Manual(M5)	R	16	22	18	17.6000	28.3733	21.2269	R									1126		SIL	2	10	
SMALL PICKUP TRUCKS 2	GMC	SONOMA 2WD	2.2	4	Auto(L4)	R	19	25	21	20.6889	32.5878	24.7567	R									964	FLEX FUEL	CLKUP	2	10	
SMALL PICKUP TRUCKS 2	GMC	SONOMA 2WD	2.2	4	Manual(M5)	R	22	28	24	24.4000	35.5000	28.3953	R									844	FLEX FUEL	SIL	2	10	
SMALL PICKUP TRUCKS 2	GMC	SONOMA 2WD	4.3	6	Auto(L4)	R	17	22	19	18.9542	28.4544	22.3055	R									1065		CLKUP	2	10	
SMALL PICKUP TRUCKS 2	GMC	SONOMA 2WD	4.3	6	Manual(M5)	R	16	22	18	17.6000	28.4239	21.2396	R									1126		SIL	2	10	
SMALL PICKUP TRUCKS 2	ISUZU	HOMBRE PICKUP 2WD	2.2	4	Auto(L4)	R	19	25	21	20.6889	32.5878	24.7567	R									964	FLEX FUEL	CLKUP	2	10	
SMALL PICKUP TRUCKS 2	ISUZU	HOMBRE PICKUP 2WD	2.2	4	Manual(M5)	R	22	28	24	24.4000	35.5000	28.3953	R									844	FLEX FUEL	SIL	2	10	
SMALL PICKUP TRUCKS 2	ISUZU	HOMBRE PICKUP 2WD	4.3	6	Auto(L4)	R	17	22	19	18.9000	28.4000	22.2491	R									1065		CLKUP	2	10	
STANDARD PICKUP TRUC	CHEVROLET	C1500 SILVERADO 2WD	4.3	6	Auto(L4)	R	16	21	18	18.1000	27.4000	21.3629	R									1126		CLKUP	2	12	
STANDARD PICKUP TRUC	CHEVROLET	C1500 SILVERADO 2WD	4.3	6	Manual(M5)	R	16	20	18	17.7302	25.9523	20.6782	R									1126		SIL	2	12	
STANDARD PICKUP TRUC	CHEVROLET	C1500 SILVERADO 2WD	4.8	8	Auto(L4)	R	16	20	17	17.3648	25.8532	20.3752	R									1191		CLKUP	2	12	
STANDARD PICKUP TRUC	CHEVROLET	C1500 SILVERADO 2WD	4.8	8	Manual(M5)	R	15	20	17	17.1610	25.8453	20.2181	R									1191		SIL	2	12	
STANDARD PICKUP TRUC	CHEVROLET	C1500 SILVERADO 2WD	5.3	8	Auto(L4)	R	15	19	17	17.1000	24.9000	19.9060	R									1191		CLKUP	2	12	
STANDARD PICKUP TRUC	DODGE	DAKOTA PICKUP 2WD	2.5	4	Manual(M5)	R	20	25	22	21.7498	31.9960	25.4117	R									921		SIL	2	12	
STANDARD PICKUP TRUC	DODGE	DAKOTA PICKUP 2WD	3.9	6	Auto(L4)	R	16	20	17	17.2570	25.9180	20.3113	R									1191			2	12	
STANDARD PICKUP TRUC	DODGE	DAKOTA PICKUP 2WD	3.9	6	Manual(M5)	R	16	22	18	17.3872	27.6709	20.8790	R									1126		SIL	2	12	
STANDARD PICKUP TRUC	DODGE	DAKOTA PICKUP 2WD	4.7	8	Auto(L4)	R	14	19	16	15.4010	24.3677	18.4574	R									1266		CLKUP	2	12	
STANDARD PICKUP TRUC	DODGE	DAKOTA PICKUP 2WD	4.7	8	Manual(M5)	R	15	20	17	16.2338	26.0000	19.5359	R									1191			2	12	















