UNIVERSITY OF MICHIGAN

Plug-in Hybrid Electric Vehicles

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Executive Summary

Vehicle purchases are important economic decisions for individual consumers and have important consequences for the nation as a whole. Consumers take capital and operating costs as well as a range of non-economic factors into account when making their purchase decisions. The major operating cost for vehicles is the consumer's expenditure on gasoline, which is determined by the vehicle's fuel efficiency, daily miles driven and the price of gasoline. Plug-in hybrid electric vehicles (PHEV) represent a significant change in technology with which most consumers are currently unfamiliar. PHEVs are expected to reduce the cost of fuel by recharging batteries from electrical outlets, but the vehicles are anticipated to cost significantly more than a conventional vehicle. Recharging batteries would require a significant shift in consumer habits and in the infrastructure of the nation's electrical grid. Importantly, PHEVs are expected to reduce overall carbon dioxide emissions, counteract global warming, and contribute to the energy independence of the nation. Environmental and other non-economic attitudes represent a potentially important component of PHEV purchase decisions.

The goal of this research was to assess the current state of knowledge and opinions about PHEVs among U.S. consumers. Interviews were conducted from July to November 2008 with a nationally representative sample of 2,513 adults. Questions about their potential interest in hybrid electric vehicles supplemented questions about their current vehicles, their driving habits, mileage and gasoline expenditures, parking location as well as official government data on the cost of gasoline, electricity, and the MPG of the vehicle they drove. Data on the economic and demographic characteristics of the household were supplemented by a range of environmental and other non-economic attitudes toward the new technology embodied in PHEVs. The purpose of this study was to examine the conditions under which consumers would purchase a PHEV. Rather than focus on "first adopters," the research focused on the potential pool of purchasers in the first several years after the introduction of PHEVs.

Hybrid electric vehicles include an electric motor and a battery pack in addition to an internal combustion engine. There are two classes of hybrid designs that differ in the way the vehicle uses gasoline and electrical power. In a "parallel" hybrid, gasoline is provided to a conventional engine and the batteries supply power to an electric motor. The vehicle can be powered by either the engine or the electric motor; the vehicle itself recharges the batteries during normal driving. In a "series" hybrid the electric motors and gasoline engine are linked in line; the electric motor powers the vehicle and the gasoline engine's only function is to recharge the battery when an electrical outlet is not available. The terms "hybrid electric vehicle" or HEV is used to indicate a parallel hybrid and the term "plug-in hybrid electric vehicle" or PHEV to indicate a series hybrid.

This research project focused on a determination of which factors would facilitate sales of plug-in hybrid electric vehicles and which factors would represent barriers to the successful introduction of these vehicles. A successful introduction is based on more than just sales in the first few years. A successful introduction implies an upward trajectory in sales that enables cost reductions though mass production and in turn fosters even greater investments in advanced technology that acts to lower prices and increase performance even more in the future. Needless to say, the successful introduction

of plug-in hybrid electric vehicles is a necessary but not a sufficient condition for the ultimate success of this new technology. Other competing technologies will continue to challenge plug-in hybrids for market supremacy.

The survey found a good deal of interest among consumers for plug-in hybrid electric vehicles as well as a good deal of resistance based on the estimated cost of this new technology. Consumer acceptance was not solely determined by costs, however, as environmental and other non-economic factors influenced the likelihood of future purchases of hybrid electric vehicles. Nonetheless, the long term success of these vehicles in the marketplace will depend on whether this technology can provide a higher value to consumers when compared with alternative technologies. Providing greater consumer value includes the reliability, durability, and convenience of the new technology as well as fuel savings and the purchase price of the vehicle. These are complex judgments that cannot be fully captured in population surveys before the vehicles have been actually produced.

Plug-in hybrid electric vehicles were described to survey respondents in general terms, with the implicit assumption that these vehicles were like conventional vehicles in every way except for how the vehicle was powered and refueled. Consumers were asked to consider two key factors about these hybrids: the savings achievable on fuel costs and the added cost premium to purchase the vehicle. The questions were based on estimates of the likely fuel savings and cost premiums for the hybrid vehicles in five to ten years (in today's dollars). The costs premiums presented to consumers for PHEVs were $2,500, $5,000, and $10,000 and the fuel savings was estimated at 75% compared with a conventional gasoline engine. Consumers' preferences for new vehicles were elicited in terms of purchase probabilities or the likelihood of a future purchase.

At an additional cost of $2,500, the mean purchase probability for a plug-in hybrid electric vehicle was 46%, which dropped to 30% for a PHEV that cost an additional $5,000, and to 14% at an additional cost of $10,000. This large response in purchase probabilities to increasing price premiums was greater than could be justified based on purely economic rationales. Based on consumers' actual gas expenditures with their current vehicles, the average payback period for the added premium to be offset by fuel savings ranged from 2.0 to 8.5 years at an inflation-adjusted discount rate of 3%. To be sure, new technology entails risks that may entail higher costs or a lower resale value which would mean that these payback periods were underestimated. At a real discount rate of 10%, the payback period ranged from 2.2 to 12.9 years. Indeed, other studies of purchases of energy-efficient household appliances have found that consumers apply up to a 20% discount rate in their actual purchasing decisions.

Three general sets of factors were investigated to gain a better understanding of how consumers judged the potential purchase of a plug-in hybrid electric vehicle. The first general factor was the characteristics of the vehicle that consumers currently own and how the vehicles were driven, determining the cost implications of vehicle purchase decisions. The second general factor focused on the socio-economic characteristics of the household, its geographic location, and recharging capabilities. The third factor was environmental and other non-economic attitudes that may be related to preferences for hybrid vehicles.

The impact of these three general factors can be summarized as follows: although economic considerations had a significant influence on hybrid purchase probabilities, environmental and other non-economic attitudes had an even larger impact. It is a rather commonplace finding that the utility that consumers draw from vehicles depends on more than a strict economic cost-benefit calculation. Even when vehicles are equivalent in every way from an economic point of view, different makes, models, and styles connote different social messages about the owner. A strong appeal of plug-in hybrids is that consumers believe such a purchase would vividly demonstrate their commitment to a cleaner environment. Such beliefs are important for the introduction of plug-in hybrids, acting to offset some of the higher economic costs by conferring social benefits. Such positive social benefits can be expected to be inversely proportional to the number of hybrid owners; at some point, the positive social benefits of owning a hybrid may shift to rising negative social implications about those who shun these more fuel efficient vehicles. Such a purely social dynamic, however, cannot exist independent of economic factors, especially since vehicles are generally the second most expensive purchase made by consumers.

The first buyers of PHEVs are likely to currently own vehicles with relatively high fuel efficiency ratings and favor the purchase of the vehicle for environmental reasons. The economic justification for the purchase will not be great since the payback period to offset the cost premium will be longer than for someone who owns a low mileage vehicle. The first time buyer will be highly educated and think it is important to signal his or her commitment to a cleaner environment to others. First time PHEV buyers are likely to own their own home, have convenient access to an electric outlet, and relish the opportunity to avoid gas stations and recharge their vehicles overnight at off-peak pricing. Although a first time PHEV buyer is likely to have relatively high income, these consumers were as sensitive as moderate or lower income consumers to the potential size of the premiums on PHEVs.

The economic challenges to the successful introduction of PHEVs are diverse, although the reactions to the premiums charged for PHEVs were nearly universal. As the premiums for PHEVs doubled from $2,500 to $5,000 and doubled again to $10,000, there was a uniform decline in purchase probabilities across all of the socio-economic characteristics measured, across all differences in the characteristics of the vehicles they currently owned and how they were used, and across all of the environmental attitudes measured. On average, the purchase probabilities declined by 16 percentage points for each doubling of the initial cost premium. This was true no matter how different the subgroup's initial purchase probability was from the overall average; each doubling prompted a very similar decline in the likelihood of purchase. This was the most vivid and convincing demonstration of the sensitivity of consumers to the price of PHEVs. At a premium of $10,000, 56% of all respondents reported that there was no chance that they would ever purchase a PHEV, more than double the 23% response at a premium of $2,500. The average purchase probability at the $10,000 premium fell by 70% to just a one-in-seven chance of purchase from nearly a one-in-two chance at the $2,500 premium.

Given that a tax credit amounting to $7,500 will be available to buyers of PHEVs, this would make a PHEV purchases much more likely, at least in theory. The problem is that most buyers would have to finance the total price of the vehicle, including the premium, before they could claim the tax credit. This would limit the already narrow group of new vehicle buyers to those who were more likely

to pay cash rather than finance the vehicle. If this tax credit could be converted into a reduction of the purchase price, perhaps through manufacturer or dealer intervention, its impact on sales would be much greater and more equitable to those who purchased on credit.

The data provide strong evidence that a combination of economic and social incentives may be the most effective for the successful introduction of PHEVs. Indeed, social forces play an important role in most purchases, including vehicles. The survey documented the significant influence of hybrid vehicles in signaling people's commitment to a clean environment. Nonetheless, the importance of the attitudes toward the environment in explaining hybrid purchase probabilities provides less compelling evidence of the underlying demand than if preferences for hybrids were mostly based on economic criteria. The presumption is that following the introduction of PHEVs, if the vehicle is priced so that consumers can recoup their initial investments over a reasonable time period, consumers would find ample economic justification for the purchase of a PHEV. The critical role of environmental and other non-economic attitudes is to provide the initial burst of interest and sales to propel PHEV's appeal to the mass market.

Introduction

Vehicle purchases are important economic decisions for individual consumers and have important consequences for the nation as a whole. Consumers can be expected to take both capital and operating costs into account when making their purchase decisions. Vehicles are typically the second most expensive purchase made by households, and the technology embodied in each vehicle determines its operating costs over the life of the vehicle. The major operating cost for vehicles is tied to consumer expenditures for gasoline, which is determined by the vehicle's fuel efficiency, daily miles driven and the price of gasoline. Petroleum prices were extremely volatile during the second half of 2008, with the per barrel price of West Texas Intermediate peaking at $133.37 in July followed by a decline to $41.12 by December; these prices translated to a national average per gallon price for regular gasoline of $4.06 in July and $1.69 by December.[1] The extraordinary volatility in the cost of gasoline during the past few years has raised the level of uncertainty among consumers about future prices and caused them to place greater weight on the expected variability and mean level of gasoline prices in their vehicle purchase decisions.

Concerns about the future prices of petroleum products have been accompanied by rising worries over both the impact of global warming due to carbon dioxide emissions and the nation's energy independence. The transportation sector accounted for one-third of all greenhouse gas emissions in the U.S. in 2006.[2] There are several federal programs designed to lower these emissions by requiring more fuel efficient vehicles, including the recently enacted increase in the required corporate average fuel economy (CAFE) standards. One-quarter of U.S. oil imports come from the Persian Gulf region, an area with whose volatility Americans are extensively familiar with.[3] Concerns about potential disruptions to the oil supply and the resultant spike in gas prices loom large with any news of new disturbances in this region. Hybrid vehicles would also reduce the use of petroleum and have been promoted by various government programs, including tax incentives to consumers. Hybrid vehicles whose batteries can be recharged by plugging into the electric grid have the additional advantages of further lowering the use of imported petroleum and lowering the total greenhouse gas emissions involved in transportation, even if the electricity for recharging the batteries is generated from coal.

Plug-in hybrid electric vehicles (PHEV), however, represent a significant change in technology with which most consumers are currently unfamiliar, and recharging the batteries would require a significant change in both consumer habits and the infrastructure of the nation's electrical grid. One factor people commonly consider in their choice of a vehicle is whether the vehicle and its refueling can provide a reliable form of transportation whenever the vehicle is needed. Ensuring that these vehicles can be recharged overnight from standard home outlets or providing charging stations at non-residential locations could assuage at least some consumer concerns about PHEVs.

[1] Energy Information Administration, Short-Term Energy Outlook, "Crude Oil Price," Released June 09, 2009.

[2] Energy Information Administration, "Emissions of Greenhouse Gases in the United States 2007," December 2008, DOE/EIA-0573(2007).

[3] Energy Information Administration. "Crude Oil Imports from Persian Gulf 2008". Released March 02, 2009.

Aside from the risks inherent in the purchase of any new technology, the savings in energy costs would be offset by the higher initial costs for the hybrid vehicle itself. Consumers, however, often reject the tradeoff of paying more for an energy efficient product that will provide more than offsetting energy savings over its usable life, especially when the added premium for the technological advances represents a significant portion of the total price of the product.

For the introduction of new technology to ultimately succeed, the initial interest among consumers only needs to warrant the continued investment in and development of the basic technology. If the technology proves its merit---especially its advantages compared with other alternative developments in vehicle fuel efficiency---the rate of adoption can be expected to increase. This research does not attempt to model the rate of adoption or the ultimate size of the market for PHEVs. This research is confined to an examination of the initial phase of adoption, detailing the circumstances and conditions under which consumers would favor or disfavor the purchase of PHEVs. Furthermore, the purpose of this study was not to solely focus on "first adopters," but the size of the potential pool of purchasers in the first several years after the introduction of PHEVs.

Given that consumers have little or no experience with PHEVs but can be expected to know something about hybrid electric vehicles (HEVs) such as the Prius, this paper will first provide a review of the defining characteristics of the two vehicles, as well as the expected advantages of each type of hybrid vehicle. These characteristics were used to devise the question wording that was used in a nationally representative sample of U.S. consumers to estimate their interest in the purchase of hybrid electric vehicles.

Hybrid Electric Vehicles

Hybrid electric vehicles include an electric motor and a battery pack in addition to a traditional internal combustion engine. There are two classes of hybrid designs that differ in the way the vehicle uses gasoline and electrical power. In a "parallel" hybrid, gasoline is provided to a conventional engine and the batteries supply power to an electric motor. The vehicle transmission, which turns the wheels, can be powered by either the engine or the electric motor. All mass produced hybrids use the vehicle itself to recharge the batteries during normal driving. Although there are some customized parallel hybrid vehicles whose batteries can be recharged by plugging into the electric grid, this research assumed the batteries of all parallel hybrids can only be recharged by the vehicle itself.

The other type of hybrid is a "series" hybrid in which the gasoline engine and electric motors are linked in line. The gasoline engine runs a generator, which is used to recharge the vehicle's batteries and the battery powered engine runs the vehicle. The gasoline engine is specially designed to be used as a generator and is never intended to directly power the transmission. When the battery power is low, the engine automatically provides the battery with enough power to run the vehicle. Most of the time, however, the battery is recharged by plugging it into the electric grid, a less expensive source of energy than gasoline.

This paper uses the terms "hybrid electric vehicle" or HEV to indicate a parallel hybrid and the term "plug-in hybrid electric vehicle" or PHEV to indicate a series hybrid. It is impossible to predict all of the variations that will be developed on these basic differences in the future, but for the purposes of this study these two basic types were chosen to characterize the main differences in hybrid vehicles.

In addition to these basic definitions of hybrid vehicles, two critical assumptions were required to determine the willingness of consumers to purchase these vehicles: the typical fuel saving and the additional cost of the vehicle itself. Like many innovations, the new technology is expensive, particularly the expected cost of the batteries. Moreover, consumers must be willing to accept the trade-off of a higher cost to acquire the vehicle for a lower cost of fuel over the useable life of the vehicle. Obviously, the number of miles driven, the all-electric range of the vehicle, gasoline and electric prices, discount rates, and other economic factors influence the purchase decision. Aside from economic factors, the decision to purchase a hybrid vehicle may be associated with other concerns, such as the risks inherent in new technology, environmental concerns, and so forth.

Predicting the cost of new technology in advance of its introduction is a difficult task. Moreover, the focus of the study was not to determine purchase probabilities for the first model introduced but the purchase probabilities over the next five to ten years. This longer term focus made the forecasting task even more difficult.

HEVs provide greater fuel economy compared to conventional vehicles of a similar model and class. Depending on the vehicle class, HEVs are estimated to save 15% to 70% in fuel costs annually, and cost between 20% and 50% more than conventional gas vehicles of the same class, before accounting for additional savings from tax credits.[4] Sales of HEVs have increased to a 2.5% share of the light-duty car and truck market in 2008, up from 2.2% in 2007 and 1.5% in 2006 according to the U.S. EPA.[5]

There are two types of incentives that could be offered to consumers to promote the purchase of hybrid vehicles: reductions in the cost of ownership of hybrid vehicles and taxes that increase the cost of gasoline. Perhaps the most effective incentives would reduce the initial purchase price of the vehicle, either through reductions in the purchase price offered by manufacturers, waivers of sales taxes, or a direct government subsidy to reduce the purchase price for consumers. Federal income tax credits are somewhat less effective since the cost reduction is deferred until the filing of an income tax return. This problem particularly affects buyers who must finance all or most of the purchase. The American Recovery and Reinvestment Act of 2009 includes a credit against annual tax payments for the purchase of certain alternative fuel vehicles. All PHEVs are eligible for the base credit of $2,500, plus $417 if their battery capacity is at least five kilowatt-hours and an additional $417 credit for each

[4] Edmunds, "Hybrid Buying Guide: What You Should Know Before Buying a Hybrid in 2009," http://www.edmunds.com/hybrid/2009/beforebuy.html, Accessed March 3

[5] US Environmental Protection Agency, "Light-Duty Automotive Technology and Fuel Economy Trends: 1975 Through 2008," September 2008, EPA 420-R-08-015.

kilowatt-hour of battery capacity above five kilowatt-hours. [6] The maximum obtainable credit for PHEVs is $7,500. The credit is set to begin phasing out after the sale of 200,000 vehicles per manufacturer and can only be applied to new vehicles purchased after December 31, 2009.

A significant factor promoting the purchase of more fuel efficient vehicles is higher gas prices, either driven by market forces or by higher state or federal taxes.[7] More recently consumers have become concerned about protecting themselves from spikes in gasoline prices, even if temporarily, by the purchase of a more fuel efficient vehicle.

PHEV technology allows for a greater reduction in petroleum fuel usage and a correspondingly higher purchase price. Most estimates of the expected future cost of a PHEV focus on the incremental cost of the Lithium-ion battery, implying offsetting costs from the shift from a gasoline to a battery power engine. The long term cost increment of a Lithium-ion battery with an all-electric range of 40 miles was expected to be $9,626 when estimated in 2006.[8] An equivalent cost per gallon of gasoline for a compact PHEV can be calculated, assuming the following: (1) 0.24 kWh consumed per mile for the PHEV[9]; (2) 30 miles travelled per gallon of gas for a conventional compact vehicle;[10] and, (3) a national average price of $0.1065 per kWh for residential electricity.[11] Applying these assumptions results in an equivalent "price per gallon of gasoline" for a PHEV of approximately $0.75.[12,13] The actual price of

[6] American Recovery and Reinvestment Act of 2009. 111th Cong., 1st Sess. (2009), Division B, Title 1, Section D, Number 14.

[7] Diamond, D. "The Impact of Government Incentives for Hybrid-Electric Vehicles: Evidence from US States," Energy Policy, Volume 37, Issue 3, March 2009.

[8] Simpson, A. "Cost / Benefit Analysis of Hybrid-Electric and Plug-In Hybrid-Electric Vehicle Technology," in "Plug-In Hybrid Electric Vehicle Analysis," Department of Energy, Office of Energy Efficiency and Renewable Energy, Milestone Report NREL/MP-540-40609, November 2006.

[9] Value calculated using Advisor modeling results for the full charge test, which simulates the all-electric mode. Specifically, 0.24 kWh / mile = 33.4 kWh / 1 gal gasoline * 1 gasoline gal equivalent / 142.1 miles. EPRI, "Comparing the Benefits and Impacts of Hybrid Electric Vehicle Options for Compact Sedan and Sport Utility Vehicles," Palo Alto, CA: 2002. 1006892.

[10] Value represents the average 2005 fuel efficiency for a light-duty passenger car. Bureau of Transportation Statistics, "National Transportation Statistics, 2006," Table 4-23, December 2006.

[11] Value represents the annual average residential retail price of electricity for 2007. Energy Information Administration, "Table 5.3. Average Retail Price of Electricity to Ultimate Customers: Total by End-Use Sector, 1994 through November 2008," in Electric Power Monthly, Released February 13, 2009.

[12] Calculation performed as follows: 0.24 kWh / mile * (30 miles / gal) * ($0.1065 / kWh) = PHEV equivalent $ / gal.

[13] This calculation uses the average retail electricity prices from 2006 and fuel efficiency for passenger cars from 2005 and is similar to prices of approximately $1.00 quoted in Department of Energy publications for mid-sized SUVs. See, for example, Parks, K. "Costs and Emissions Associated with Plug-In Hybrid Electric Vehicle Charging in the Xcel Energy Colorado Service Territory," Department of Energy, Office of Energy Efficiency and Renewable Energy, Technical Report NREL/TP-640-4140, May 2007.

gasoline paid by respondents at the time of the survey averaged about $3.55. Shifting from gasoline to electricity to power a vehicle would imply a 79% reduction in the cost of fuel.

Study Design and Methods

The goal of the consumer survey was to assess the current state of knowledge and opinions about PHEVs. In particular, the survey addressed the willingness of individuals to pay for HEV or PHEV technology given different cost and fuel savings scenarios. Individuals were asked about PHEVs during a longer consumer survey which was based on a representative national sample of U.S. adults aged 18 or older. The interviews were conducted between July 1 and November 25, 2008 and included 2,513 respondents, of whom 93% were licensed drivers at the time of the survey. Additional demographic information such as age, income, education, geographic location, gender, and race was also collected during the survey as well as information about the consumer's vehicles and how they used them.

A number of key assumptions about emerging technology, fuel savings, and the cost of the vehicle underpin the PHEV survey. The respondents were asked to compare the HEVs and PHEVs to a conventional internal combustion engine vehicle; the survey did not ask consumers to compare an HEV to a PHEV. The survey questions incorporated the assumption that HEVs achieve 25% more fuel efficiency and cost $1,500 more than a comparable traditional gas engine vehicle. While the HEV cost premium is smaller than at present, the HEV premium is expected to decline after PHEVs are introduced. PHEVs were assumed to obtain 75% greater fuel efficiency, with possible price premiums of $2,500, $5,000, or $10,000 over conventional vehicles. The range was based on the premiums that are likely to exist following a successful introduction of the PHEV. While some estimates of the initial premium were much higher than $10,000, pretesting indicated that at premiums higher than $10,000, few, if any, consumers would purchase a PHEV.

Determining potential consumer demand for PHEVs is a difficult task since no consumer can be expected to know the features and costs of a vehicle that does not currently exist in the marketplace. To assess potential demand, realistic descriptions of PHEVs and associated costs must be provided to consumers. To be sure, the potential matrix of variations in the features of PHEVs crossed by variations in costs was too large to fully investigate in population surveys. As a result, some limitations on the types and costs of hybrid vehicles had to be devised to adequately represent the distinctive aspects of the product as well as the purchase decision faced by consumers. Two key decisions were made in order to facilitate consumers' assessments. First, since pretests revealed confusion among consumers between the characteristics of HEVs and PHEVs, questions were specifically tailored to ensure clarity. Second, rather than offer descriptions of multiple types of PHEVs, the survey asked about different purchase costs for the same type of PHEV.

The first question was aimed at HEVs, the type of vehicle with which most consumers were already familiar. The description was intended to describe a parallel HEV much like the Prius:

Vehicle manufacturers currently offer for sale hybrid vehicles which combine an ordinary gasoline engine with a battery powered electric motor to increase fuel efficiency. The battery is recharged by the vehicle itself during normal driving, with most of the gas savings generated during city driving.

The description was intended to be an easily understood statement of the essential characteristics of an HEV that avoided too much technical detail or jargon. Consumers' interest in purchasing this type of vehicle was measured by a probability scale, first without any mention of a purchase cost differential between an HEV and a normal vehicle. Note that no fixed time of purchase was given, since the goal of the study was not to estimate next year's sales of hybrids but to determine long term trends in demand.

On a scale of zero to one hundred, where zero means that you would definitely not buy and one hundred means you definitely would buy, what are the chances that you might buy a hybrid vehicle sometime in the future?

The cost elements were then introduced by noting that hybrids were distinctive both in terms of fuel expenditures and purchase price.

The cost of driving a hybrid vehicle had two major components: the cost of the vehicle itself and the cost of gasoline. While hybrids reduce gasoline consumption, the hybrid vehicle itself typically costs more than an ordinary vehicle.

The purchase probability question was again asked, this time with cost information. Rather than indicating specific estimates for specific vehicles, an overall average of a 25% reduction in fuel costs and an increase of $1,500 in the vehicle cost were used. Predicting the actual amounts of gas savings and the added cost of purchase took into account both corresponding changes in the costs of non-hybrids and a reduced differential price as more hybrids were produced in the future. Pretests of the survey revealed that using a "reduction of costs" rather than an increase in MPG made the comparison easier for respondents.

If a hybrid vehicle reduced total fuel costs by twenty-five percent and the vehicle itself costs one thousand five hundred dollars more than an ordinary vehicle, what are the chances that you might buy a hybrid vehicle, using the same scale ranging from zero to one hundred, where zero means that you would definitely not buy and one hundred mean you definitely would buy sometime in the future?

Following the questions on HEVs, respondents were then asked about PHEVs in a similar format. A definition of a PHEV was first read to the respondent, with the essential difference being that the recharging was mainly done from plugging in the vehicle to a standard outlet. The question was framed to describe a series rather than a parallel hybrid.

Vehicle manufacturers are also developing a more fuel efficient type of hybrid vehicle, which is called a plug-in hybrid. The battery on this vehicle is recharged by plugging the vehicle into a standard electrical outlet. Starting each day with a fully recharged battery, the vehicle could travel from ten to sixty miles on battery power. When the battery runs low, the gasoline engine would automatically generate the power to run the vehicle.

The same purchase probability scale was then used, with the first question making no reference to the potential costs:

> *On a scale of zero to one hundred, where zero means that you would definitely not buy and one hundred means you definitely would buy, what are the chances that you might buy a plug-in hybrid vehicle sometime in the future?*

Respondents were then reminded of the same division between the purchase price of the vehicle and operating costs, including those associated with electricity and gasoline.

> *The cost of driving a plug-in hybrid also has two major components: the cost of the vehicle itself and the total cost of electricity and gasoline. While the plug-in hybrids reduce overall fuel consumption, the plug-in hybrid itself typically costs more than an ordinary vehicle.*

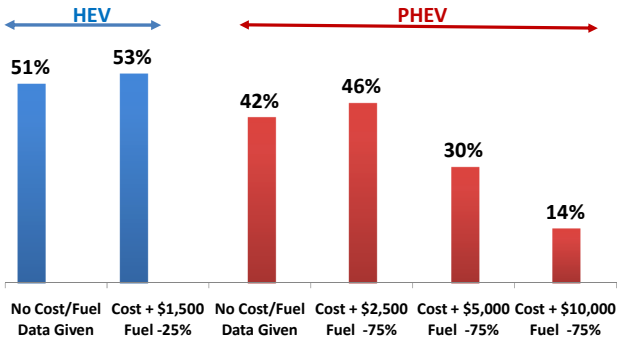
The reduction in total fuel costs was set at 75%, derived from the estimated cost of electricity compared with gasoline. Fuel and vehicle costs were intended to be reasonable estimates for the situation five to ten years from now. While this may be an overestimate or underestimate of the true fuel savings in the future, the impact on the analytic results is minimal since it was held constant as the added price of the vehicle itself varied from $2,500 to $5,000 and finally to $10,000. While an added cost of $2,500 may appear well below future production costs, the difference between high and low figure was meant to model a tax incentive of $7,500 for the purchase of a PHEV.

> *If a plug-in hybrid reduced total fuel costs by seventy-five percent and cost two thousand five hundred dollars more than an ordinary vehicle, what are the chances you might buy the plug-in hybrid?*
>
> *What if a plug-in hybrid that reduced total fuel costs by seventy-five percent cost five thousand dollars more than an ordinary vehicle, what are the chances you might buy the plug-in hybrid?*
>
> *What if a plug-in hybrid that reduced total fuel costs by seventy-five percent cost ten thousand dollars more than an ordinary vehicle, what are the chances you might buy the plug-in hybrid?*

Hybrid Purchase Probabilities

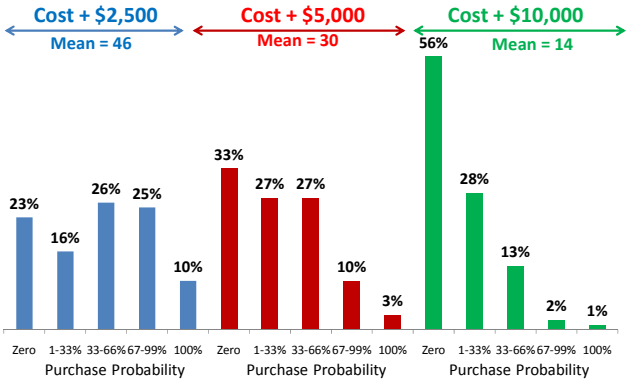
Consumers judged the probability of purchasing an HEV at 51% when no cost data were provided, and at 53% with an assumed fuel saving of 25% and an added vehicle price of $1,500 (see Chart 1 at right and Table 2). The results suggest that when consumers were not provided any cost data, they had assumed figures very close to the 25% reduction in fuel costs and paying an additional $1,500 for the HEV. The same result was found for PHEVs in that consumers were slightly more disposed to purchasing a PHEV with fuel savings of 75% and paying an additional $2,500 for the vehicle. This indirect evidence suggests that consumers anticipated slightly higher costs or less fuel savings than the alternatives given in the first follow-up question.

Chart 1:
Purchase Probabilities Among All Vehicle Owning Households



The overall level of the probability of purchase suggests widespread interest, with consumers rating the purchase of an HEV as nearly as likely as a standard vehicle, and being only slightly less likely to purchase a PHEV than a standard vehicle. Nonetheless, these preferences are highly dependent on prices, as with each successive doubling of the price of PHEVs, the probability of purchase falls by 16 percentage points. The average probability of a PHEV purchase fell to just 14% when the vehicle cost an additional $10,000.

Chart 2:
Purchase Probabilities for PHEVs with 75% Fuel Savings



The probability distribution changes dramatically at higher costs. At the lowest cost of an additional $2,500, the distribution appears rather flat; it steepened at an added cost of $5,000, and became very steep at the top premium of $10,000 (see Chart 2 and Table 1). Indeed, 56% of all consumers responded that there was no chance that they would buy a PHEV at the top premium. The proportion indicating a zero probability of purchase moves from nearly one-in-four at $2,500, to one-in-three at $5,000, to more than one-in-two at an added cost of $10,000. At the other extreme, those that said they were 100% certain that they would buy a PHEV, reached a high of just 10% for the lowest added cost and fell to just 1% for the highest added cost. It should be no surprise that vehicle purchases, typically the second largest purchase households make, would be very sensitive to price.

Correlates of Purchase Probabilities for Hybrid Vehicles

What prompts people to favor a hybrid vehicle over a standard internal combustion engine vehicle? There are two general classes of variables that could help explain these relative preferences. Perhaps the most important set of variables are those that determine the total cost of a hybrid compared with a conventional vehicle. These variables cover the cost of fuel and the vehicle itself, the fuel efficiency of the vehicle, the mix and number of highway and city miles driven, the cost, availability, and convenience of refueling options, as well as the willingness and ability of consumers to trade-off higher capital costs against lower operating costs. The second set involves consumer preferences for different types of vehicles and technology, including the impact of environmental attitudes on vehicle purchases.

The total number of potential correlates was larger than the survey could reasonably accommodate, as is usually the case. Whether a correlate was actually included in the survey was the result of an assessment of the likely impact of a variable on the choice between a hybrid and non-hybrid vehicle. The variables included can be conveniently summarized by the following general categories.

- Non-survey data on actual costs in geographic location of residence at time of survey
  - prices of gasoline and electricity, and vehicle MPG
- Characteristics of the currently owned vehicle and vehicle usage patterns
  - Make/model and age of vehicle and total number of household vehicles
  - Number of miles driven, highway miles, and amount spent on gasoline
- Demographic and economic characteristics of the individual and household
  - Age, income, education, gender, and location of residence
  - Location where park and availability of an outlet for recharging
- Environmental attitudes and preferences for new technology
  - Minimum all-electric range, avoidance of gas stations, responsiveness to electric pricing
  - Hybrids favored for cost vs. environment, hybrids as show of commitment, favor new technology

The complete list and definitions of these variables are included in the attached tables along with how hybrid purchase probabilities differed based on these classifications. The overall assessment of these variables is made in the context of a multivariate analysis (Table 5). It is nonetheless of some interest to review in detail the univariate relationships with hybrid purchase probabilities. Tables 12 - 24 include the demographic correlates of the key independent variables.

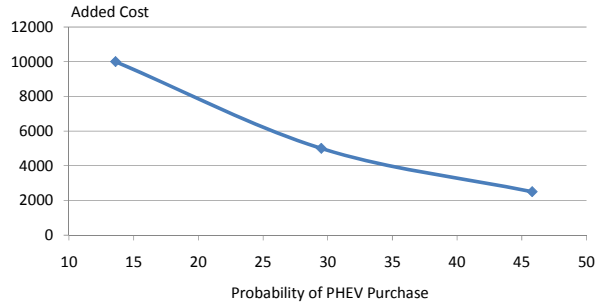
The multivariate analysis seeks to determine the independent influence of each variable after controlling for the influence of the other predictors. Linear regression models with standard errors robust to the presence of heteroscedasticity were fitted for six dependent variables, spanning HEVs and PHEVs with no cost data as well as the added cost premium versions. The multivariate models generally confirmed the univariate results; whenever they differed, the potential reasons for the difference are discussed.

Before addressing these issues, this paper first considers two key economic constructs: the responsiveness of consumers to prices and estimates of how long it would take consumers to recover the additional cost of the vehicle in savings from the reduced amount of fuel that they would need. To be sure, this research did not attempt to compute a comprehensive assessment of either the price elasticity of demand or the expected payoff period of PHEV purchases, but the estimates below can provide a framework for considering these constructs.

Price Elasticity and Payoff Periods

The data suggest a very high price responsiveness of demand for hybrid vehicles. The traditional calculation of price elasticity---the percentage change in demand divided by the percentage change in price---can only be approximated by the collected data. The change in demand must be estimated by the change in purchase probabilities, and the change in price must be approximated by combining the base price of a vehicle with the additional cost of the hybrid. The basic data is shown in Chart 3 and Table 3. If the base price of a comparable vehicle is assumed to be $25,000, the total change in price for a PHEV would be 27.3% (from $27,500 to $35,000) and the total change in purchase probabilities would be -69.9%, so the price elasticity would be -2.6%, or for each percentage point change in the price of the vehicle, the purchase probability would be reduced by 2.6%. At a base cost of $20,000, the price elasticity would be -2.1%; at a base price for a conventional vehicle of $30,000, the price elasticity of PHEV purchase probabilities would be -3.0%. These calculations assume that the choice set of available vehicles only includes PHEVs.

Chart 3:
Responsiveness of PHEV Purchase Probabilities to Price
(PHEV with fuel savings of 75%)



It is of some interest to note that the reduction in purchase probabilities as the assumed costs of a PHEV increased was nearly identical across all consumers. This finding held across differences in consumers' economic and demographic characteristics; nor did it vary by the characteristics of the vehicles they owned or how they were used; it was also largely independent of their environmental attitudes (see Table 3). Overall, the data indicated a near universal responsiveness to PHEV prices. To be sure, there were differences in the appeal of PHEVs across these subgroups, but however high or low the initial appeal of a PHEV, as prices increases the appeal decreased at about the same rate in all subgroups.

The payoff period for a purchase of PHEVs was calculated based on the difference in expenditures on gasoline and the additional cost of the vehicle. The survey asked consumers for their monthly expenditures on gasoline for their current vehicle. The savings was calculated at 75% of that total and compared with the additional cost of the vehicle. Several possible discount rates were then used to equate the additional upfront lump sum payment for the vehicle with the fuel savings distributed over time (see Chart 4 and Table 4). The payoff period was defined as the number of years it

would take before the upfront costs of the vehicle were fully recovered by reduced fuel expenditures. The yearly estimate represented the median of the distribution, that is, when half of all consumers would reach the break-even point.

With an inflation adjusted discount rate of 3%, it would take 3.7 years for consumers to repay the additional $1,500 for a HEV. For a PHEV, it would take 2.0 years at an additional cost of $2,500, 4.1 years with an added cost of $5,000, and 8.5 years with an additional cost of $10,000. Since the median age of a new vehicle in the sample is just under 4 years, one would expect well over 50% of consumers to favor the purchase of a PHEV at an additional cost of $2500. The reported hybrid purchase probabilities, however, indicate that consumers may use substantially higher discount rates. While a real discount rate of 3% is a reasonable estimate based on economic criteria, the literature often estimates a much higher real discount rate that consumers require before they would purchase a more energy efficient item. Hausman (1979) estimates that consumers use a discount rate of about 20% in making the tradeoff decision when purchasing energy-using durables. When the estimates are based on a real discount rate of 10%, the payoff period is greatly extended for the highest additional costs for PHEVs---it would take 12.9 years to reach the break-even point when the PHEV carried an added cost of $10,000. Even at a discount rate of 5%, it would take the median consumer 9.3 years to break even. Discount rates of 20% would mean that almost no consumers could expect to break even on a PHEV purchase with a cost increment of $10000 within a reasonable time frame.

Chart 4:
Payoff Period Given Respondent's Actual Gas Expenses
(Gas Prices at time of Interview; median payoff periods in years)

	HEV @ 25% fuel reduction	PHEV @ 75% fuel reduction		
Real Discount Rate	+$1,500	+$2,500	+$5,000	+$10,000
0%	3.5	2.0	3.9	7.6
3%	3.7	2.0	4.1	8.5
5%	3.8	2.1	4.2	9.3
10%	4.1	2.2	4.7	12.9

These calculations have several flaws, the most important of which is that today's expenditures on gasoline may not be a good estimate of the prevailing prices of gasoline five or ten years from now. To account for this difference, consumers were asked to estimate what they thought gas would cost in five years. While consumers' estimates of future gas prices can hardly be considered to be a reliable guide to the future cost of gasoline, the estimates do indicate the frame of reference that consumers used in answering questions on the purchase probabilities for hybrid vehicles. Respondents expected gasoline to average $4.35 in five years, up from the $3.55 that they actually paid at the time of the survey. When data for expected gas prices were substituted for the actual prices of gasoline at the time of the interview, it had the impact of shortening the payoff time period (see Chart 5 and Table 4). At the 3% real discount rate, the break-even period was 3.1 years for an HEV, 1.7 years for a PHEV at $2,500 more, 3.4 years at $5,000 more, and 7.1 years

Chart 5:
Payoff Period Given Respondent's Expected Gas Expenses
(Gas Prices Expected in Five Years; median payoff periods in years)

	HEV @ 25% fuel reduction	PHEV @ 75% fuel reduction		
Real Discount Rate	+$1,500	+$2,500	+$5,000	+$10,000
0%	3.0	1.7	3.3	6.4
3%	3.1	1.7	3.4	7.1
5%	3.2	1.8	3.6	7.7
10%	3.4	1.8	3.9	9.7

at an additional $10,000. At a 10% real discount rate, it was a substantial 9.7 years when the PHEV cost an additional $10,000.

The difference in the number of years it would take to reach break-even levels based on differences in added vehicle costs was substantial. As the price rose from an additional $2,500 to $10,000, the number of years to reach the break-even point increased by 5.4 years when employing a 3% real discount rate and rose by 7.9 years at a 10% real discount rate. These estimates are based on expected future gas prices; when the price of gas at the time of the interview was used, the increases in break-even levels were even higher. Moreover, at lower gas prices, the increase in years before a break-even point was reached would be even higher.

The break-even points did vary by the characteristics of the consumer since people vary in how much they typically spend on gasoline (see Tables 4a and 4b). It is not surprising that driving fewer miles or spending less on gasoline was associated with longer break-even period, or that these attributes are associated with older and lower income consumers.

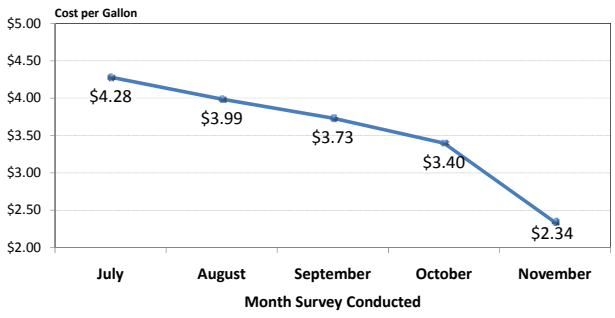
It was of some importance, however, that consumers who drove cars as opposed to pickups, vans or SUVs recorded much longer payback periods, as would be expected from their relatively higher fuel efficiency. At a real discount rate of 3%, car owners had a break-even period of 2.1 years compared with 1.5 years among van and SUV drivers when the PHEV cost an additional $2,500; at an added $10,000 for a PHEV, drivers of cars had a break-even period of 8.8 years compared with 6.0 years among van and SUV drivers. For HEVs, the break-even point for car drivers was 3.8 years and for van and SUV drivers it was 2.6 years.

In the multivariate models, years to pay off the initial cost premium was always significant; it completely dominated the amount spent on gasoline, a central component of the estimated break-even point (see Table 5). To reduce collinearity, the amount spent on gasoline was dropped from the regression model. The significance of the payback period indicates that consumers thought in economic terms about the costs and benefits of purchasing hybrids. Nonetheless, the payback period explained very little variance in the purchase probabilities, indicating that hybrid purchases are responsive to a broader range of preferences aside from the economics of the purchase.

Impact of Current Economic Environment

Current Gas Prices. When the survey first began in July 2008, gasoline prices were near their all-time peak level, and subsequently fell sharply during the period of data collection. To determine the impact of current gasoline prices on consumers' intentions to purchase a hybrid vehicle, data from the Energy Information Administration (EIA) on retail prices of regular gasoline at the time of the survey were matched to the geographic location of the respondent. For some

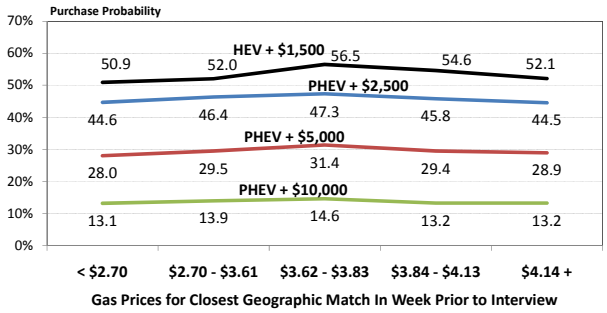
Chart 6:
Actual Gas Prices by Month of Data Collection
(EIA data weighted to reflect closest geographic match to respondent)



respondents, EIA data were available for the city or metropolitan area in which they resided, for others, state level data were used, and for the participants living in areas without finer-grained price data, regional data on retail gasoline prices were used (See Appendix A for full details). The data on gas prices represent the average retail price during the week prior to the interview so as to match the respondent's most recent purchases. The data shown in Chart 6 represent the averages of the retail price of gasoline faced by respondents in the month the survey was conducted. Gas prices averaged $4.28 in July, then fell by about 30 cents per month to $3.40 in October and then doubled this three month decline, falling to $2.34 in November.

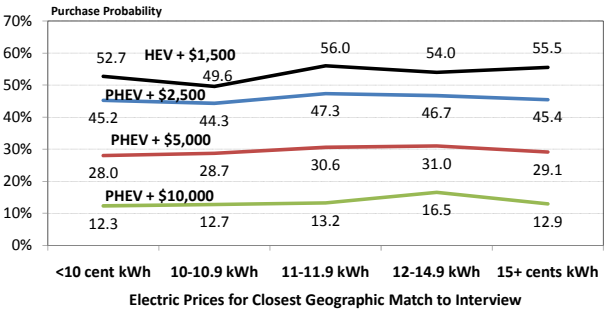
Since the falling price of gasoline could be expected to affect people's willingness to purchase a hybrid vehicle, the data on purchase probabilities were arrayed by the price of gas at the time of the interview. As shown in Chart 7 and Table 2, there was no relationship between hybrid purchase probabilities and the price of gas (grouped into quintiles). The best test is to compare probabilities when gas was at its lowest price to when gas was the most expensive: the purchase probabilities for all vehicle cost scenarios were virtually identical. For example, at an additional cost of $2,500, the difference was just 0.1 percentage point, for $5,000 the difference was just 0.9 and for $10,000 the difference was again only 0.1 percentage point. All these results were insignificant and well below the standard errors of the differences. A similar trend was evident for the HEV, with a difference between purchase probabilities of 1.2 percentage points.

Chart 7:
Purchase Probabilities by Gas Prices At Time of Survey
(Reduction in fuel costs: HEVs = 25% and PHEVs: = 75%)



Electricity Prices. The retail price of electricity was obtained from the EIA and merged with the interview data, taking into account the respondent's state of residence (see Appendix A for details on the estimation). The presumption is that lower electric prices would be associated with higher purchase probabilities for PHEVs. This hypothesis cannot be accepted from the data, since purchase probabilities in areas with the least expensive electricity are virtually identical to purchase probabilities in areas with the most expensive electricity (see Chart 8 and Table 2). There are several potential reasons for the lack of association: the large price differential between gasoline and electricity, the greater time variance in gas compared to electric prices, the lack of knowledge about the effective cost of electricity per mile traveled, and that the question's wording was

Chart 8:
Purchase Probabilities by Actual Retail Price of Electricity
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



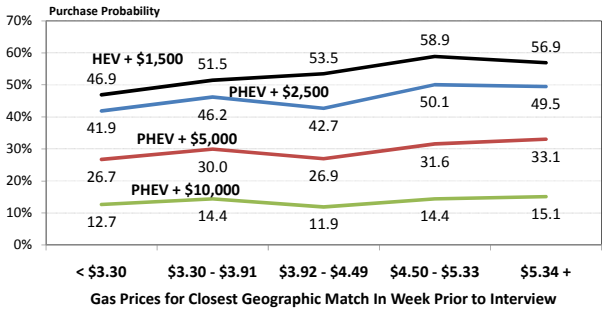
intended to mean that the total savings on fuel costs, including both gasoline and electric, was fixed at 75%.

Fuel Costs and Fuel Efficiency

The presumption that the falling price of gasoline would immediately have an impact on preferences for hybrids depends on the notion that consumers take the current price as their expectation of the long run price of gasoline. This is not the case, however. The survey included a question on five-year gas price expectations, a time frame that would be consistent with the expected average fuel costs over the ownership period. To be sure, five-year gas price expectations were higher than current prices throughout the time period, and fell along with current prices. Nonetheless, in the last month of the survey, the expected five year average gas price was $3.39, which was $1.01 more than the actual price at that same time, a 41 cent increase over the previous month's difference between the actual price and the five year expectation. Moreover, the survey also provided evidence that consumers were as concerned about the variability of prices as the overall level of gas prices, in the form of attitudes toward the main advantages of PHEVs. While no consumer would complain about an unexpected decline, unexpected increases in gas prices have repeatedly caused financial hardship. To avoid the adverse financial impact, consumers have voiced their willingness to engage in defensive planning by obtaining more fuel efficient vehicles and expecting more variations in gas prices in the future.

Gas Price Expectations. When data on purchase probabilities were compared with five-year gas price expectations, higher expected gas prices were associated with higher probabilities of a PHEV purchase (see Chart 9 and Table 2). Respondents varied widely in their anticipation of gas prices, with a difference of over $2.00 between the upper and lower fifths of the distribution. Consumers who held gas price expectations in the lowest fifth of the distribution had significantly lower PHEV purchase probabilities than those who expected the highest future gas prices. The differences in purchase probabilities between those with the highest and lowest expectations of gas prices narrowed as the cost premium for the PHEV increased from $2,500 to $10,000. The 95% confidence intervals for an additional cost of $2,500 were about ±6.4 compared with a difference of 7.6 between the high and low quintiles; for an added cost of $5,000, the 95% confidence intervals were about ±5.4 with a difference of 6.4, and for an added cost of $10,000, the 95% confidence intervals were about ±3.9 with a difference of 2.4. In comparison, the HEV had a difference of 10 between the purchase probabilities for those with the highest and lowest expectations. To be sure, these differences in the PHEV and HEV purchase probabilities are rather small for increase of $2.00 in expected gas price.

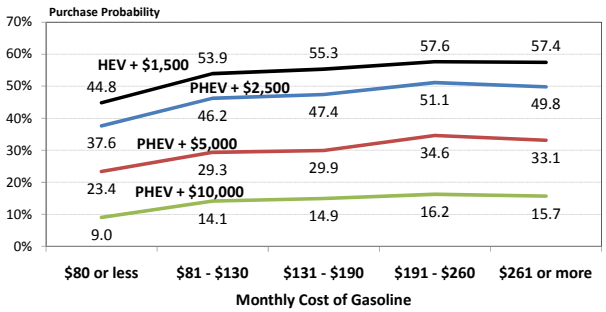
Chart 9:
Purchase Probabilities by Gas Prices Expected in 5 Years
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



These expectations proved to be a positive and significant predictor of purchase probabilities for hybrids when the estimated payback periods were excluded from the model; when the payback period was included, the payback period completely dominated gas price expectations. This was not surprising since the payback period was based in part on expected gas prices during the next five years. To lower collinearity, the five year gas price expectation variable was dropped from the regression model (see Table 5).

Total Amount Spent on Gasoline. Purchase probabilities for PHEVs increase along with the total amount consumers spend on gasoline (Chart 10 shows the gasoline expenditures divided into quintiles). Most of the increase in purchase probabilities was documented as consumers moved from the lowest expenditures to the upper part of the distribution, with the probabilities actually declining (insignificantly) after gasoline expenditures exceeded $260 per month. The probabilities are shown along with their standard errors in Table 2. For a reduction in fuel costs of 75% and an increase in costs of $2,500, the confidence interval was less than ± 6.2, for $5,000 it was ±5.2, and for $10,000 it was ±3.6. Thus, the increase from the lowest to the middle quintile was a significant increase, but the increase from the middle to the top quintile was not.

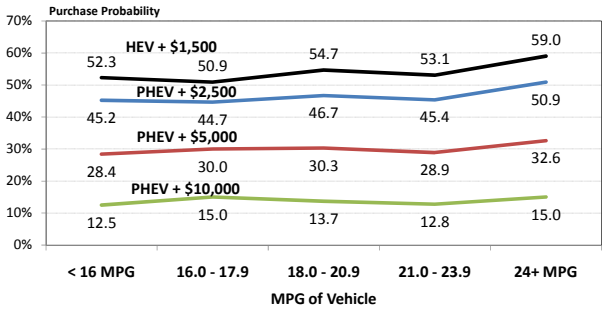
Chart 10:
Purchase Probabilities by Monthly Cost of Gasoline
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



Without the presence of the payback variable, total gasoline expenditures proved to be a significant predictor; when the payback variable was included, it dominated the gas expenditure variable. This was not surprising since the payback variable was calculated using the monthly gas expenditure adjusted by the expected future price of gasoline.

Vehicle MPG. The total amount spent on fuel represents the combination of the vehicle's fuel efficiency and the total number of miles traveled. Based on the characteristics of the vehicle reported (make, model, and year) as well as the proportion of total miles that were highway miles, EPA data were used to estimate the actual MPG achieved by the consumer (see Appendix A for details on the MPG estimate). Presumably, a lower MPG would be associated with greater savings and higher purchase probabilities for hybrids. The data indicated, however, that this assumption was not true (see Chart 11 and Table 2). Indeed, purchase probabilities were largely independent of MPG estimates, with only the owners of the most fuel efficient vehicles responding significantly differently -- and in the opposite direction -- than predicted based on costs. Vehicle MPG was also a

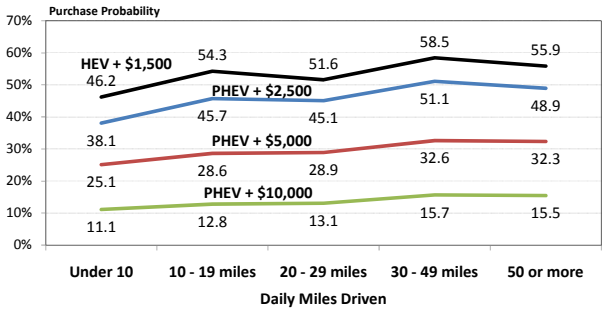
Chart 11:
Purchase Probabilities by Vehicle MPG
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



significant and positive predictor in all the regressions, although the size and significance of the coefficient declined as the cost premium rose (see Table 5). It would seem that those that were already most concerned with vehicle MPG, as demonstrated by the high fuel economy of their current vehicles, were also more likely to favor the purchase of a PHEV or an HEV.

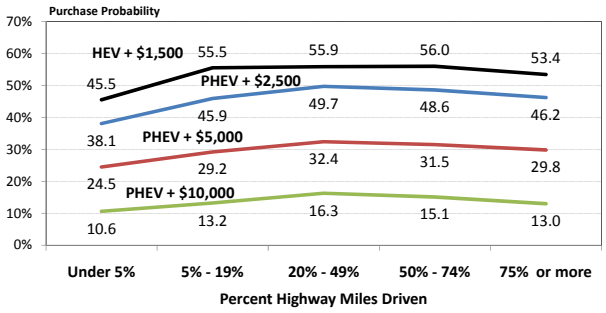
Miles Driven. The dominant factor in explaining the amount spent on gasoline is the total number of miles driven. The greater the number of daily miles, the more respondents should favor PHEVs (see Chart 12). Unlike the data for MPG, the total number of daily miles driven did have a significant impact on PHEV purchase probabilities across groupings. For PHEVs that cost an additional $2,500, the probability of purchase rose 10.8 points between those whose daily trips were in the lowest fifth of the distribution and those in the highest fifth. For PHEVs that cost an additional $5,000, the gain was 7.2 points and for an additional cost of $10,000 it was 4.4 points. All of these differences were significant at the 95% level of confidence (see Table 2a). In a similar manner, for HEVs the difference in purchase probabilities between the individuals with the least and greatest vehicle miles travelled per day was 9.7 points. In the regressions, however, daily miles driven were not a significant predictor in any of the models (see Table 5). The effect of daily miles driven was effectively muted by monthly gas expenditure (the Pearson correlation coefficient was 0.59 between miles driven and gas expenditures), with both variables being dominated by the payback variable

Chart 12:
Purchase Probabilities by Daily Miles Driven
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



Highway Miles. While it was beyond the scope of the survey to determine precise vehicle usage patterns, respondents were asked for the percentage of the total miles that were driven on highways. Unlike for HEVs, there are substantial enhancements to fuel efficiency provided by PHEVs in highway as well as local driving. The data indicated that the highest PHEV purchase probabilities occurred in the middle fifth of the distribution, among drivers who drove between 20% and 49% on highways. To be sure, the relationship was not symmetrical in that the PHEV purchase probabilities among those that drove the most highway miles were only slightly and insignificantly lower, while those that drove the least highway miles (those in the bottom quintile) reported significantly lower probabilities. The same trend was evident when HEV purchases were considered (see Chart 13 and Table 2a). Those who had the lowest highway mile percentage clustered disproportionately among those who drove the fewest miles (See Table 15a). This relationship was

Chart 13:
Purchase Probabilities by Percent Highway Miles Driven
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



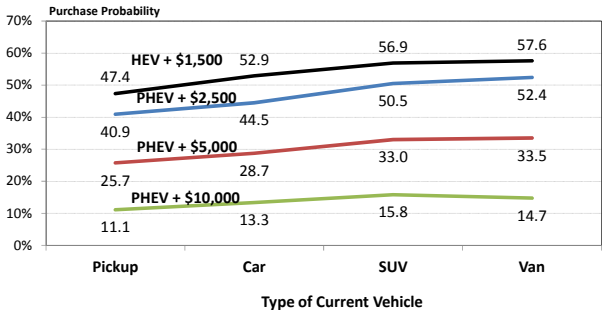
confirmed in the multivariate model. The regressions found a small but persistently negative effect for those who drove the highest proportion of highway miles across all hybrids and all premiums (see Table 5). This negative relationship between highway miles and preferences for hybrid may reflect assumptions on the part of respondents that the overall size of the hybrid would too small or too light to best serve their needs for highway driving.

Impact of Current Vehicle Ownership

Preferences for PHEVs are likely to differ by the type of vehicle currently owned, whether it was purchased new or used, its current age, and the total number of vehicles owned by the household. For this report, vehicles leased for personal use are treated as "owned."

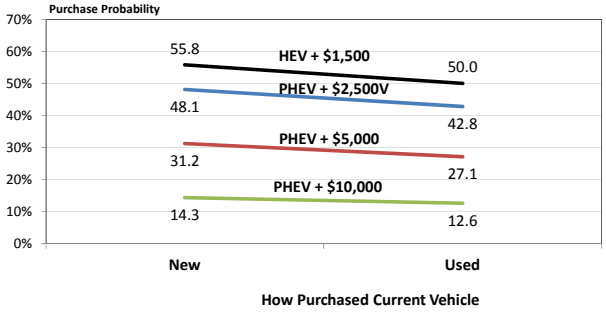
Type of Vehicle. The type of vehicle currently driven represents a revealed set of preferences about the potential uses and features valued by the consumer. While the survey did not obtain detailed data about all features, the vehicles were classified by major type. PHEV purchase probabilities, not surprisingly, were the lowest for owners of pickups; these owners frequently use these vehicles in connection with work, for hauling larger objects, or for towing purposes and would be most concerned about horsepower (see Chart 14). Vans, on the other hand, are more frequently owned by households with young children, and these owners were the most predisposed to PHEVs. Owners of SUVs, vehicles likely to have lower fuel efficiency, were also more likely to express higher PHEV purchase probabilities. The same trend was found with HEV purchases (see Table 2a). Regression analysis found that owners of vans and SUVs were significantly more likely to favor hybrid vehicles compared with car owners, although not for a PHEV that cost an additional $5,000 or more. Pickup owners compared with car owners were more likely to favor HEVs but not PHEVs (see Table 5).

Chart 14:
Purchase Probabilities by Type of Current Vehicle
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



New or Used Purchase. Initially, only consumers in the market for a new vehicle will have the opportunity to purchase a PHEV. In addition to concerns about new technology, there are a number of consumers who prefer to avoid the steep depreciation of vehicles associated with the first year of ownership. Moreover, whether a vehicle was purchased new or used is related to the income and age of the household. It is therefore of some importance to determine the relative strength of interest in PHEVs among new vehicle buyers. Since someone could switch and

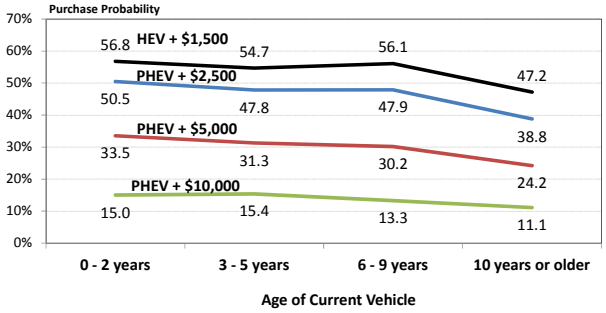
Chart 15:
Purchase Probabilities by New/Used Vehicle Purchase
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



become a new vehicle buyer specifically to purchase a PHEV, and since younger consumers are more likely to have purchased a used vehicle and switch to purchasing new vehicles in later life, it is nonetheless of some interest to determine PHEV purchase probabilities by whether they purchased their current vehicle new or used. The data indicate that new vehicle purchasers were more likely to favor a PHEV purchase, but the differences were only significant for PHEVs at an additional cost of $2,500. New vehicle owners were also more likely to prefer an HEV preference (see Chart 15 and Table 2a). The regressions, however, never indicated a significant lower probability of a hybrid purchase among owners of used vehicles compared with new vehicle buyers (see Table 5). The univariate relationship reflects the common influence of income on new vehicle purchases and hybrid preferences.

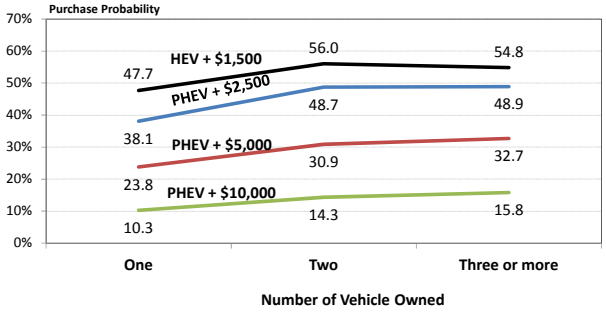
Age of Vehicle. One might speculate that the older the current vehicle, the more likely that it will need to be replaced, and the individual would have been more likely to consider which vehicle to purchase next. On the other hand, owning a newer vehicle could indicate a higher importance given to this purchase or simply that given the respondent's economic situation, the purchase was more likely to be new. Significantly higher purchase probabilities were found for owners of vehicles less than 3 years old when compared with purchase probabilities for those owners with vehicles 10 years or older (see Chart 16). This trend was evident for both PHEVs and HEVs. There was no significant difference between the purchase probabilities for owners of 3-5 year and 6-9 year old vehicles, except for the scenario where PHEVs cost $10,000 more than a conventional vehicle (see Table 2a). The age of the vehicle that the individual currently owns never proved significant in the regressions, suggesting that the age of the vehicle simply reflected the economic and demographic characteristics of the individual and not their preference for newer cars (see Table 5).

Chart 16:
Purchase Probabilities by Age of Current Vehicle
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



Number of Household Vehicles. Households with just one vehicle have a greater need to obtain a dependable vehicle, whereas multiple vehicle households can more easily manage the risk of a vehicle malfunctioning. The data indicate that one-vehicle households were the least likely to favor purchasing a PHEV at each premium level (see Chart 17 and Table 2a). Whether households owned two or three vehicles or more, however, had no additional impact. This trend was also observed for HEV purchase preferences. The multivariate model found a significant positive effect only for the probability of purchasing a PHEV at an additional $10,000 (see Table 5). This

Chart 17:
Purchase Probabilities by Number of Vehicles Owned
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



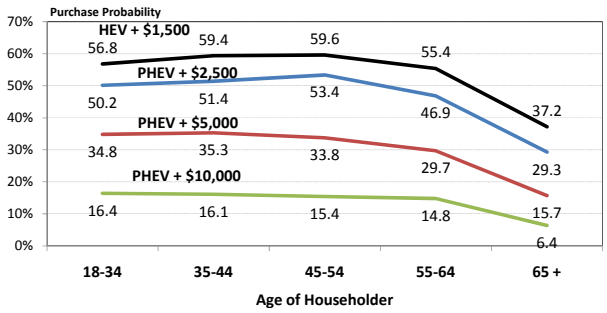
suggests that the number of vehicles is primarily a function of income, and households that own two or more vehicles generally have higher incomes.

Impact of Household Demographics

The demographic and economic characteristics of the household as well as its geographic location are hypothesized to have a major impact on preferences for PHEVs. Total income determines the ability to purchase vehicles, which are typically the second most expensive purchase made by households. The age of the household plays two major roles. Age acts as a proxy for lifecycle, with the demands for personal transportation increasing until middle age and then rapidly declining in retirement. Second, age along with education is typically associated with environmental and technological views which may affect demand for PHEVs. The region and degree of urbanization of the residential location can be expected to have an impact on the willingness of individuals to consider the purchase of a PHEV.

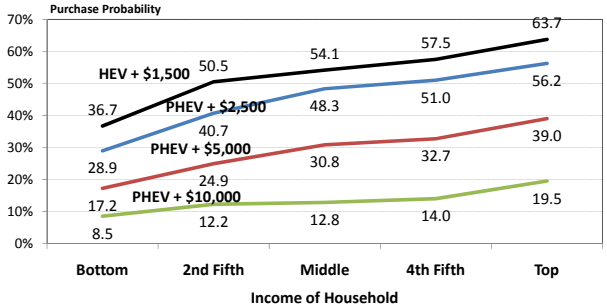
Age of Householder. PHEV purchase probabilities showed little variation for consumers under age 54, but at older ages the probabilities dropped off sharply (see Chart 18). Perhaps it is the unchanged views among those under age 55 that is more surprising than the rapid falloff among older consumers. The hypothesis that younger people are more environmentally conscious would imply greater interest than is apparent among those under 35. The falloff among older consumers may be due to lessened use of vehicles, especially after retirement, or their lower level of comfort with new technology. In fact, those over 65 were the most likely to drive nine miles or less, as shown in Table 14. The change from ages 45 to 54 to those over age 65 amounted to a decline of about 50% in PHEV purchase probabilities. A similar trend was observed for HEV purchases (see Table 2b). In the multivariate model, older individuals were significantly less likely to favor the purchase of a hybrid vehicle, with most of the impact on purchase probabilities occurring among those over age 60 (see Table 5).

Chart 18:
Purchase Probabilities by Age Subgroups
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



Income of Household. The income of the household proved to be a strong correlate of consumers who expressed interest in the purchase of a hybrid vehicle (see Chart 19). Households were divided into income quintiles, with the top quintile expressing a purchase probability that was about twice the size of the probability reported by consumers in the lowest income quintile for each of the cost premiums. In general, at each higher quintile, consumers reported a significantly

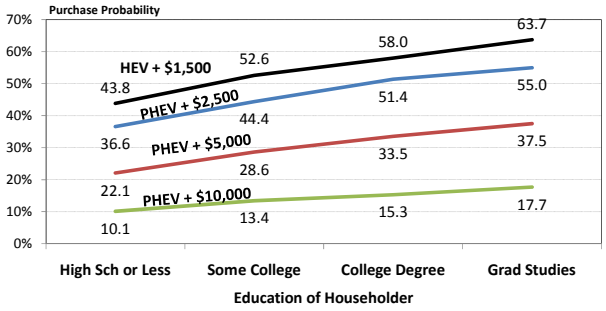
Chart 19:
Purchase Probabilities by Income Subgroups
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



higher purchase probability (see Table 2b). Note that the size of the probability gains was much smaller for purchasing a PHEV that cost an additional $10,000 compared with one that cost an additional $2,500 (an increase of 11 points compared with a 27.3 point gain). The multivariate model confirmed the independent impact of income on hybrid purchases, although as the cost premium increased, the impact of higher income declined (See Table 5). It was somewhat surprising that at the highest premium, income had no impact, suggesting that the purchase of a PHEV at an added $10,000 was influenced by factors other than the ability of the individual to buy a PHEV.

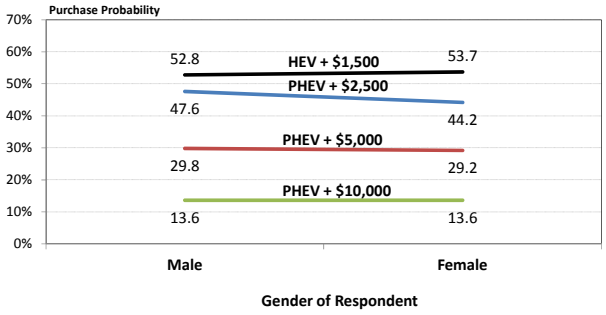
Education of Householder. Higher education was associated with significantly higher probabilities of purchasing both HEVs and PHEVs (see Chart 20 and Table 2b). People with graduate degrees held purchase probabilities that were 18.4 percentage points higher than those with a high school education or less when the PHEV was presented as costing $2,500 more, and 15.4 percentage points higher at an additional cost of $5,000, and 7.6 percentage points higher at an additional cost of $10,000. To be sure, income is likely to differ across education subgroups, but social attitudes do as well. This trend was also observed for the HEV preferences, with those who held graduate degrees reporting a 19.9 percentage point greater probability than those with high school educations or less. The multivariate analysis found education to be the most important demographic characteristic associated with preferences for hybrids (see Table 5).

Chart 20:
Purchase Probabilities by Education Subgroups
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



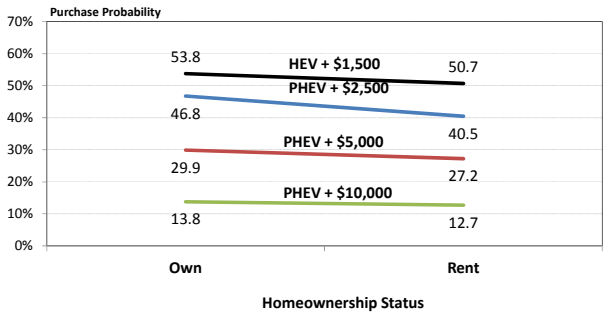
Gender. There is some evidence that men and women hold different preferences for vehicle attributes, including the size of the engine and other factors that would impact fuel economy. The data included in this survey indicate that women drive less than men, are slightly more likely to be environmentalists, and are less likely to favor the adoption of new technology. Nonetheless, the data on HEV and PHEV purchase probabilities were nearly identical for men and women (see Chart 21). The slightly higher purchase probabilities for HEVs for women were not significantly different from men (see Tables 2b and 5). When other characteristics are controlled for in the multivariate analysis, however, women are less likely to favor the purchase of a PHEV at an additional premium of $2,500, but are not different than men at higher cost premiums (see Table 5).

Chart 21:
PHEV Purchase Probabilities by Gender of Respondent
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



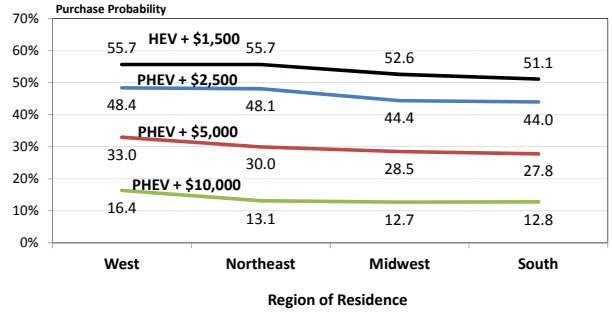
Home Ownership. Home owners are more likely to have outlets to plug in a PHEV than those who rent. While recharging stations may be available in the future, at the present time a renter may not be able to find a place to regularly recharge their vehicle. Concerns about this ability to charge may therefore influence the decision regarding the purchase of a PHEV. Renters are also more likely to reside in urban region, and to be younger and have lower incomes. At an additional cost of $2500, homeowners are significantly more likely to purchase a PHEV than those who do not own their own home (See Chart 22 and Table 2b). At higher premiums, these differences disappear. In the regression models, whether or not the respondent has a plug that a PHEV could be conveniently recharged at completely dominated whether the residence was owned or rented. These variables were highly correlated and to reduce the level of collinearity, whether the residence was owned or rented was dropped from the regression models.

Chart 22:
PHEV Purchase Probabilities by Homeownership
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



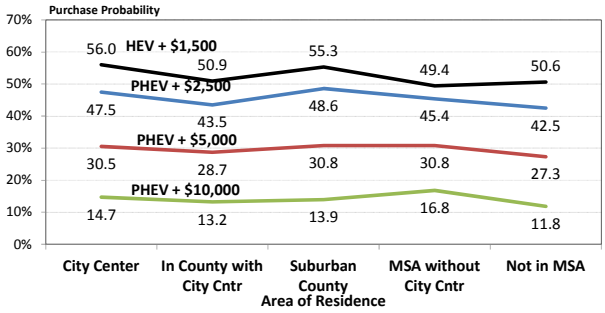
Region. The costs of operating vehicles, fuel prices, and concerns about vehicle emissions are known to vary by region (see Chart 23). While these collective differences have made residents of the West and Northeast more predisposed to PHEVs, the overall differences between these regions and those that reside in the Midwest and South were barely significant. For example, the difference was about five percentage points or less across all three cost premiums for PHEVs. The same trend was observed for HEV purchases (see Table 2b). In the multivariate model, only residents of the West were significantly more likely to favor the purchase of a PHEV (compared to residents of the Midwest, the omitted category in the set of dummy variables). The likelihood that Western residents would purchase fell as the premium rose, however (see Table 5). This finding underscores a previous result: no matter how predisposed consumers are to the purchase of a PHEV, as the price premium increases, the probability of purchase uniformly declines for all groups.

Chart 23:
Purchase Probabilities by Region of Residence
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



Metropolitan Status. People who live in the most urbanized areas may think of their transportation choices differently than those living in the most rural areas. Some urban areas have alternative transportation, higher gasoline prices, and more emissions regulations, while some rural areas may entail driving much greater distances, fewer available gas stations and greater inconvenience stemming from a possibly unreliable vehicle. Contrary to expectations, most of the differences between metropolitan regions were insignificant, although the most rural residents---those not living in an MSA---were the least likely to favor the purchase on a PHEV. In contrast, those living in an MSA with no city center were the least likely to prefer an HEV purchase; however, this result was not significantly different from the values reported by individuals residing in other areas (see Chart 24 and Table 2b). Metropolitan status did not show a significant relationship with PHEV preferences, but living in a rural area was significantly related to HEV preferences (see Table 5).

Chart 24:
Purchase Probabilities by Residential Area
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



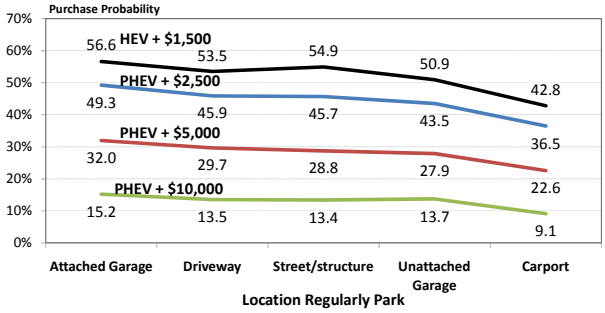
Recharging Hybrid Vehicles

The perceptions of PHEVs held by consumers may be affected by the different requirements associated with owning an electric vehicle. Households need access to an outlet to recharge the vehicle, for example, which may imply that they would not be able to park in their driveways or in the street even if they had garages. Apartment buildings may not have available outlets or residential locations in the city may not even provide parking spaces. While the lack of recharging facilities at home is a clear drawback to owning a PHEV, presumably, over time, public or employer provided recharging stations may become available. Nonetheless, the survey made no attempt to ask consumers to assume that public recharging stations would be available; the survey was limited to simply asking about their current situation. The survey did collect data on a potential advantage of PHEVs based on the conclusion that recharging at home was more convenient and that they would not have to go to gasoline stations as frequently.

These recharging requirements are reflected by a range of demographic characteristics and environmental attitudes. Parking places and outlet availability are related to the type of residence respondents currently occupy, and by extension to their income, age and urban status. Other characteristics, such as responsiveness to off-peak pricing, aversion to gas stations and minimum all-electric range are components of a respondent's tastes and preferences regarding the environment and the new technology embodied in PHEVs. Of particular interest is whether these preferences have an independent influence on hybrid purchase probabilities after the economics, demographics and location of the household are taken into account.

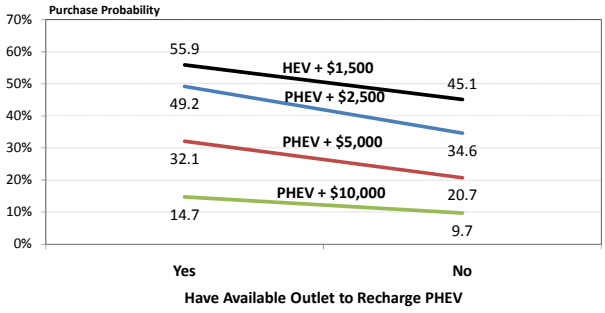
Regular Parking Place. Reliable access to a parking location that has access to the equipment needed to recharge a PHEV is an important consideration for consumers. When evaluating PHEVs, those with access to an attached garage showed the greatest probability of purchase, as shown in Chart 25 and Table 2c. One-third of all drivers reported that they regularly parked their vehicle in a garage (see Table 16). Following this group in purchase probability were the respondents that regularly parked in a driveway, street or structure, or an unattached garage. The purchase probabilities among these last three groups were not significantly different from one another; however, their probabilities were significantly different from the final group of respondents: those who parked their vehicles in a carport, which accounts for 10% of all drivers. This segment of respondents showed the least preference for both PHEVs and HEVs. The overall trend in purchase probabilities is notable. There may be a link between type of parking location, income, metropolitan status, and environmental attitudes. The multivariate model indicated that regularly parking in an attached garage did not significantly relate to preferences for hybrid vehicles, but was significantly associated with access to a plug to recharge a PHEV. The lack of a significant effect on hybrid purchase probabilities was due to the strong association of an attached garage with economic and demographic characteristics of the household (see Table 16). Its high correlation with having an electrical outlet indicated it was best to drop this variable from the multivariate model to decrease collinearity among the independent variables.

Chart 25:
Purchase Probabilities by Regular Parking Location
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



Access to Electrical Outlet. Some type of access to an outlet is required for recharging a PHEV. There was no attempt to determine if the outlet would meet local electric codes (for example, if the outlet was on a dedicated circuit), or to ascertain the location or properties of the electrical line connecting the hybrid vehicle with electricity and so forth. No prompts were given regarding the necessary qualities of a circuit for charging a PHEV overnight. Access to an outlet to recharge the vehicle had a significant impact on the purchase probabilities for PHEVs (see Chart 26 and Table 2c). At an additional cost of $2,500, the availability of an outlet raised the probability of purchase by 14.6 percentage points, at an extra $5,000, the gain was 11.4 percentage points and at $10,000 it was 5.0 percentage points. The multivariate model confirmed that having an electrical outlet is a significantly predictor of preferences for PHEVs, even when other characteristics of the person or household are considered (see Table 5). While similar trends were found for HEVs, the significance is

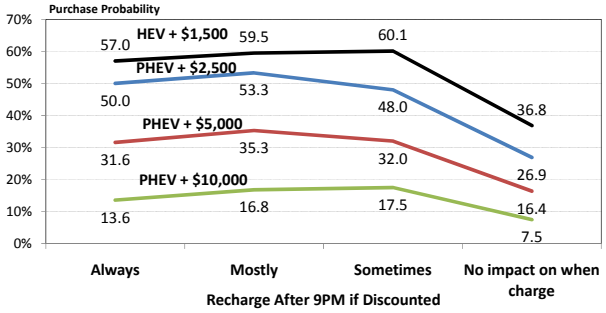
Chart 26:
Purchase Probabilities by Available Outlet to Recharge
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



likely to be due to the fact that interest in all hybrids is higher among those with an outlet, suggesting the incomplete control in the model of other associated variables, such as income or wealth.

Impact on Electrical Grid. The electricity generating capacity of utility companies could face significant problems if people choose to recharge their PHEVs during peak electrical loads. One possible solution to this problem is time-of-use management: consumers are encouraged by time-of-day pricing to shift their demand for electricity to the later hours. Given that electric is cheaper than gasoline, consumers may not be as responsive as might be expected. Indeed, among all consumers, just 35% reported that they would "always" recharge their vehicle when lower electric rates were available after 9 p.m., 39% reported that they would recharge "most of the time" when reduced rates were available, 5% only "some of the time," and 21% reported that discounted rates would have no effect on when they recharged (see Table 18).

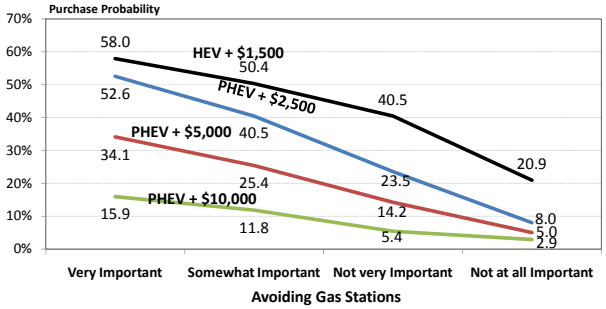
Chart 27:
Purchase Probabilities by Recharging Preferences
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



The probability of a PHEV purchase was significantly related to their likelihood of responding to time-of-use pricing (see Chart 26 and Table 2c). Predictably, those who would not shift their electricity demand were also the least likely to purchase PHEVs. Those who were 65 or older and lower income clustered disproportionately in this group (See Table 18). In contrast, those that indicated that they would recharge after 9pm at least some of the time were more likely to purchase a PHEV. Those that were willing to shift charging time reported purchase probabilities that were nearly twice as likely to buy at all three tested additional costs (see Table 2c). The multivariate model confirmed that a willingness to ignore off-peak pricing had a significantly negative impact on purchase probabilities, except for PHEVs that carried a $10,000 premium (see Table 5). This indicates that saving money is an important motivation for potential PHEV buyers, but a $10,000 premium is simply too much to justify based on cost savings.

Avoiding Gas Stations. The ability to avoid gas stations by recharging at home was an attractive feature of the PHEVs. Overall, 67% viewed avoiding gas stations as a "very important" advantage of PHEVs compared with just 10% who thought it was "not important" (see Table 19). Importantly, consumers who rated avoiding gas stations as very important had significantly higher purchase probabilities for PHEVs. Consumers that thought it was "very important" to avoid gas stations held PHEV probabilities that were nearly three times as large as those who thought avoiding gas

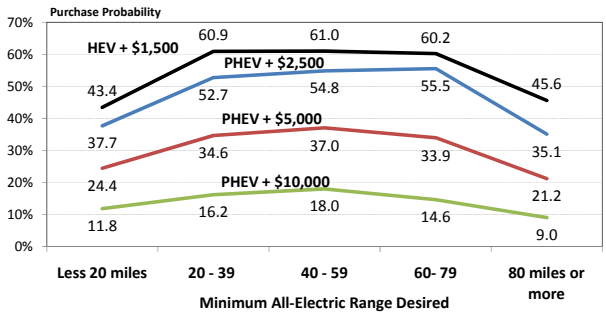
Chart 28:
Purchase Probabilities by Desire to Avoid Gas Stations
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



stations was "not important" (see Chart 28 and Table 2c). The multivariate model found wanting to avoid gas stations to be an extremely strong and independent predictor of preferences toward hybrid vehicles (see Table 5). This may reflect antipathy toward the "dirty" technology of gas stations. Particularly, as Table 19 indicates, those with the strongest preference for avoiding gas stations are more educated, had higher incomes and lived in more urban areas. A frequent hypothesis is that women are particularly troubled by having to visit gas stations (for safety and other reasons); this hypothesis could not be accepted from the data.

All-Electric Range. Another important consideration for consumers was the minimum all-electric range provided by a PHEV. The majority of all consumers required a minimum all electric range between 20 and 60 miles, which encompasses the vast majority of all daily miles travelled. Two-thirds of the respondents indicated ranges between 20 and 80 miles, with just 12% of consumers reporting a minimum of 20 or fewer miles and 23% reporting a minimum of 80 miles or more (see Table 20). Interestingly, most consumers said they preferred a substantially higher all-electric range than their reported daily miles driven, suggesting that the occasional longer trip was also a factor in their preferences (see Table 20).

Chart 29:
Purchase Probabilities by Minimum All-Electric Range
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



Individuals who were most likely to purchase a PHEV were those whose all-electric range needs were 40 to 60 miles, although their purchase probabilities were not significantly different from those that reported a minimum all-electric range that was slightly lower (20 to 39 miles) or a slightly higher (60 to 79 miles) minimum all-electric range. Overall, this indicates that consumers would accept any PHEV that had an all-electric range in the broad interval of 20 to 80 miles (see Chart 29 and Table 2c). It was somewhat surprising that at both extremes, either a minimum all-electric range of fewer than 20 or more than 80 miles, consumers gave significantly lower purchase probabilities. The multivariate model bore this out, with preferences for an all-electric range below 20 or above 80 associated with significantly lower purchase probabilities for hybrids (see Table 5). Those who needed the PHEV for less than twenty miles likely would not have realized sufficient gas savings to make the added premium cost effective. Perhaps the upper extreme response signaled that these consumers did not expect PHEVs to be appropriate for anything but a very tiny vehicle or perhaps they simply set a threshold that was unlikely to be met anytime soon.

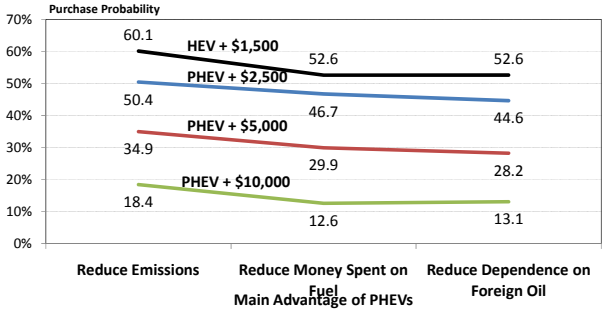
Attitudes toward the Environment and Technology

Attitudes toward the environment and new technology were powerful predictors of who would be an HEV early adopter. Hybrid vehicles are generally thought to be favored by those who believe that gasoline powered vehicles harm the environment, by those who want to visibly demonstrate their commitment to a cleaner environment, and by those that want to be the first to adopt new technology.

While economic factors can be expected to dominate a mature industry, these environmental views may be critical to gain early sales so as to provide for mass production efficiencies that lower future costs.

Main Advantage of PHEVs. Consumers were asked what they thought was the main advantage of a plug-in electric hybrid vehicle: reducing the amount of money spent on fuel, reducing vehicle emissions, or reducing dependence of foreign oil. Given the high price of gasoline during the time of the survey, it was somewhat surprising that just 31% thought it was reducing the money spent on fuel. Rather, the majority of consumers (54%) reported that it was reducing dependence on foreign oil that was the main advantage. By far, reducing vehicle emissions was the least frequently cited advantage, reported by just 15% of all consumers (see Table 21). The distribution of responses, however, not only indicates the secondary role of environmental attitudes for most consumers, but that consumers were more concerned about being vulnerable to sudden changes in global oil prices. Variable gasoline prices make it difficult to plan budgets in advance, and variations in oil prices have far outstripped variations in the cost of household electricity. The overall distribution of responses showed few differences across economic and demographic groupings, although the youngest quintile saw a greater advantage in reducing fuel costs and the oldest saw the greatest advantage in reducing foreign dependence (see Table 21). Even among the highest educated group, those with graduate degrees, just 20% thought the primary advantage of PHEVs was the reduction in emissions that they would facilitate.

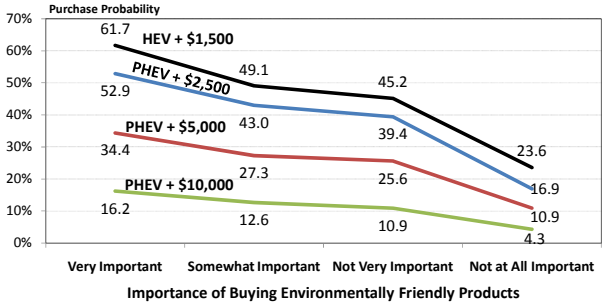
Chart 30:
Purchase Probabilities by Main Advantage of PHEVs
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



Although just 15% of all consumers thought the primary advantage of PHEVs was to reduce emissions, these consumers voiced higher PHEV purchase probabilities that widened to significance as the cost premiums increased. The multivariate model further confirmed that wanting to reduce emissions provides a boost to the probability of purchasing PHEVs at cost premiums of $5,000 or above (see Table 5). Those who thought reducing dependence on foreign oil reported insignificantly different purchase probabilities compared to the omitted category of reducing the cost of fuel.

Demonstration of Environmental Commitment. Consumers were asked if their purchase of a PHEV would overtly demonstrate their commitment to buying products that were environmentally friendly. Toyota, for example, has deliberately styled the Prius in a distinctive manner so that it would be immediately recognized as a hybrid vehicle. Such social statements of an individual's tastes and preferences, referred to as "badging," have long been recognized as

Chart 31:
Purchase Probabilities by Environmental Commitment
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)

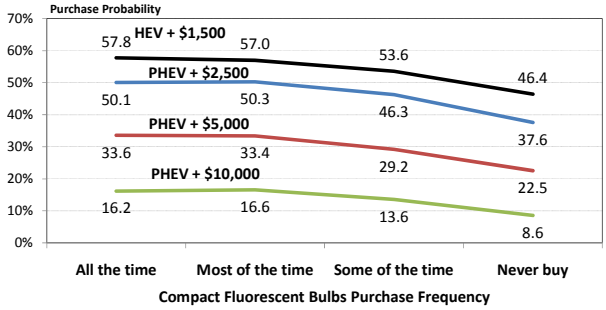


having a powerful influence on purchases of many different products. Indeed, half of all consumers reported that showing a commitment to the environment through the purchase of a PHEV was "very important". Just 15% reported that such a purchase was either "not very important" or "not at all important," with the balance reporting it "somewhat important" in demonstrating an environmental commitment. There was little variation in these views across economic and demographic subgroups (see Table 22).

These assessments of whether a PHEV demonstrates a social commitment to the environment had a significant impact on the probability of a purchase (see Chart 31). Those that agreed that a PHEV made a very important statement about the owner's commitment to the environment reported a purchase probability nearly twice as high as those who thought the purchase did not demonstrate any message across all tested additional costs for the PHEV. The multivariate model confirmed that showing a strong commitment to the environment by purchasing a hybrid was significant at all cost premiums, although its effect fell as the price premium rose (see Table 5). Conversely, the view that it was not at all important to demonstrate commitment to the environment was significantly related to lower hybrid purchase probabilities. This suggest that social factors are just as important as economic factors in spurring the adoption of hybrid vehicles, and increasing social forces pushing toward the purchase of hybrids may be cheaper than using economic incentives.

Higher Product Prices, Lower Operating Costs. PHEVs share the characteristic of having a higher purchase price but lower operating costs with a number of other products. For instance, compact fluorescent bulbs cost more but promise substantial environmental benefits and significantly lower electric consumption. Consumers were asked about their past purchases of fluorescent bulbs as an indicator of their willingness to pay more initially to save on electric costs over the life of a product. Fluorescent bulbs were reported to be purchased "all the time" by 24% of all consumers and "never" purchased by the same proportion (see Table 23). Between these extremes, more consumers purchased fluorescent bulbs "some of the time" compared with "most of the time" (30% versus 22%). There were a few differences by economic and demographic subgroups; notably lower income households were more likely to report "never" purchasing fluorescents and residents of the West were the most likely to always purchase these energy saving bulbs (see Table 23).

Chart 32:
Purchase Probabilities by Buying Fluorescent Bulbs
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)

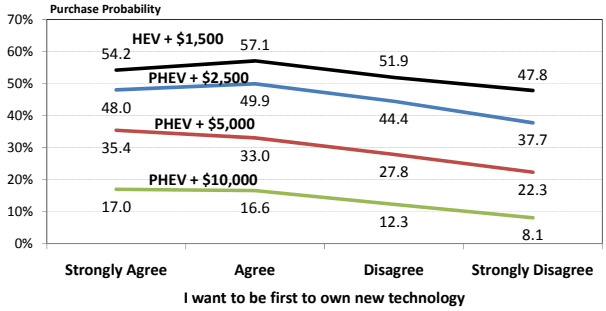


When compared with the probabilities of a PHEV purchase, those that reported buying fluorescents "always" or "most of the time" reported significantly higher purchase probabilities than those that reported "never" purchasing a fluorescent bulb (see Chart 32 and Table 2d). The multivariate models indicated that this buying preference had a slight impact on hybrid purchase probabilities, mostly on the negative side; that is, those who never bought compact fluorescent bulbs were also less

likely to favor the purchase of a hybrid vehicle (see Table 5). Whether these consumers are simply more "traditional" or are less concerned with the environment cannot be determined by the collected data.

Early Adoption of New Technology. Since PHEVs represent a new technology that is virtually untested in mass markets, there are some risks as well as benefits. Some people prefer not to be the first to own new technology given the higher likelihood of problems, defects, faulty design, or purchasing products whose technology becomes quickly outdated. Others derive more benefits from being the first to own new and experimental technology, including social benefits as well as greater influence on the ultimate development of the product itself. The risks of being the first to own new technology are generally viewed as large, with just 7% of all consumers reporting that they "strongly agreed" with the statement that they wanted to be the first to own new or advanced technology. Half that number, 14%, said that they strongly disagreed (see Table 24). Overall, those that did not want to be the first to own new technology outnumbered the proportion that wanted to be first by 57% to 41%.

Chart 33:
Purchase Probabilities by First Adopter Preference
(Reduction in fuel costs: HEVs = 25% and PHEVs = 75%)



People that viewed themselves as wanting to be first to own new technology reported PHEV purchase probabilities that were significantly higher than those that did not want to be first to own untested technology. The difference between the two extreme responses was about ten percentage points (see Chart 33 and Table 2d). The multivariate model indicated that being strongly opposed to the early adoption of new technology proved to be a significant factor in reducing PHEV purchase probabilities, while strongly favoring the adoption of new technology had generally insignificant effects (see Table 5).

Multivariate Models of Hybrid Purchase Probabilities

It is convenient to summarize the results of the multivariate models by dividing the independent variables used to predict hybrid purchase probabilities into three groups. The first grouping includes the characteristics of the respondent's current vehicle, how it is used, its fuel efficiency, and the price of gasoline. The second grouping includes the economic and demographic characteristics of the individual. The final grouping includes the environmental and other attitudes of the respondent toward pricing and technology. The division is not strict, but one of convenience since a few of the independent variables in each group could have been assigned to another group. The underlying reason for this division is that many of the hypotheses about the appeal of hybrid vehicles do conform to this division.

The prime advantage of the division is to distinguish the relative contributions to the explanation of hybrid purchase probabilities across the characteristics of the vehicle, the objective

characteristics of the person, and the impact of environmental attitudes. Such an assessment will be useful in any recommendations about how to best promote the adoption of more energy efficient vehicles.

Vehicle Characteristics. How long it would take the consumers to offset the initial cost premium to purchase a hybrid had a significant impact on purchase probabilities. This relationship reflects the standard economic theory of comparing benefits and costs (see Chart 34 and Table 5). The payback period was calculated based on the reported expenditure on gasoline, given their current vehicle and driving habits, and adjusted for the change in gas prices expected over the next five years by the respondent.

Chart 34:
Regression Models of PHEV Purchase Probabilities
(Sign of coefficient & *=.05, **=.01, ***=.001)

	HEV @ - 25% fuel		PHEV @ 75% fuel reduction			
	No cost added	+$1,500	No cost added	+$2,500	+$5,000	+$10,000
Years to Break Even	N/A	-***	N/A	-***	-***	-**
Current gas price						
Current electric price						
MPG of vehicle	+ ***	+ ***	+ ***	+ ***	+ **	+ *
Miles driven			-**			
Percent highway miles	- ***	-***	- *	- ***	-*	- *
Van	+ ***	+ **	+ **	+ ***		
Pickup	+ *					
SUV	+ **	+ **	+ ***	+ ***		
Age of vehicle						
Number of vehicles						+*

While differences in the fuel efficiency of the respondent's vehicle should have been already reflected in the estimated payback period, the MPG of the vehicle proved to have a significant independent effect on purchase probabilities, but in the opposite direction from what would have been expected. Hybrids purchase probabilities were significantly higher among those who already owned a vehicle with a high MPG fuel efficiency rating. The higher the MPG rating, the more they favored the purchase of a hybrid. Rather than acting as an indicator of potential fuel saving, the MPG rating of their current vehicle acted as an indicator of their revealed preference for fuel efficient vehicles. While this finding is not surprising, it does indicate that consumers who purchase a PHEV are likely to trade-in vehicles that are already relatively fuel efficient.

The only other characteristic that had a universal influence on the purchase probability for hybrids was the proportion of highway miles the respondent drove (controlling for the total number of miles driven): a greater proportion of highway miles was associated with lower hybrid purchase probabilities. While this finding was consistent with achieving the highest fuel economy in an HEV, it was a surprising association for PHEVs and may indicate that more knowledge about the operation of PHEVs is needed by consumers.

Owning a pickup, van or SUV was associated with somewhat higher hybrid purchase probabilities than owning a car as long as the premium was $2,500 or less. Presumably these consumers valued the unique characteristics of these vehicles, apart from the vehicle's fuel efficiency, and were only likely to give them up at relatively low premiums.

It is also of some interest to note what was proved to be insignificant. The risk to the household of the new PHEV technology in meeting its transportation needs was assumed to be lower for households that owned multiple vehicles. The data, however, found that the number of household

vehicles was only related to PHEV purchase probabilities at the $10,000 premium. The age of the vehicle also never proved significant, despite plausible reasons for owners of newer vehicles to prefer PHEVs.

Demographic Characteristics. The education of the respondent demonstrated the strongest relationship with hybrid preferences. Highly educated people were more favorably disposed toward the purchase of hybrids at all cost premiums. It is of some importance to note that even when controlling for income and environmental attitudes, both highly related to educational attainment, education retained its significance as a predictor. This suggests that neither income nor the environmental attitudes that were actually measured captured all of the information that is relevant for hybrid preferences. Education may be a surrogate for lifetime income, and thus a proxy for economic status, or for the ability of people to make complex purchasing decisions that involve comparing future payoffs to current costs.

Chart 35:
Regression Models of PHEV Purchase Probabilities
(Sign of coefficient & *=.05, **=.01, ***=.001)

	HEV @ -25% fuel		PHEV @ 75% fuel reduction			
	No cost added	+$1,500	No cost added	+$2,500	+$5,000	+$10,000
Age in years	- **				- **	-*
Age > 60 dummy			- **	- **		- *
Household income	+ ***	+ ***		+ **	+ *	
Education in years	+ ***	+ ***	+ **	+ ***	+ ***	+ **
Gender			- *	- *		
West		+ *		+ *	+ *	+ *
Northeast						
South						
Urban						
Rural		+ *				
Have electrical outlet		+ **	+ ***	+ ***	+ ***	+ *

Higher income households were more predisposed to purchase a hybrid, but the impact fell as the PHEV premium rose and disappeared when the premium reached $10,000. The age of the respondent was also generally significant, with older consumers expressing a smaller likelihood of purchase, especially those over age 60. The drop-off in purchase probabilities after age 60 was independent of their driving habits as well as their environmental attitudes and suggests a more basic resistance to change among older consumers.

The most important characteristic of the housing unit was not where it was located (except for the West), the degree of urbanization, whether they regularly parked the vehicle in a garage, or owned or rented the dwelling unit, but whether they had an available electrical outlet. Having an electrical outlet was able to combine in one variable the effects of these various factors. This suggests that the presence or absence of an electric outlet not only is a key determinant of PHEV purchase preferences, but a key planning factor for electrical utilities. Moreover, if PHEVs are to expand beyond this group, planning for public smart-meters is an essential component of the overall strategy.

There is likely to be a wide variety of local regulatory codes on the use of electricity to recharge PHEVs, such as a requirement to have a dedicated line and not using extension cords that extend across lawns or sidewalks, and so forth. It is unclear who---the utilities, the dealership, or the customer---should have the primary responsibility to ensure a safe recharging operation.

Environmental and Other Attitudes. The social implications of purchasing a hybrid are an important component that can motivate the actual purchase. Indeed, attitudes towards the importance of signaling commitment to the environment played a strong role in explaining hybrid preferences (See Chart 36 and Table 5). Strongly supporting the notion that the purchase of a hybrid would demonstrate their commitment to the environment was associated with the highest levels of hybrid preference, whereas strongly opposing this notion was associated with low purchase probabilities. The challenge is turning the social desirability of owning a hybrid vehicle into an actual purchase. This strong association suggests that producing PHEVs that could be immediately recognized as hybrids by the general public is a key component of capitalizing on a hybrid purchase's social significance and a successful advertising campaign by private companies or public agencies.

Chart 36:
Regression Models of PHEV Purchase Probabilities
(Sign of coefficient & *=.05, **=.01, ***=.001)

	HEV @ -25% fuel		PHEV @ 75% fuel reduction			
	No cost added	+$1,500	No cost added	+$2,500	+$5,000	+$10,000
Ignore off-peak pricing	- **	- ***	- ***	- ***	- **	
Avoid gas stations	+ ***	+**	+ ***	+ ***	+***	+ ***
Min AER < 20	- **	- ***	- ***	- ***	-*	
Min AER > 60	- ***	- ***	- ***	- ***	- ***	- ***
Reduce emissions	+ *	+ *			+ *	+ ***
Reduce dependence						
Buy Green important	+ ***	+ ***	+ ***	+ ***	+ ***	+ **
Buy Green not import.	- ***	- ***	- ***	- ***	- ***	- ***
Always buy green bulbs						
Never buy green bulbs	-*		- **	-*		- **
Early Adopter						
Late Adopter			- **	- **	- ***	- ***

It is of some importance to contrast the social desirability of a PHEV purchase with attitudes toward the ability of hybrids to reduce vehicle emissions or reduce the dependence on foreign oil supplies. The advantage of reducing dependence on foreign oil supplies was never significant, and reducing emissions was significant only for HEVs and for PHEVs with premiums above $5,000. Whereas the social desirability component of a hybrid purchase was universally significant, viewing the main advantage of hybrids as reducing emission was highly significant only for those willing to pay an additional $10,000---surely the most committed environmentalists. These results suggest that the most effective strategy to initially promote PHEVs is to focus on the social desirability of owning a hybrid and reducing harmful emissions rather than a focus on the more widely agreed upon goal of achieving energy independence.

People's preferences for new technology also played a role in PHEV preferences, but not in the manner widely hypothesized. The typical hypothesis is that people who have an active preference to be a "first-adopter" of new technology would express higher PHEV purchase probabilities. The data, however, indicated just the opposite: those who expressed a preference to avoid the purchase of new technology, what could be called a "late adopter," were significantly less likely to favor the purchase of a PHEV. These preferences were significant across all of the PHEV premium levels. This suggests that if PHEV technology can begin to establish itself, new groups of consumers will quickly become open to it. In contrast, being an "early adopter" was not significant compared with more neutral attitudes toward technology.

The other major factor predicting increased preference for PHEV purchase was a strong desire to avoid gas stations. Whether this reflects the greater convenience of home recharging, a distaste for the relatively dirtier task of gas refueling, or a judgment about safety was not determined. Even with

the level of expenditure at the gas station and environmental attitudes controlled for, this aversion to gas stations retained its significance across all premium cost levels for HEVs and PHEVs.

Finally, the all-electric range of a PHEV was a critical determinant of its appeal. Importantly, an all-electric range of less than 20 miles or more than 60 miles was outside the range specified in the questions on PHEV purchase probabilities. Consumers that held preferences for a minimum all-electric range outside of the 20 to 60 miles specified in the questions expressed significantly lower purchase probabilities. Presumably, those that preferred a shorter or longer all-electric range were not fully represented in the collected data.

Comparative Strength of Factors. The three broad groups of variables can be conceptualized as representing: (1) the economic benefits of a hybrid vehicle based on the respondent's current vehicle, its characteristics and how it is used; (2) the income, location, and other factors that affect the ability of the consumer to purchase a hybrid vehicle, and (3) the impact of environmental and technological attitudes on hybrid purchase probabilities. While none of these areas were exhaustively represented, the data did provide an overall assessment of which area had the greatest impact on hybrid purchase probabilities, controlling for the high inter-correlations among these broad factors. An assessment of the added explanatory power of each set was estimated based on the assumption that the vehicle characteristics were the primary factors, followed by demographic characteristics, and lastly by environmental attitudes. The results strongly support the conclusion that the environmental variables are the most important, as they explained nearly half of the total variance even after taking the vehicle and demographic characteristics into account (see Chart 37). In contrast, the least variance was explained by the characteristics of the vehicle and how it was used, which are the prime determinants of the economic benefits of hybrids compared with conventional vehicles. Indeed, the estimated payback period, combined with the revealed preferences regarding auto type based on the respondent's current vehicle and actual driving behavior explained the least variance---less than 4%. Even the demographic characteristics of the individual and the dwelling unit explained more variance.

Chart 37:
Regression Models of PHEV Purchase Probabilities
Marginal and Total R^2

	HEV @ -25% fuel		PHEV @ 75% fuel reduction			
	No cost added	+$1,500	No cost added	+$2,500	+$5,000	+$10,000
Vehicle Characteristics	.029	.033	.020	.037	.029	.020
Demographic Characteristics	.079	.088	.064	.096	.095	.039
Environmental Attitudes	.106	.099	.126	.126	.086	.064
Total R^2	.215	.220	.210	.258	.210	.123

The total amount of explained variance based on all three factors was between 20% and 25%, with the sole exception of a PHEV with the highest premium of $10,000, where the predictors accounted for just half as much variance. Importantly, as the premiums for a PHEV increased, the amount of explained variance decreased. This probably reflects the diminished amount of variance in the probability measures at the higher premium levels (at a premium of $2,500, 23% reported a zero probability of purchase, but at a premium of $10,000, 56% reported a zero probability of purchasing a PHEV).

Conclusions

The survey found a good deal of interest among consumers for plug-in hybrid electric vehicles as well as a good deal of resistance based on the estimated cost of this new technology. Consumer acceptance was not solely determined by costs, however, as environmental and other non-economic factors influenced the likelihood of future purchases of hybrid electric vehicles. Nonetheless, the long term success of these vehicles in the marketplace will depend on whether this technology can provide a higher value to consumers when compared with alternative technologies. Providing greater consumer value includes the reliability, durability, and convenience of the new technology as well as fuel savings and the purchase price of the vehicle. These are complex judgments that cannot be fully captured in population surveys before the vehicles have been actually produced.

This research project focused on a determination of which factors would facilitate sales of plug-in hybrid electric vehicles and which factors would represent barriers to the successful introduction of these vehicles. A successful introduction is based on more than just sales in the first few years. A successful introduction implies an upward trajectory in sales that enables cost reductions though mass production and in turn fosters even greater investments in advanced technology that acts to lower prices and increase performance even more in the future. Needless to say, the successful introduction of plug-in hybrid electric vehicles is a necessary but not a sufficient condition for the ultimate success of this new technology. Other competing technologies will continue to challenge plug-in hybrids for market supremacy.

Plug-in hybrid electric vehicles were described to survey respondents in general terms, with the implicit assumption that these vehicles were like conventional vehicles in every way except for how the vehicle was powered and refueled. Consumers were asked to consider two key factors about these hybrids: the savings achievable on fuel costs and the added cost premium to purchase the vehicle. The questions were based on estimates of the likely fuel savings and cost premiums for the hybrid vehicles in five to ten years (in today's dollars). The cost premiums presented to consumers for PHEVs were $2,500, $5,000, and $10,000 and the fuel savings were estimated at 75% compared with a conventional gasoline engine. Consumers' preferences for new vehicles were elicited in terms of purchase probabilities or the likelihood of a future purchase.

With an additional cost of $2,500, the mean purchase probability for a plug-in hybrid electric vehicle was 46%, which dropped to 30% for a PHEV that cost an additional $5,000, and to 14% at an additional cost of $10,000. These large changes in purchase probabilities to increasing price premiums were greater than could be justified based on purely economic rationales. Based on consumers' actual gas expenditures with their current vehicles, the average payback period for the added premium to be offset by fuel savings ranged from 2.0 to 8.5 years at an inflation-adjusted discount rate of 3%. To be sure, new technology entails risks that may entail higher costs or a lower resale value which would mean that these payback periods were underestimated. At a real discount rate of 10%, the payback period ranged from 2.2 to 12.9 years. Indeed, other studies of purchases of energy-efficient household appliances have found even longer payback periods implied by the actual purchase decisions of consumers, up to a 20% discount rate.

Three general sets of factors were investigated to gain a better understanding of how consumers judged the potential purchase of a plug-in hybrid electric vehicle. The first general factor was the characteristics of the vehicle that consumers currently own and their driving habits, determining the cost implications of vehicle purchase decisions. The second general factor focused on the socio-economic characteristics of the household, its geographic location, and recharging capabilities. The third factor was environmental and other non-economic attitudes that may be related to preferences for hybrid vehicles.

The impact of these three general factors can be summarized as follows: although economic considerations had a significant influence on hybrid purchase probabilities, environmental and other non-economic attitudes had an even larger impact. It is a rather commonplace finding that the utility that consumers draw from vehicles depends on more than a strict economic cost-benefit calculation. Even when vehicles are equivalent in every way from an economic point of view, different makes, models, and styles connote different social messages about the owner. A strong appeal of plug-in hybrids is that consumers believe such a purchase would vividly demonstrate their commitment to a cleaner environment. Such beliefs are important for the introduction of plug-in hybrids, acting to offset some of the higher economic costs through social benefits. Such positive social benefits can be expected to be inversely proportional to the number of hybrid owners; at some point, the positive social benefits of owning a hybrid may switch to rising negative social implications about those who shun more fuel efficient vehicles. Such a purely social dynamic, however, cannot exist independent of economic factors, especially since vehicles are generally the second most expensive purchase made by consumers.

The first buyers of PHEVs are likely to currently own vehicles with relatively high fuel efficiency ratings and favor the purchase of the vehicle for environmental reasons. The economic justification for the purchase will not be great since the payback period to offset the cost premium will be longer than for someone who owns a low mileage vehicle. The first time buyer will be highly educated and think it is important to signal his or her commitment to a cleaner environment to others. First time PHEV buyers are likely to own their own home, have convenient access to an electric outlet, and relish the opportunity to avoid gas stations and recharge their vehicles overnight at off-peak pricing. Although a first time PHEV buyer is likely to have relatively high income, these consumers were as sensitive as moderate or lower income consumers to the potential size of the premiums on PHEVs.

The economic challenges to the successful introduction of PHEVs are diverse, although the reactions to the premiums charged for PHEVs were nearly universal. As the premiums for PHEVs doubled from $2,500 to $5,000 and doubled again to $10,000, there was a uniform decline in purchase probabilities across all of the socio-economic characteristics measured, across all differences in the characteristics of the vehicles they currently owned and how they were used, and across all of the environmental attitudes measured. On average, the purchase probabilities declined by 16 percentage points for each doubling of the initial cost premium. This was true no matter how different the subgroup's initial purchase probability was from the overall average; each doubling prompted a very similar decline in the likelihood of purchase. This was the most vivid and convincing demonstration of the sensitivity of consumers to the price of PHEVs. At a premium of $10,000, 56% of all respondents reported that there was no chance that they would ever purchase a PHEV, more than double the 23%

response at a premium of $2,500. The average purchase probability at the $10,000 premium fell by 70% to just a one-in-seven chance of purchase from nearly a one-in-two chance at the $2,500 premium.

Given that a tax credit amounting to $7,500 will be available to buyers of PHEVs, this would make a PHEV purchases much more likely, at least in theory. The problem is that most buyers would have to finance the total price of the vehicle, including the premium, before they could claim the tax credit. This would limit the already narrow group of new vehicle buyers to those who were more likely to pay cash rather than finance the vehicle. If this tax credit could be converted into a reduction of the purchase price, perhaps through the intervention of manufacturers or dealers, its impact on sales would be much greater and more equitable to those who purchased on credit.

The data provide strong evidence that a combination of economic and social incentives may be the most effective for the successful introduction of PHEVs. Indeed, social forces play an important role in most purchases, including vehicles. The survey documented the significant influence of hybrid vehicles in signaling people's commitment to a clean environment. Nonetheless, the importance of the attitudes toward the environment in explaining hybrid purchase probabilities provides less compelling evidence of the underlying demand than if preferences for hybrids were mostly based on economic criteria. The presumption is that following the introduction of PHEVs, if the vehicle is priced so that consumers can recoup their initial investments over a reasonable time period, consumers would find ample economic justification for the purchase of a PHEV. The critical role of environmental and other non-economic attitudes is to provide the initial burst of interest and sales to propel PHEV's appeal to the mass market.

Bibliography

American Recovery and Reinvestment Act of 2009. 111th Cong., 1st Sess. (2009), Division B, Title 1, Section D, Number 14.

Diamond, D. "The Impact of Government Incentives for Hybrid-Electric Vehicles: Evidence from US States." Energy Policy, Volume 37 (3): 972-83 (2009).

Edmunds, "Hybrid Buying Guide: What You Should Know Before Buying a Hybrid in 2009." <http://www.edmunds.com/hybrid/2009/beforebuy.html>. First Accessed March 2009.

Electric Power Research Institute. "Comparing the Benefits and Impacts of Hybrid Electric Vehicle Options for Compact Sedan and Sport Utility Vehicles." Palo Alto, CA: 2002. 1006892.

Hausman, Jerry A., "individual Discount Rates and the Purchase and Utilization of Energy-Using Durables," Bell Journal of Economics, Vol. 10, No. 1 (Spring 1979), pp. 33-54.

Parks, K. "Costs and Emissions Associated with Plug-In Hybrid Electric Vehicle Charging in the Xcel Energy Colorado Service Territory." Department of Energy, Office of Energy Efficiency and Renewable Energy, Technical Report NREL/TP-640-4140, May 2007.

Simpson, A. "Cost / Benefit Analysis of Hybrid-Electric and Plug-In Hybrid-Electric Vehicle Technology." in "Plug-In Hybrid Electric Vehicle Analysis." Department of Energy, Office of Energy Efficiency and Renewable Energy, Milestone Report NREL/MP-540-40609, November 2006.

US Department of Energy, Energy Information Administration. "Crude Oil Imports from Persian Gulf 2008". Released March 02, 2009.

US Department of Energy, Energy Information Administration. "Current and Historical Monthly Retail Sales, Revenues and Average Revenue per Kilowatt hour by State and by Sector (Form EIA-826)." <http://www.eia.doe.gov/cneaf/electricity/epm/table5_6_b.html>. Last Updated March 24, 2009. Last Accessed April 10, 2009.

Energy Information Administration, "Emissions of Greenhouse Gases in the United States 2007," December 2008, DOE/EIA-0573(2007).

US Department of Energy, Energy Information Administration, Short-Term Energy Outlook. "Crude Oil Price." Released June 09 2009, 2009.

US Department of Energy, Energy Information Administration, Short-Term Energy Outlook. "Gasoline and Crude Oil Price." Released February 10, 2009.

US Department of Energy, Energy Information Administration, Electric Power Monthly. "Table 5.3. Average Retail Price of Electricity to Ultimate Customers: Total by End-Use Sector, 1994 through November 2008." February 13, 2009.

US Department of Energy, Energy Information Administration, Electric Power Monthly. “Table 5.6.A. Average Retail Price of Electricity to Ultimate Customers by End-Use Sector, by State, November 2008 and 2007.” February 13, 2009.

US Department of Transportation, Bureau of Transportation Statistics, "National Transportation Statistics, 2006." Table 4-23, December 2006.

US Environmental Protection Agency, “Light-Duty Automotive Technology and Fuel Economy Trends: 1975 through 2008.” September 2008, EPA 420-R-08-015.

US Environmental Protection Agency, “Light-Duty Automotive Technology and Fuel Economy Trends: 1975 through 2008.” September 2008, EPA 420-S-08-03.

US Environmental Protection Agency. “2008 Fuel Economy Guide.” <http://fueleconomy.gov/feg/ratings2008.shtml>. Last Updated October 8, 2008. First Accessed January 2009.

US Environmental Protection Agency. “Reformulated Gas.” <http://www.epa.gov/otaq/rfg/information.htm>. Last Updated 16 July 2008. First Accessed January 2009.

Appendix: Non-Survey Data

Estimates of Vehicle Fuel Efficiency. Respondents provided the year, make and model of their vehicle, and these data were combined with the Environmental Protection Agency's fuel economy data to determine city and highway miles per gallon (MPG) data for each respondent's vehicle.[14] The EPA updated its testing regimen in 2008 to reflect real world conditions and provides recalculated estimates for vehicles manufactured between 1985 and 2007, reflecting the more stringent conditions applied in this test.[15] Cars manufactured between 1978 and 1985 have not had their fuel economy data updated to reflect the new tests, so the data from the old tests were used instead. Since the EPA provides no data for fuel economy before 1978, vehicles older than 1978 were assigned the MPG data for the 1978 model year.

Survey respondents generally provided only the make and model of the car, without specifying the particular engine. Generally, these differences within a model are reflected in slight MPG variations. When there were multiple versions of a given model available, the median city and highway MPG's were used. The EPA treats two-wheel drive and four-wheel drive versions of a vehicle as different models, but both groups were combined when constructing the medians. MPG estimates based on flex fuels were also ignored unless the respondent specified that their vehicle used them.

Vehicles exceeding an 8500 pound gross vehicle weight rating are excluded from the EPA's testing requirements.[16] Since some respondents reported driving vehicles that exceeded this size, it was necessary to assign an MPG value to these trucks. The value chosen was 10 city MPG and 11 highway MPG, which are the lowest values for any vehicle in the sample. These values were selected under the assumption that the heavy trucks and vans would have poorer fuel economy than any of the lighter cars, trucks or vans.

Fuel economy estimates are essentially best case scenarios, arising from tests of vehicles with new engines and no significant wear. These tests also assume proper maintenance and use of the correct grade of gas.[17] Suboptimal conditions will lead to lower fuel economy. It is possible that over the course of use, vehicle fuel economy begins to fall, systematically biasing the official EPA estimates for older cars upward. However, there are no accepted methods for discounting the MPG of a vehicle as it ages, and the condition of a respondent's car is unknown, so this issue is left unresolved. Since a variety of other gas price and driving behavior variables are included, the bias from this overestimation of MPG should be small.

[14] All fuel economy data taken from www.fueleconomy.gov

[15] Environmental Protection Agency. "2008 Fuel Economy Guide." <http://fueleconomy.gov/feg/ratings2008.shtml>. Updated October 8, 2008.

[16] Ibid.

[17] Ibid.

Gas Prices at the Time of the Survey. Energy prices are taken from data provided by the Energy Information Administration. Data were available at the national and regional level for all respondents, and at the state and metro level for certain areas. The closest match to the respondents' actual residential location was used. Values were taken from the end of the week when the interview occurred and are for the average of all grades and all formulations.

The EIA provides price information regarding different gasoline grades and formulations. Certain metropolitan areas, particularly those in the Northeast Corridor, and all counties in California, are mandated to use cleaner burning reformulated gasoline (RFG) under the Clean Air Act.[18] Since RFG is required in many major metro areas, the gas price data employed in this analysis employs both conventional and reformulated gasoline prices in arriving at a price estimate. The EIA weights various gas types in arriving at an all grades and all formulations price, basing the weights on sales and delivery data from other EIA surveys.

Electricity Prices at the Time of the Survey. Electricity price data are taken from the Energy Information Administration. The series used for the regression variable is the Monthly Average Retail Price Residential (c/kWh), available at the state level.[19] The revised figures from the month of the interview were used.

[18] Environmental Protection Agency. "Reformulated Gas." <http://www.epa.gov/otaq/rfg/information.htm>. Last Updated 16 July 2008. First Accessed January 2009.

[19] "Current and Historical Monthly Retail Sales, Revenues and Average Revenue per Kilowatt hour by State and by Sector (Form EIA-826) ." Energy Information Administration. <http://www.eia.doe.gov/cneaf/electricity/epm/table5_6_b.html>. Last updated March 24, 2009. Last accessed April 10, 2009.

Table 1
Purchase Probabilities for Hybrid Vehicles

	Purchase Probabilities						
	Zero	1% - 33%	34% - 66%	67% - 99%	100%	Total	Cases
HEV							
No mileage or cost data given	21	14	25	25	15	100%	2329
Fuel cost -25% & vehicle cost +$1,500	18	13	25	29	15	100%	2327
PHEV							
No mileage or cost data given	25	19	27	20	9	100%	2336
Fuel cost -75% & vehicle cost +$2,500	23	16	26	25	10	100%	2334
Fuel cost -75% & vehicle cost +$5,000	33	27	27	10	3	100%	2330
Fuel cost -75% & vehicle cost +$10,000	56	28	13	2	1	100%	2333

The questions were:
Vehicle manufacturers currently offer for sale hybrid vehicles which combine an ordinary gasoline engine with a battery powered electric motor to increase fuel efficiency. The battery is recharged by the vehicle itself during normal driving, with most of the gas savings generated during city driving. On a scale of zero to one hundred, where zero means that you would definitely not buy and one hundred means you definitely would buy, what are the chances that you might buy a hybrid vehicle sometime in the future?

The cost of driving a hybrid vehicle had two major components: the cost of the vehicle itself and the cost of gasoline. While hybrids reduce gasoline consumption, the hybrid vehicle itself typically costs more than an ordinary vehicle. If a hybrid vehicle reduced total fuel costs by twenty-five percent and the vehicle itself costs one thousand five hundred dollars more than an ordinary vehicle, what are the chances that you might buy a hybrid vehicle, using the same scale ranging from zero to one hundred, where zero means that you would definitely not buy and one hundred mean you definitely would buy sometime in the future?

Vehicle manufacturers are also developing a more fuel efficient type of hybrid vehicle, which is called a plug-in hybrid. The battery on this vehicle is recharged by plugging the vehicle into a standard electrical outlet. Starting each day with a fully recharged battery, the vehicle could travel from ten to sixty miles on battery power. When the battery runs low, the gasoline engine would automatically generate the power to run the vehicle. On a scale of zero to one hundred, where zero means that you would definitely not buy and one hundred means you definitely would buy, what are the chances that you might buy a plug-in hybrid vehicle sometime in the future?

The cost of driving a plug-in hybrid also has two major components: the cost of the vehicle itself and the total cost of electricity and gasoline. While the plug-in hybrids reduce overall fuel consumption, the plug-in hybrid itself typically costs more than an ordinary vehicle. If a plug-in hybrid reduced total fuel costs by seventy-five percent and cost two thousand five hundred dollars more than an ordinary vehicle, what are the chances you might buy the plug-in hybrid, using the scale ranging from zero to one hundred, where zero means that you would definitely not buy and one hundred means you definitely would buy?

What if a plug-in hybrid that reduced total fuel costs by seventy-five percent cost five thousand dollars more than an ordinary vehicle, what are the chances you might buy the plug-in hybrid, using the scale ranging from zero to one hundred, where zero means that you would definitely not buy and one hundred means you definitely would buy?

What if a plug-in hybrid that reduced total fuel costs by seventy-five percent cost ten thousand dollars more than an ordinary vehicle, what are the chances you might buy the plug-in hybrid, using the scale ranging from zero to one hundred, where zero means that you would definitely not buy and one hundred means you definitely would buy?

Note: Table is based on all vehicle owning households in which the respondent was a licensed driver. Table excludes "don't know" and "not ascertained" responses. These replies averaged just 13 cases per question or about one-half of one percent of all replies.

Table 2
Hybrid Vehicle Purchase Probabilities by Energy Costs
(Standard errors of estimates in parentheses)

	Purchase Probabilities					
	HEV		PHEV			
	No Cost Data Given	Fuel cost: -25% Veh cost: +$1,500	No Cost Data Given	Fuel cost-75% and Vehicle Cost of: +$2,500	+$5,000	+$10,000
All Households	50.7 (0.75)	53.3 (0.73)	42.0 (0.25)	45.8 (0.72)	29.5 (0.61)	13.6 (0.44)
Gas Price at Time of Survey (EIA Data)						
$0.01-$2.699	48.0 (1.71)	50.9 (1.71)	40.7 (1.62)	44.6 (1.65)	28.0 (1.39)	13.1 (1.01)
$2.70-$3.619	51.3 (1.66)	52.0 (1.64)	42.4 (1.62)	46.4 (1.63)	29.5 (1.34)	13.9 (1.03)
$3.62-$3.839	53.7 (1.59)	56.5 (1.53)	44.9 (1.54)	47.3 (1.54)	31.4 (1.38)	14.6 (0.99)
$3.84-$4.139	50.6 (1.66)	54.6 (1.61)	41.8 (1.55)	45.8 (1.57)	29.4 (1.33)	13.2 (0.95)
$4.14 or more	49.8 (1.73)	52.1 (1.72)	40.1 (1.59)	44.5 (1.67)	28.9 (1.38)	13.2 (0.96)
Retail Price of Electricity (EIA Data)						
1-9.9 cents kWh	50.2 (1.61)	52.7 (1.59)	42.6 (1.55)	45.2 (1.59)	28.0 (1.29)	12.3 (0.92)
10-10.9 cents kWh	47.5 (1.54)	49.6 (1.53)	40.7 (1.46)	44.3 (1.48)	28.7 (1.24)	12.7 (0.87)
11-11.9 cents kWh	52.7 (1.74)	56.0 (1.70)	41.7 (1.66)	47.3 (1.71)	30.6 (1.50)	13.2 (1.04)
12-14.9 cents kWh	51.1 (1.63)	54.0 (1.56)	43.0 (1.53)	46.7 (1.55)	31.0 (1.34)	16.5 (1.03)
15 or more cents kWh	53.6 (1.87)	55.5 (1.85)	42.2 (1.76)	45.4 (1.77)	29.1 (1.50)	12.9 (1.11)
Expectation of Gas Price: Five Years						
$1-$3.299	46.2 (1.74)	46.9 (1.68)	37.9 (1.60)	41.9 (1.62)	26.7 (1.33)	12.7 (0.97)
$3.30-$3.919	49.9 (1.61)	51.5 (1.61)	43.5 (1.58)	46.2 (1.61)	30.0 (1.39)	14.4 (1.03)
$3.92-$4.499	48.9 (1.68)	53.5 (1.66)	40.4 (1.61)	42.7 (1.60)	26.9 (1.31)	11.9 (0.93)
$4.50-$5.339	55.6 (1.62)	58.9 (1.60)	44.0 (1.55)	50.1 (1.58)	31.6 (1.34)	14.4 (1.02)
$5.34 or more	54.4 (1.71)	56.9 (1.64)	45.4 (1.60)	49.5 (1.64)	33.1 (1.47)	15.1 (1.03)
Monthly Cost of Gas						
$80 or less	43.7 (1.58)	44.8 (1.58)	36.3 (1.50)	37.6 (1.55)	23.4 (1.21)	9.0 (0.73)
$81 - $130	51.4 (1.74)	53.9 (1.65)	43.2 (1.64)	46.2 (1.62)	29.3 (1.38)	14.1 (1.08)
$131 - $190	52.0 (1.64)	55.3 (1.61)	44.8 (1.57)	47.4 (1.59)	29.9 (1.38)	14.9 (1.04)
$191 - $260	55.6 (1.68)	57.6 (1.63)	47.0 (1.63)	51.1 (1.66)	34.6 (1.47)	16.2 (1.10)
$261 or more	54.0 (1.71)	57.4 (1.67)	42.7 (1.59)	49.8 (1.59)	33.1 (1.42)	15.7 (1.07)
Vehicle Fuel Efficiency (EPA Data)						
1-15.9 MPG	50.2 (1.74)	52.3 (1.71)	42.3 (1.59)	45.2 (1.60)	28.4 (1.33)	12.5 (0.89)
16-17.9 MPG	47.6 (1.75)	50.9 (1.72)	40.3 (1.64)	44.7 (1.73)	30.0 (1.50)	15.0 (1.14)
18-20.9 MPG	52.0 (1.78)	54.7 (1.57)	42.9 (1.57)	46.7 (1.56)	30.3 (1.38)	13.7 (0.96)
21-23.9 MPG	50.7 (1.79)	53.1 (1.75)	42.4 (1.69)	45.4 (1.71)	28.9 (1.43)	12.8 (1.03)
24 MPG or more	57.0 (1.76)	59.0 (1.69)	45.8 (1.73)	50.9 (1.74)	32.6 (1.46)	15.0 (1.14)

Table 2a
Hybrid Vehicle Purchase Probabilities by Vehicle Characteristics
(Standard errors of estimates in parentheses)

	Purchase Probabilities					
	HEV		PHEV			
	No Cost Data Given	Fuel cost: -25% Veh cost: +$1,500	No Cost Data Given	Fuel cost-75% and Vehicle Cost of: +$2,500	+$5,000	+$10,000
All Households	50.7 (0.75)	53.3 (0.73)	42.0 (0.25)	45.8 (0.72)	29.5 (0.61)	13.6 (0.44)
Average Miles Driven per Day						
9 miles or less	45.2 (1.85)	46.2 (1.80)	37.0 (1.69)	38.1 (1.72)	25.1 (1.41)	11.1 (0.91)
10-19 miles	52.1 (1.61)	54.3 (1.55)	43.6 (1.51)	45.7 (1.51)	28.6 (1.27)	12.8 (0.92)
20-29 miles	50.2 (1.61)	51.6 (1.61)	41.2 (1.55)	45.1 (1.59)	28.9 (1.35)	13.1 (0.97)
30-49 miles	55.2 (1.65)	58.5 (1.61)	47.0 (1.63)	51.1 (1.64)	32.6 (1.43)	15.7 (1.08)
50 or more miles	51.1 (1.64)	55.9 (1.60)	41.4 (1.55)	48.9 (1.57)	32.3 (1.36)	15.5 (1.06)
Percent Highway Miles						
4% or less	44.9 (1.93)	45.5 (1.87)	36.3 (1.74)	38.1 (1.77)	24.5 (1.44)	10.6 (0.97)
5% - 19%	51.1 (1.66)	55.5 (1.62)	42.3 (1.59)	45.9 (1.64)	29.2 (1.38)	13.2 (0.98)
20% - 49%	55.2 (1.62)	55.9 (1.63)	45.0 (1.56)	49.7 (1.57)	32.4 (1.39)	16.3 (1.05)
50% - 74%	53.2 (1.62)	56.0 (1.59)	45.7 (1.59)	48.6 (1.59)	31.5 (1.36)	15.1 (1.03)
75% or more	49.7 (1.54)	53.4 (1.50)	40.9 (1.46)	46.2 (1.48)	29.8 (1.26)	13.0 (0.92)
Type of Vehicle						
Car	50.5 (1.01)	52.9 (0.99)	41.2 (0.97)	44.5 (0.99)	28.7 (0.83)	13.3 (0.60)
Pickup	43.6 (1.99)	47.4 (1.95)	36.8 (1.84)	40.9 (1.86)	25.7 (1.55)	11.1 (1.05)
Van	56.7 (2.49)	57.6 (2.48)	46.4 (2.35)	52.4 (2.44)	33.5 (2.20)	14.7 (1.56)
SUV	54.2 (1.57)	56.9 (1.56)	46.6 (1.47)	50.5 (1.47)	33.0 (1.30)	15.8 (0.98)
Purchased New or Used						
New	52.5 (0.94)	55.8 (0.91)	44.1 (0.89)	48.1 (0.90)	31.2 (0.78)	14.3 (0.58)
Used	48.3 (1.24)	50.0 (1.23)	39.1 (1.17)	42.8 (1.20)	27.1 (0.98)	12.6 (0.69)
Age of Vehicle						
0 - 2 years	52.9 (1.60)	56.8 (1.52)	44.9 (1.52)	50.5 (1.52)	33.5 (1.31)	15.0 (0.97)
3 - 5 years	52.5 (1.41)	54.7 (1.41)	44.0 (1.37)	47.8 (1.39)	31.3 (1.23)	15.4 (0.97)
6 - 9 years	54.5 (1.43)	56.1 (1.42)	44.2 (1.37)	47.9 (1.39)	30.2 (1.19)	13.3 (0.80)
10 years or older	44.0 (1.52)	47.2 (1.50)	36.3 (1.42)	38.8 (1.44)	24.2 (1.15)	11.1 (0.81)
Number of Vehicles Owned						
One	47.5 (1.41)	47.7 (1.39)	37.9 (1.30)	38.1 (1.32)	23.8 (1.07)	10.3 (0.73)
Two	52.9 (1.18)	56.0 (1.16)	43.7 (1.13)	48.7 (1.14)	30.9 (0.97)	14.3 (0.69)
Three or more	50.8 (1.30)	54.8 (1.26)	43.7 (1.26)	48.9 (1.28)	32.7 (1.13)	15.8 (0.88)

Table 2b
Hybrid Vehicle Purchase Probabilities by Demographic Subgroups
(Standard errors of estimates in parentheses)

	Purchase Probabilities					
	HEV		PHEV			
	No Cost Data Given	Fuel cost: -25% Veh cost: +$1,500	No Cost Data Given	Fuel cost -75% and Vehicle Cost of: +$2,500	+$5,000	+$10,000
All Households	50.7 (0.75)	53.3 (0.73)	42.0 (0.25)	45.8 (0.72)	29.5 (0.61)	13.6 (0.44)
Age						
18 -34	56.3 (1.91)	56.8 (1.87)	43.7 (1.87)	50.2 (1.89)	34.8 (1.65)	16.4 (1.25)
35 - 44	57.2 (1.66)	59.4 (1.65)	46.9 (1.68)	51.4 (1.70)	35.3 (1.47)	16.1 (1.06)
45-54	55.3 (1.50)	59.6 (1.43)	47.5 (1.43)	53.4 (1.43)	33.8 (1.27)	15.4 (0.97)
55-64	51.4 (1.66)	55.4 (1.61)	43.7 (1.54)	46.9 (1.56)	29.7 (1.33)	14.8 (1.06)
65 or older	35.6 (1.51)	37.2 (1.50)	30.0 (1.41)	29.3 (1.37)	15.7 (1.03)	6.4 (0.65)
Income						
Bottom fifth	37.6 (2.20)	36.7 (2.21)	31.2 (2.04)	28.9 (2.01)	17.2 (1.55)	8.5 (1.15)
Second fifth	48.1 (1.96)	50.5 (1.88)	37.7 (1.80)	40.7 (1.84)	24.9 (1.48)	12.2 (1.07)
Middle fifth	52.2 (1.53)	54.1 (1.47)	44.6 (1.48)	48.3 (1.47)	30.8 (1.32)	12.8 (0.91)
Fourth fifth	53.0 (1.47)	57.5 (1.42)	45.1 (1.46)	51.0 (1.44)	32.7 (1.25)	14.0 (0.87)
Top fifth	60.1 (1.48)	63.7 (1.45)	49.4 (1.47)	56.2 (1.44)	39.0 (1.32)	19.5 (1.09)
Education						
High School or less	41.0 (1.38)	43.8 (1.38)	34.6 (1.29)	36.6 (1.10)	22.1 (1.03)	10.1 (0.75)
Some College	50.4 (1.59)	52.6 (1.65)	41.2 (1.57)	44.4 (1.61)	28.6 (1.35)	13.4 (0.97)
College degree	55.1 (1.32)	58.0 (1.28)	45.3 (1.31)	51.4 (1.32)	33.5 (1.14)	15.3 (0.84)
Graduate school	61.8 (1.52)	63.7 (1.44)	51.4 (1.46)	55.0 (1.44)	37.5 (1.35)	17.7 (1.03)
Gender						
Male	50.1 (1.10)	52.8 (1.08)	43.2 (1.08)	47.6 (1.08)	29.8 (0.90)	13.6 (0.67)
Female	51.2 (1.02)	53.7 (1.00)	41.1 (0.94)	44.2 (0.97)	29.2 (0.83)	13.6 (0.59)
Home Ownership						
Own	50.8 (0.81)	53.8 (0.79)	42.5 (0.76)	46.8 (0.77)	29.9 (0.66)	13.8 (0.48)
Rent	50.5 (1.95)	50.7 (1.95)	39.5 (1.88)	40.5 (1.93)	27.2 (1.61)	12.7 (1.14)
Region						
West	53.2 (1.69)	55.7 (1.67)	45.2 (1.62)	48.4 (1.63)	33.0 (1.43)	16.4 (1.09)
North Central	49.9 (1.40)	52.6 (1.37)	41.5 (1.37)	44.4 (1.39)	28.5 (1.17)	12.7 (0.80)
Northeast	52.4 (1.71)	55.7 (1.69)	42.7 (1.60)	48.1 (1.63)	30.0 (1.37)	13.1 (1.02)
South	49.0 (1.28)	51.1 (1.25)	40.2 (1.20)	44.0 (1.23)	27.8 (1.02)	12.8 (0.74)
Metropolitan Status						
City center	53.8 (1.47)	56.0 (1.38)	43.9 (1.34)	47.5 (1.37)	30.5 (1.15)	14.7 (0.82)
In country of city cntr	47.1 (1.60)	50.9 (1.57)	40.3 (1.49)	43.5 (1.49)	28.7 (1.32)	13.2 (0.99)
Suburban county	53.9 (1.49)	55.3 (1.48)	44.2 (1.46)	48.6 (1.46)	30.8 (1.21)	13.9 (0.90)
MSA with no city cntr	51.1 (3.58)	49.4 (3.61)	42.1 (3.51)	45.4 (3.63)	30.8 (3.12)	16.8 (2.40)
Not in MSA	46.8 (1.60)	50.6 (1.58)	39.1 (1.51)	42.5 (1.57)	27.3 (1.32)	11.8 (0.91)

Table 2c
Hybrid Vehicle Purchase Probabilities by Charging Characteristics
(Standard errors of estimates in parentheses)

	Purchase Probabilities					
	HEV		PHEV			
	No Cost Data Given	Fuel cost: -25% Veh cost: +$1,500	No Cost Data Given	Fuel cost-75% and Vehicle Cost of: +$2,500	+$5,000	+$10,000
All Households	50.7 (0.75)	53.3 (0.73)	42.0 (0.25)	45.8 (0.72)	29.5 (0.61)	13.6 (0.44)
Location Regularly Park						
Attached garage	53.2 (1.24)	56.6 (1.20)	44.7 (1.19)	49.3 (1.19)	32.0 (1.03)	15.2 (0.79)
Unattached garage	46.4 (2.58)	50.9 (2.61)	42.1 (2.42)	43.5 (2.42)	27.9 (2.08)	13.7 (1.56)
Carport	40.2 (2.54)	42.8 (2.45)	35.8 (2.32)	36.5 (2.32)	22.6 (1.81)	9.1 (1.19)
Driveway	51.3 (1.20)	53.5 (1.19)	41.4 (1.14)	45.9 (1.17)	29.7 (1.01)	13.5 (0.70)
Street/lot/structure	55.3 (2.61)	54.9 (2.50)	43.5 (2.50)	45.7 (2.58)	28.8 (2.13)	13.4 (1.57)
Have Available Outlet to Recharge PHEV						
Yes	52.7 (0.83)	55.9 (0.82)	45.1 (0.81)	49.2 (0.81)	32.1 (0.71)	14.7 (0.52)
No	44.6 (1.65)	45.1 (1.61)	31.9 (1.44)	34.6 (1.50)	20.7 (1.14)	9.7 (0.79)
Recharge after 9PM if Offered Discount						
Always	54.0 (1.30)	57.0 (1.26)	45.9 (1.22)	50.0 (1.22)	31.6 (1.05)	13.6 (0.77)
Most of the time	56.7 (1.10)	59.5 (1.06)	48.2 (1.07)	53.3 (1.09)	35.3 (0.98)	16.8 (0.74)
Some of the time	60.2 (2.60)	60.1 (2.62)	43.0 (2.71)	48.0 (2.59)	32.0 (2.42)	17.5 (1.97)
No impact when charge	34.8 (1.69)	36.8 (1.70)	26.3 (1.54)	26.9 (1.54)	16.4 (1.22)	7.5 (0.82)
Want to Avoid Gas Stations by Recharging PHEV at Home						
Very important	55.6 (0.90)	58.0 (0.87)	48.3 (0.86)	52.6 (0.86)	34.1 (0.76)	15.9 (0.57)
Somewhat important	47.3 (1.45)	50.4 (1.46)	36.7 (1.37)	40.5 (1.40)	25.4 (1.17)	11.8 (0.85)
Not very important	36.9 (3.48)	40.5 (3.44)	20.5 (2.87)	23.5 (2.94)	14.2 (2.20)	5.4 (1.29)
Not at all important	20.4 (3.12)	20.9 (3.02)	10.2 (2.18)	8.0 (1.90)	5.0 (1.33)	2.9 (1.01)
Minimum All-Electric Range for Work and Daily Errands						
Less than 20 miles	43.9 (2.34)	43.4 (2.30)	37.2 (2.22)	37.7 (2.30)	24.4 (1.82)	11.8 (1.21)
20 - 39 miles	58.2 (1.42)	60.9 (1.38)	49.9 (1.40)	52.7 (1.40)	34.6 (1.26)	16.2 (0.96)
40 - 59 miles	57.3 (1.42)	61.0 (1.34)	50.7 (1.35)	54.8 (1.35)	37.0 (1.27)	18.0 (1.00)
60 - 79 miles	57.6 (1.86)	60.2 (1.82)	47.9 (1.80)	55.5 (1.76)	33.9 (1.58)	14.6 (1.12)
80 miles or more	42.7 (1.62)	45.6 (1.59)	30.5 (1.42)	35.1 (1.46)	21.2 (1.13)	9.0 (0.83)

Table 2d
Hybrid Vehicle Purchase Probabilities by Environmental Preferences
(Standard errors of estimates in parentheses)

	Purchase Probabilities					
	HEV		PHEV			
	No Cost	Fuel cost: -25%	No Cost	Fuel cost -75% and Vehicle Cost of:		
	Data Given	Veh cost: +$1,500	Data Given	+$2,500	+$5,000	+$10,000
All Households	50.7 (0.75)	53.3 (0.73)	42.0 (0.25)	45.8 (0.72)	29.5 (0.61)	13.6 (0.44)
Monthly Trips to Gas Station						
One	41.4 (2.33)	42.7 (2.32)	34.2 (2.20)	36.7 (2.27)	23.8 (1.79)	9.8 (1.11)
Two	49.7 (1.60)	51.6 (1.61)	42.2 (1.55)	44.8 (1.58)	27.9 (1.32)	12.0 (0.92)
Three	52.1 (1.95)	55.4 (1.87)	44.0 (1.89)	45.8 (1.89)	31.9 (1.63)	15.9 (1.24)
Four	52.9 (1.42)	55.5 (1.36)	43.0 (1.33)	47.7 (1.34)	29.4 (1.15)	13.8 (0.87)
Five or more	53.1 (1.47)	56.1 (1.44)	43.3 (1.38)	48.7 (1.41)	32.3 (1.23)	15.3 (0.92)
Main Advantage of Hybrid						
Reduce fuel money	49.8 (1.34)	52.6 (1.32)	41.8 (1.29)	46.7 (1.32)	29.9 (1.10)	12.6 (0.74)
Reduce emissions	58.4 (1.96)	60.1 (1.91)	46.8 (1.91)	50.4 (1.91)	34.9 (1.71)	18.4 (1.39)
Reduce dependence oil	50.1 (1.02)	52.6 (1.00)	41.5 (0.95)	44.6 (0.97)	28.2 (0.81)	13.1 (0.60)
Show Commitment by Buying Environmental Friendly Products						
Very important	59.8 (1.04)	61.7 (1.01)	49.7 (1.01)	52.9 (1.02)	34.4 (0.91)	16.2 (0.70)
Somewhat important	45.2 (1.18)	49.1 (1.16)	38.0 (1.12)	43.0 (1.15)	27.3 (0.97)	12.6 (0.67)
Not very important	44.8 (2.43)	45.2 (2.49)	35.3 (2.22)	39.4 (2.38)	25.6 (1.86)	10.9 (1.29)
Not at all important	21.7 (2.72)	23.6 (2.72)	17.0 (2.56)	16.9 (2.44)	10.9 (1.72)	4.3 (1.01)
Buy Compact Fluorescent Bulbs						
All the time	56.6 (1.60)	57.8 (1.55)	45.8 (1.57)	50.1 (1.54)	33.6 (1.40)	16.2 (1.08)
Most of the time	54.9 (1.50)	57.0 (1.49)	47.2 (1.43)	50.3 (1.46)	33.4 (1.30)	16.6 (0.99)
Some of the time	50.4 (1.35)	53.6 (1.32)	42.3 (1.26)	46.3 (1.31)	29.2 (1.07)	13.6 (0.78)
Never	42.8 (1.56)	46.4 (1.53)	34.0 (1.43)	37.6 (1.48)	22.5 (1.15)	8.6 (0.71)
Want to be 1st to Own New Technology						
Strongly agree	55.0 (3.03)	54.2 (2.98)	46.8 (2.92)	48.0 (3.01)	35.4 (2.68)	17.0 (2.03)
Agree	54.5 (1.25)	57.1 (1.22)	46.4 (1.24)	49.9 (1.23)	33.0 (1.07)	16.6 (0.83)
Disagree	49.2 (1.12)	51.9 (1.10)	40.0 (1.03)	44.4 (1.07)	27.8 (0.89)	12.3 (0.62)
Strongly disagree	44.1 (2.05)	47.8 (2.05)	34.6 (1.87)	37.7 (1.90)	22.3 (1.48)	8.1 (0.91)

Table 3
Change in PHEV Purchase Probabilities as Premiums Change by Energy Costs
(Standard errors of estimates in parentheses)

	PHEV with Fuel Cost -75%					
	Cost increases from:					
	$2,500 to $5,000		$5,000 to $10,000		$2,500 to $10,000	
	Δ Probability	% Change	Δ Probability	% Change	Δ Probability	% Change
All Households	-16.3 (0.41)	-35.6%	-15.8 (0.39)	-53.6%	-32.0 (0.60)	-69.9%
Gas Price at Time of Survey (EIA Data)						
$0.01-$2.699	-16.7 (0.96)	-37.4%	-14.7 (0.91)	-52.5%	-31.5 (1.40)	-70.6%
$2.70-$3.619	-16.9 (0.95)	-36.4%	-15.6 (0.81)	-52.9%	-32.4 (1.38)	-69.8%
$3.62-$3.839	-16.0 (0.84)	-33.8%	-16.7 (0.89)	-53.2%	-32.7 (1.26)	-69.1%
$3.84-$4.139	-16.4 (0.89)	-35.8%	-16.3 (0.83)	-55.4%	-32.7 (1.28)	-71.4%
$4.14 or more	-15.4 (0.91)	-34.6%	-15.7 (0.91)	-54.3%	-31.4 (1.38)	-70.6%
Retail Price of Electricity (EIA Data)						
1-9.9 cents kWh	-17.1 (0.90)	-37.8%	-15.6 (0.86)	-55.7%	-32.9 (1.35)	-72.8%
10-10.9 cents kWh	-15.7 (0.82)	-35.4%	-15.9 (0.81)	-55.4%	-31.6 (1.23)	-71.3%
11-11.9 cents kWh	-16.9 (0.97)	-35.7%	-17.1 (0.96)	-55.9%	-34.0 (1.41)	-71.9%
12-14.9 cents kWh	-15.6 (0.87)	-33.4%	-14.6 (0.78)	-47.1%	-30.3 (1.24)	-64.9%
15 or more cents kWh	-16.5 (1.05)	-36.3%	-16.2 (0.98)	-55.7%	-32.7 (1.51)	-72.0%
Expectation of Gas Price: Five Years						
$1-$3.299	-15.2 (0.95)	-36.3%	-14.0 (0.89)	-52.4%	-29.2 (1.38)	-69.7%
$3.30-$3.919	-16.2 (0.91)	-35.1%	-15.1 (0.86)	-50.3%	-31.8 (1.31)	-68.8%
$3.92-$4.499	-15.7 (0.89)	-36.8%	-15.0 (0.82)	-55.8%	-30.8 (1.32)	-72.1%
$4.50-$5.339	-18.6 (0.92)	-37.1%	-17.1 (0.84)	-54.1%	-35.7 (1.35)	-71.3%
$5.34 or more	-16.4 (0.92)	-33.1%	-17.9 (0.95)	-54.1%	-34.4 (1.34)	-69.5%
Monthly Cost of Gas						
$80 or less	-14.2 (0.83)	-37.8%	-14.4 (0.85)	-61.5%	-28.6 (1.30)	-76.1%
$81 - $131	-17.0 (0.97)	-36.8%	-15.2 (0.88)	-51.9%	-32.2 (1.36)	-69.7%
$130 - $190	-17.4 (0.94)	-36.7%	-14.7 (0.77)	-49.2%	-32.5 (1.29)	-68.6%
$191 - $260	-16.7 (0.86)	-32.7%	-18.4 (0.97)	-53.2%	-35.1 (1.38)	-68.7%
$261 or more	-16.8 (0.96)	-33.7%	-17.0 (0.88)	-51.4%	-33.7 (1.35)	-67.7%
Vehicle Fuel Efficiency (EPA Data)						
1-15.9 MPG	-16.9 (0.99)	-37.4%	-16.1 (0.87)	-56.7%	-33.0 (1.38)	-73.0%
16-17.9 MPG	-15.0 (0.91)	-33.6%	-15.1 (0.91)	-50.3%	-30.2 (1.39)	-67.6%
18-20.9 MPG	-16.2 (0.85)	-34.7%	-17.0 (0.91)	-56.1%	-33.3 (1.30)	-71.3%
21-23.9 MPG	-16.8 (0.95)	-37.0%	-16.1 (0.97)	-55.7%	-33.0 (1.45)	-72.7%
24 MPG or more	-18.6 (1.08)	-36.5%	-17.9 (0.97)	-54.9%	-36.5 (1.52)	-71.7%

Table 3a
Change in PHEV Purchase Probabilities as Premiums Change by Vehicle Characteristics
(Standard errors of estimates in parentheses)

	PHEV with Fuel Cost -75%					
	Cost increases from:					
	$2,500 to $5,000		$5,000 to $10,000		$2,500 to $10,000	
	Δ Probability	%Change	Δ Probability	%Change	Δ Probability	%Change
All Households	-16.3 (0.41)	-35.6%	-15.8 (0.39)	-53.6%	-32.0 (0.60)	-69.9%
Average Miles per Day						
9 miles or less	-13.0 (0.91)	-34.1%	-13.9 (0.92)	-55.4%	-27.1 (1.37)	-71.1%
10-19 miles	-17.1 (0.88)	-37.4%	-15.9 (0.85)	-55.6%	-32.9 (1.28)	-72.0%
20-29 miles	-16.3 (0.89)	-36.1%	-15.6 (0.85)	-54.0%	-31.9 (1.33)	-70.7%
30-49 miles	-18.5 (0.96)	-36.2%	-16.8 (0.85)	-51.5%	-35.5 (1.35)	-69.5%
50 or more miles	-16.7 (0.93)	-34.2%	-16.8 (0.88)	-52.0%	-33.5 (1.34)	-68.5%
Percent Highway Miles						
4% or less	-13.7 (0.91)	-36.0%	-13.6 (0.92)	-55.5%	-27.4 (1.44)	-71.9%
5% - 19%	-16.7 (0.92)	-36.4%	-16.0 (0.89)	-54.8%	-32.7 (1.35)	-71.2%
20% - 49%	-17.2 (0.93)	-34.6%	-16.0 (0.83)	-49.4%	-33.4 (1.30)	-67.2%
50% - 74%	-17.2 (0.95)	-35.4%	-16.4 (0.85)	-52.1%	-33.6 (1.33)	-69.1%
75% or more	-16.4 (0.84)	-35.5%	-16.8 (0.85)	-56.4%	-33.3 (1.26)	-72.1%
Type of Vehicle						
Car	-15.8 (0.55)	-35.5%	-15.2 (0.53)	-53.0%	-31.1 (0.82)	-69.9%
Pickup	-15.2 (1.02)	-37.2%	-14.5 (1.01)	-56.4%	-29.8 (1.53)	-72.9%
Van	-18.9 (1.59)	-36.1%	-18.8 (1.42)	-56.1%	-37.7 (2.11)	-71.9%
SUV	-17.4 (0.84)	-34.5%	-17.2 (0.81)	-52.1%	-34.7 (1.23)	-68.7%
Purchased New or Used						
New	-16.9 (0.52)	-35.1%	-16.8 (0.50)	-53.8%	-33.7 (0.76)	-70.1%
Used	-15.7 (0.68)	-36.7%	-14.5 (0.62)	-53.5%	-30.3 (0.98)	-70.8%
Age of Vehicle						
0 - 2 years	-17.0 (0.86)	-33.7%	-18.5 (0.91)	-55.2%	-35.4 (1.31)	-70.1%
3 - 5 years	-16.5 (0.80)	-34.5%	-15.8 (0.72)	-50.5%	-32.4 (1.14)	-67.8%
6 - 9 years	-17.7 (0.81)	-37.0%	-16.8 (0.77)	-55.6%	-34.6 (1.16)	-72.2%
10 years or older	-14.6 (0.80)	-37.6%	-13.0 (0.73)	-53.7%	-27.7 (1.19)	-71.4%
Number of Vehicles Owned						
One	-14.2 (0.76)	-37.3%	-13.3 (0.71)	-55.9%	-27.8 (1.11)	-73.0%
Two	-17.8 (0.66)	-36.6%	-16.7 (0.63)	-54.0%	-34.5 (0.97)	-70.8%
Three or more	-16.1 (0.69)	-32.9%	-16.9 (0.68)	-51.7%	-33.0 (1.03)	-67.5%

Table 3b
Change in PHEV Purchase Probabilities as Premiums Changes by Demographic Subgroup
(Standard errors of estimates in parentheses)

	PHEV with Fuel Cost -75%					
	Cost increases from:					
	$2,500 to $5,000		$5,000 to $10,000		$2,500 to $10,000	
	Δ Probability	% Change	Δ Probability	% Change	Δ Probability	% Change
All Households	-16.3 (0.41)	-35.6%	-15.8 (0.39)	-53.6%	-32.0 (0.60)	-69.9%
Age						
18 -34	-15.3 (1.01)	-30.5%	-18.4 (1.08)	-52.9%	-33.7 (1.57)	-67.1%
35 - 44	-16.0 (0.90)	-31.1%	-19.2 (1.00)	-54.4%	-35.2 (1.45)	-68.5%
45-54	-19.5 (0.87)	-36.5%	-18.2 (0.77)	-53.8%	-37.9 (1.21)	-71.0%
55-64	-17.4 (0.90)	-37.1%	-14.8 (0.80)	-49.8%	-32.3 (1.26)	-68.9%
65 or older	-13.4 (0.89)	-45.7%	-9.4 (0.72)	-59.9%	-22.9 (1.19)	-78.2%
Income						
Bottom fifth	-11.5 (1.21)	-39.8%	-8.7 (0.96)	-50.6%	-20.3 (1.65)	-70.2%
Second fifth	-15.8 (1.12)	-38.8%	-12.4 (0.90)	-49.8%	-28.3 (1.52)	-69.5%
Middle fifth	-17.5 (0.85)	-36.2%	-18.1 (0.88)	-58.8%	-35.5 (1.24)	-73.5%
Fourth fifth	-18.4 (0.81)	-36.1%	-18.7 (0.83)	-57.2%	-37.1 (1.22)	-72.7%
Top fifth	-17.4 (0.81)	-31.0%	-19.4 (0.83)	-49.7%	-36.8 (1.25)	-65.5%
Education						
High School or less	-14.5 (0.80)	-39.6%	-12.0 (0.67)	-54.3%	-26.5 (1.11)	-72.4%
Some College	-15.8 (0.91)	-35.6%	-15.2 (0.85)	-53.1%	-31.1 (1.32)	-70.0%
College degree	-17.8 (0.72)	-34.6%	-18.2 (0.73)	-54.3%	-36.2 (1.10)	-70.4%
Graduate school	-17.7 (0.84)	-32.2%	-19.6 (0.88)	-52.3%	-37.3 (1.23)	-67.8%
Gender						
Male	-17.9 (0.63)	-37.6%	-16.1 (0.56)	-54.0%	-34.1 (0.91)	-71.6%
Female	-14.9 (0.53)	-33.7%	-15.5 (0.53)	-53.1%	-30.5 (0.79)	-69.0%
Home Ownership						
Own	-16.9 (0.44)	-36.1%	-16.1 (0.42)	-53.8%	-33.0 (0.64)	-70.5%
Rent	-13.2 (1.04)	-32.6%	-14.5 (1.04)	-53.3%	-27.8 (1.59)	-68.6%
Region						
West	-15.2 (0.90)	-31.4%	-16.5 (0.91)	-50.0%	-32.0 (1.33)	-66.1%
North Central	-15.8 (0.78)	-35.6%	-15.8 (0.76)	-55.4%	-31.7 (1.15)	-71.4%
Northeast	-18.2 (0.97)	-37.8%	-16.9 (0.86)	-56.3%	-35.0 (1.39)	-72.8%
South	-16.3 (0.69)	-37.0%	-14.8 (0.65)	-53.2%	-31.1 (1.02)	-70.7%
Metropolitan Status						
City center	-17.2 (0.82)	-36.2%	-15.6 (0.70)	-51.1%	-32.9 (1.12)	-69.3%
In country of city cntr	-14.8 (0.80)	-34.0%	-15.4 (0.86)	-53.7%	-30.8 (1.25)	-70.8%
Suburban county	-17.9 (0.84)	-36.8%	-16.9 (0.78)	-54.9%	-34.9 (1.23)	-71.8%
MSA with no city cntr	-14.6 (1.83)	-32.2%	-14.0 (1.73)	-45.5%	-28.6 (2.77)	-63.0%
Not in MSA	-15.2 (0.87)	-35.8%	-15.4 (0.87)	-56.4%	-30.6 (1.30)	-72.0%

Table 3c
Change in PHEV Purchase Probabilities as Premiums Change by Charging Characteristics
(Standard errors of estimates in parentheses)

	PHEV with Fuel Cost -75%					
	Cost increases from:					
	$2,500 to $5,000		$5,000 to $10,000		$2,500 to $10,000	
	Δ Probability	%Change	Δ Probability	%Change	Δ Probability	%Change
All Households	-16.3 (0.41)	-35.6%	-15.8 (0.39)	-53.6%	-32.0 (0.60)	-69.9%
Location Regularly Park						
Attached garage	-17.2 (0.66)	-34.9%	-16.8 (0.65)	-52.5%	-34.1 (0.98)	-69.2%
Unattached garage	-15.6 (1.44)	-35.9%	-14.3 (1.29)	-51.3%	-29.8 (1.98)	-68.5%
Carport	-14.0 (1.36)	-38.4%	-13.5 (1.31)	-59.7%	-27.5 (2.04)	-75.3%
Driveway	-16.3 (0.65)	-35.5%	-16.1 (0.64)	-54.2%	-32.5 (0.96)	-70.8%
Street/lot/structure	-16.9 (1.66)	-37.0%	-14.9 (1.32)	-51.7%	-32.0 (2.25)	-70.0%
Have Available Outlet to Recharge PHEV						
Yes	-17.1 (0.46)	-34.8%	-17.3 (0.46)	-53.9%	-34.5 (0.68)	-70.1%
No	-13.9 (0.90)	-40.2%	-11.0 (0.69)	-53.1%	-24.9 (1.25)	-72.0%
Recharge after 9PM if Offered Discount						
Always	-18.5 (0.74)	-37.0%	-17.8 (0.69)	-56.3%	-36.3 (1.05)	-72.6%
Most of the time	-18.0 (0.61)	-33.8%	-18.5 (0.62)	-52.4%	-36.6 (0.92)	-68.7%
Some of the time	-15.9 (1.58)	-33.1%	-14.5 (1.33)	-45.3%	-30.4 (2.13)	-63.3%
No impact when charge	-10.5 (0.92)	-39.0%	-9.0 (0.79)	-54.9%	-19.5 (1.27)	-72.5%
Want to Avoid Gas Stations by Recharging PHEV at Home						
Very important	-18.5 (0.52)	-35.2%	-18.2 (0.50)	-53.4%	-36.7 (0.73)	-69.8%
Somewhat important	-15.0 (0.79)	-37.0%	-13.6 (0.71)	-53.5%	-28.8 (1.15)	-71.1%
Not very important	-9.2 (1.59)	-39.3%	-8.7 (1.47)	-61.3%	-18.1 (2.45)	-77.0%
Not at all important	-2.8 (1.12)	-35.0%	-2.3 (0.75)	-46.0%	-5.0 (1.54)	-62.5%
Minimum All-Electric Range for Work and Daily Errands						
Less than 20 miles	-13.3 (1.13)	-35.3%	-12.6 (1.11)	-51.6%	-25.9 (1.76)	-68.7%
20 - 39 miles	-18.1 (0.89)	-34.3%	-18.2 (0.82)	-52.6%	-36.5 (1.23)	-69.3%
40 - 59 miles	-17.8 (0.77)	-32.5%	-18.9 (0.79)	-51.1%	-36.8 (1.11)	-67.2%
60 - 79 miles	-21.6 (1.17)	-38.9%	-19.4 (1.09)	-57.2%	-40.9 (1.59)	-73.7%
80 miles or more	-14.0 (0.88)	-39.9%	-12.1 (0.78)	-57.1%	-26.2 (1.28)	-74.6%

Table 3d
Change in PHEV Purchase Probabilities as Premiums Change by Environmental Attitudes
(Standard errors of estimates in parentheses)

	PHEV with Fuel Cost -75%					
	Cost increases from:					
	$2,500 to $5,000		$5,000 to $10,000		$2,500 to $10,000	
	Δ Probability	%Change	Δ Probability	%Change	Δ Probability	%Change
All Households	-16.3 (0.41)	-35.6%	-15.8 (0.39)	-53.6%	-32.0 (0.60)	-69.9%
Monthly Trips to Gas Station						
One	-12.9 (1.10)	-35.1%	-14.0 (1.22)	-58.8%	-26.9 (1.85)	-73.3%
Two	-17.0 (0.92)	-37.9%	-15.9 (0.88)	-57.0%	-32.9 (1.33)	-73.4%
Three	-13.9 (0.94)	-30.3%	-15.8 (0.97)	-49.5%	-29.7 (1.47)	-64.8%
Four	-18.2 (0.81)	-38.2%	-15.6 (0.70)	-53.1%	-34.0 (1.13)	-71.3%
Five or more	-16.6 (0.82)	-34.1%	-16.9 (0.80)	-52.3%	-33.5 (1.19)	-68.8%
Main Advantage of Hybrid						
Reduce money spent on fuel	-16.8 (0.73)	-36.0%	-17.2 (0.74)	-57.5%	-34.0 (1.11)	-72.8%
Reduce emissions	-15.7 (1.03)	-31.2%	-16.3 (1.00)	-46.7%	-32.1 (1.54)	-63.7%
Reduce dependence on foreign oil	-16.4 (0.57)	-36.8%	-15.1 (0.52)	-53.5%	-31.5 (0.81)	-70.6%
Show Commitment by Buying Environmental Friendly Products						
Very important	-18.6 (0.64)	-35.2%	-18.1 (0.59)	-52.6%	-36.8 (0.89)	-69.6%
Somewhat important	-15.7 (0.62)	-36.5%	-14.7 (0.61)	-53.8%	-30.5 (0.93)	-70.9%
Not very important	-13.8 (1.14)	-35.0%	-14.7 (1.11)	-57.4%	-28.5 (1.86)	-72.3%
Not at all important	-6.2 (1.19)	-36.7%	-6.5 (1.16)	-59.6%	-12.7 (2.01)	-75.1%
Buy Compact Fluorescent Bulbs						
All the time	-16.5 (0.88)	-32.9%	-17.2 (0.92)	-51.2%	-33.8 (1.30)	-67.5%
Most of the time	-16.9 (0.85)	-33.6%	-16.9 (0.80)	-50.6%	-33.8 (1.21)	-67.2%
Some of the time	-17.1 (0.76)	-36.9%	-15.6 (0.66)	-53.4%	-32.7 (1.08)	-70.6%
Never	-15.1 (0.82)	-40.2%	-13.9 (0.79)	-61.8%	-29.0 (1.25)	-77.1%
Want to be 1st to Own New Technology						
Strongly agree	-12.6 (1.38)	-26.3%	-18.3 (1.83)	-51.7%	-30.9 (2.47)	-64.4%
Agree	-16.9 (0.74)	-33.9%	-16.4 (0.65)	-49.7%	-33.4 (1.03)	-66.9%
Disagree	-16.6 (0.60)	-37.4%	-15.3 (0.58)	-55.0%	-32.1 (0.89)	-72.3%
Strongly disagree	-15.4 (1.07)	-40.8%	-14.3 (1.03)	-64.1%	-29.7 (1.62)	-78.8%

Table 4
Median Payback Periods in Years for Hybrid Vehicles
Based on Current Monthly Gasoline Expenditures

	HEV	PHEV		
	Fuel: -25%	Fuel -75% and Vehicle Cost of:		
	Veh: +$1,500	+$2,500	+$5,000	+$10,000
At Current Gas Prices with Discount Rate of:				
0%	3.5	2.0	3.9	7.6
3%	3.7	2.0	4.1	8.5
5%	3.8	2.1	4.2	9.3
10%	4.1	2.2	4.7	12.9
At 5 Year Gas Price Expectations with Discount Rate of:				
0%	3.0	1.7	3.3	6.4
3%	3.1	1.7	3.4	7.1
5%	3.2	1.8	3.6	7.7
10%	3.4	1.8	3.9	9.7

Table 4a
Median Years Pay Back Periods in Years for Hybrid Vehicles by Demographic Subgroup
Five Year Gas Price Expectations; 3% Discount Rate

	HEV	PHEV		
	Fuel: -25%	Fuel -75% and Vehicle Cost of:		
	Veh: +$1,500	+$2,500	+$5,000	+$10,000
All Households	3.08	1.74	3.43	7.10
Age				
18 - 34	2.82	1.58	3.14	6.46
35 - 44	2.51	1.43	2.77	5.62
45 - 54	2.53	1.44	2.81	5.75
55 - 64	3.43	1.93	3.85	8.06
65 and older	5.61	3.07	6.29	13.79
Income				
Bottom fifth	4.69	2.62	5.32	11.27
Second fifth	3.59	1.99	3.99	8.31
Middle fifth	3.08	1.74	3.46	7.12
Fourth fifth	2.71	1.50	2.99	6.14
Top fifth	2.63	1.46	2.90	6.00
Education				
High School or less	3.34	1.89	3.73	7.77
Some College	3.42	1.91	3.76	7.93
College degree	2.89	1.63	3.20	6.59
Graduate school	2.92	1.65	3.26	6.72
Gender				
Male	2.86	1.62	3.20	6.60
Female	3.37	1.88	3.72	7.77
Home Ownership				
Own	3.01	1.70	3.35	6.93
Rent	3.60	2.02	4.02	8.45
Metropolitan Status				
City center	3.38	1.90	3.75	7.86
In county of city center	3.03	1.71	3.38	7.07
Suburban county	2.98	1.68	3.31	6.89
MSA with no city center	2.64	1.48	2.95	5.98
Not in MSA	3.03	1.72	3.38	7.04
Region				
West	3.49	1.96	3.89	8.21
North Central	3.15	1.78	3.51	7.29
Northeast	2.96	1.68	3.29	6.85
South	2.96	1.66	3.30	6.82

Table 4b
Median Pay Back Periods in Years for Hybrid Vehicles by Vehicle Characteristics

	HEV	PHEV		
	Fuel: -25%	Fuel -75% and Vehicle Cost of:		
	Veh: +$1,500	+$2,500	+$5,000	+$10,000
Type of Vehicle				
Car	3.75	2.10	4.19	8.78
Pickup	2.44	1.38	2.68	5.46
Van	2.61	1.48	2.89	5.90
SUV	2.64	1.48	2.93	6.01
Purchased New or Used				
New	3.07	1.73	3.42	7.08
Used	3.08	1.74	3.43	7.13
Age of Vehicle				
0 - 2 years	2.76	1.54	3.03	6.19
3 - 5 years	2.86	1.62	3.18	6.55
6 - 9 years	3.10	1.74	3.43	7.17
10 years or older	3.92	2.18	4.37	9.20
Average Miles per Day				
9 miles or less	6.16	3.36	6.94	15.00
10 - 19 miles	3.93	2.20	4.38	9.26
20 - 29 miles	3.21	1.80	3.62	7.42
30 - 49 miles	2.43	1.40	2.70	5.50
50 or more miles	1.75	1.02	1.94	3.88
Percent Highway Miles				
4% or less	4.64	2.57	5.15	11.11
5% - 19%	3.70	2.09	4.14	8.74
20% - 49%	2.92	1.65	3.21	6.70
50% - 74%	2.91	1.64	3.24	6.66
75% or more	2.37	1.36	2.65	5.35
Monthly Cost of Gas				
$80 or less	8.94	4.75	10.13	15.00
$81 - $130	4.41	2.42	4.92	10.47
$131- $190	2.99	1.67	3.32	6.89
$191 - $260	2.15	1.24	2.38	4.80
$261 or more	1.18	0.70	1.31	2.51
Monthly Trips to Gas Station				
One	12.02	6.18	13.60	15.00
Two	5.31	2.90	5.91	12.94
Three	3.28	1.82	3.61	7.49
Four	2.57	1.46	2.84	5.82
Five or more	1.49	0.88	1.66	3.27
Number of Vehicles Owned				
One	3.97	2.20	4.41	9.30
Two	2.95	1.66	3.29	6.80
Three or more	2.75	1.54	3.03	6.20

Table 5
Regression Models of Hybrid Vehicle Purchase Probabilities
(Standard Errors in Parentheses)

	HEV		PHEV			
	No Cost	Fuel: -25%	No Cost	Fuel -75% and Vehicle Cost of:		
	Data Given	Veh: +$1,500	Data Given	+$2,500	+$5,000	+$10,000
Years to Break Even	N/A	-0.010***	N/A	-0.012***	-0.007***	-0.004**
(Five Year Gas Price; 3% Discount Rate)		(0.002)		(0.003)	(0.002)	(0.001)
Current Gas Price	0.008	0.011	-0.007	-0.009	0.000	0.002
	(0.011)	(0.011)	(0.010)	(0.010)	(0.009)	(0.007)
Current Electric Price	0.001	-0.0004	-0.003	-0.005	-0.001	0.003
	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)
MPG of Vehicle	0.012***	0.013***	0.010***	0.011***	0.006**	0.003*
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)
Daily Miles Driven	0.000	-0.0001	-0.001	0.000004	-0.0001	0.0002
	(0.000)	(0.0004)	(0.000)	0.0004	0.0003	0.0002
Percent Highway Miles	-0.001***	-0.001***	-0.001*	-0.001***	-0.001*	-0.0004*
	(0.000)	(0.0003)	(0.000)	(0.0003)	(0.0003)	(0.0002)
Van	0.105***	0.073**	0.080**	0.105***	0.048	0.017
(Omitted=Car)	(0.029)	(0.028)	(0.029)	(0.029)	(0.026)	(0.019)
Pickup	0.058*	0.054	0.040	0.036	0.019	0.005
(Omitted=Car)	(0.029)	(0.028)	(0.029)	(0.028)	(0.025)	(0.019)
SUV	0.076**	0.067**	0.079***	0.070***	0.029	0.015
(Omitted=Car)	(0.023)	(0.022)	(0.022)	(0.021)	(0.019)	(0.016)
Used	0.007	-0.011	0.005	-0.009	-0.004	-0.013
(Omitted=New)	(0.018)	(0.017)	(0.017)	(0.016)	(0.015)	(0.011)
Age of Vehicle in Years	0.003	0.004	0.001	0.002	0.000	0.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)
Number of Vehicles	-0.016	-0.011	-0.002	0.004	0.009	0.016*
	(0.009)	(0.009)	(0.009)	(0.009)	(0.008)	(0.006)
Age of respondent in years	-0.002**	-0.001	0.000	-0.001	-0.002**	-0.001*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
If age of respondent > 60	-0.044	-0.053*	-0.081**	-0.065**	-0.046*	-0.021
	(0.027)	(0.026)	(0.026)	(0.025)	(0.022)	(0.018)
Household Income (ln)	0.040***	0.047***	0.020	0.032**	0.023*	0.000
	(0.012)	(0.012)	(0.011)	(0.012)	(0.010)	(0.009)
Education in Years	0.020***	0.017***	0.013**	0.014***	0.013***	0.007
	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)
Female	-0.003	0.004	-0.038*	-0.038*	-0.004	-0.001
(Omitted=Male)	(0.017)	(0.016)	(0.017)	(0.017)	(0.015)	(0.011)
West	0.038	0.044*	0.026	0.048*	0.044*	0.034*
(Omitted=North Central)	(0.023)	(0.022)	(0.022)	(0.022)	(0.020)	(0.015)

Table 5 (continued)
Regression Models of Hybrid Vehicle Purchase Probabilities
(Standard Errors in Parentheses)

	HEV		PHEV			
	No Cost	Fuel: -25%	No Cost	Fuel -75% and Vehicle Cost of:		
	Data Given	Veh: +$1,500	Data Given	+$2,500	+$5,000	+$10,000
Northeast	0.003	0.025	0.012	0.052	0.004	-0.022
(Omitted=North Central)	(0.032)	(0.030)	(0.030)	(0.029)	(0.026)	(0.021)
South	0.013	0.000	0.002	0.013	-0.004	0.000
(Omitted=North Central)	(0.019)	(0.018)	(0.019)	(0.019)	(0.017)	(0.012)
Urban	0.022	0.034	0.007	0.009	-0.001	0.005
(Omitted=Surburban)	(0.019)	(0.018)	(0.018)	(0.018)	(0.016)	(0.012)
Rural	0.006	0.045*	0.002	0.014	0.013	0.001
(Omitted=Surburban)	(0.020)	(0.019)	(0.020)	(0.019)	(0.017)	(0.013)
Have electrical outlet	0.032	0.054**	0.072***	0.077***	0.071***	0.026*
	(0.020)	(0.019)	(0.019)	(0.019)	(0.016)	(0.012)
Ignore Off-Peak Pricing	-0.056**	-0.062***	-0.085***	-0.094***	-0.051**	-0.012
	(0.020)	(0.019)	(0.019)	(0.018)	(0.016)	(0.012)
Avoid Gas Stations	0.058***	0.046**	0.105***	0.118***	0.079***	0.041***
	(0.017)	(0.017)	(0.017)	(0.017)	(0.014)	(0.010)
Min AER < 20 miles	-0.085***	-0.113***	-0.096***	-0.086***	-0.046*	-0.019
	(0.024)	(0.024)	(0.024)	(0.024)	(0.020)	(0.015)
Min AER > 60 miles	-0.063***	-0.071***	-0.103***	-0.085***	-0.084***	-0.060***
	(0.018)	(0.017)	(0.017)	(0.017)	(0.015)	(0.011)
Reduce Emissions	0.056*	0.055*	0.030	0.022	0.045*	0.067***
(Omitted=Reduce cost)	(0.025)	(0.024)	(0.025)	(0.024)	(0.023)	(0.019)
Reduce Dependence	0.015	0.012	0.007	-0.006	-0.002	0.013
(Omitted=Reduce cost)	(0.018)	(0.017)	(0.017)	(0.017)	(0.015)	(0.011)
Buy Green important	0.130***	0.108***	0.100***	0.084***	0.058***	0.029**
(Omitted=Neutral)	(0.017)	(0.016)	(0.016)	(0.016)	(0.014)	(0.010)
Buy Green not important	-0.164***	-0.160***	-0.106***	-0.140***	-0.090***	-0.049***
(Omitted=Neutral)	(0.034)	(0.033)	(0.032)	(0.030)	(0.022)	(0.014)
Always buy green bulbs	0.034	0.033	0.011	0.020	0.032	0.019
(Omitted=Sometimes)	(0.019)	(0.019)	(0.019)	(0.018)	(0.017)	(0.014)
Never buy green bulbs	-0.048*	-0.029	-0.050**	-0.040*	-0.030	-0.033*
(Omitted=Sometimes)	(0.020)	(0.019)	(0.019)	(0.019)	(0.016)	(0.011)
Early Adopter	0.022	-0.017	0.012	-0.023	0.026	0.023
(Omitted=Middle)	(0.034)	(0.034)	(0.034)	(0.033)	(0.030)	(0.024)
Late Adopter	-0.043	-0.045	-0.064**	-0.062**	-0.065***	-0.056***
(Omitted=Middle)	(0.023)	(0.023)	(0.022)	(0.021)	(0.017)	(0.012)
Intercept	-0.452	-0.4616**	-0.160	-0.217	-0.196	-0.039
	(0.147)	(0.150)	(0.145)	(0.148)	(0.125)	(0.106)
RSQD Adjusted	0.215	0.220	0.210	0.258	0.210	0.123

Note: Robust standard errors were calculated using a consistent estimate of the covariance matrix that allowed for heteroscedasticity.

Table 6
Purchase Probabilities for HEVs: No Mileage or Cost Data Given

	Purchase Probabilities						
	Zero	1%-33%	34%-66%	67%-99%	100%	Total	Cases
All Households	21	13	25	25	16	100%	2329
Age							
18 - 34	13	14	27	29	17	100%	311
35 - 44	13	13	28	30	16	100%	399
45 - 54	13	16	25	30	16	100%	519
55 - 64	21	15	22	24	18	100%	499
65 and older	40	13	21	14	12	100%	597
Income							
Bottom fifth	40	12	21	14	13	100%	291
Second fifth	29	12	18	24	17	100%	390
Middle fifth	16	14	29	26	15	100%	507
Fourth fifth	12	18	30	27	13	100%	490
Top fifth	11	13	24	34	18	100%	504
Education							
High School or less	32	13	26	16	13	100%	694
Some College	21	15	23	26	15	100%	471
College degree	14	15	26	30	15	100%	676
Graduate school	9	14	22	34	21	100%	480
Gender							
Male	20	15	26	26	13	100%	1024
Female	21	13	24	25	17	100%	1305
Home Ownership							
Own	20	14	25	26	15	100%	1974
Rent	24	12	23	23	18	100%	354
Metropolitan Status							
City center	19	12	23	28	18	100%	650
In county of city center	24	17	21	25	13	100%	525
Suburban county	18	11	28	25	18	100%	569
MSA with no city center	13	20	27	30	10	100%	88
Not in MSA	23	16	27	21	13	100%	497
Region							
West	21	13	20	27	19	100%	489
North Central	19	14	29	26	12	100%	613
Northeast	19	13	25	28	15	100%	433
South	22	16	24	23	15	100%	794

The question was: On a scale of zero to one hundred, where zero means that you would definitely not buy and one hundred means you definitely would buy, what are the chances that you might buy a hybrid vehicle sometime in the future?

Table 6 (continued)
Purchase Probabilities for HEVs: No Mileage or Cost Data Given

	Purchase Probabilities						
	Zero	1%-33%	34%-66%	67%-99%	100%	Total	Cases
Type of Vehicle							
Car	21	15	24	24	16	100%	1283
Pickup	28	15	25	21	11	100%	329
Van	15	13	27	27	18	100%	193
SUV	18	12	25	30	15	100%	505
Purchased New or Used							
New	19	14	24	27	16	100%	1456
Used	23	14	25	23	15	100%	850
Age of Vehicle							
0 - 2 years	17	15	24	26	18	100%	504
3 - 5 years	16	16	27	27	14	100%	598
6 - 9 years	18	11	27	27	17	100%	608
10 years or older	30	15	21	20	14	100%	602
Average Miles per Day							
9 miles or less	29	15	19	23	14	100%	433
10-19 miles	21	12	24	26	17	100%	513
20-29 miles	19	16	24	27	14	100%	491
30-49 miles	15	11	30	27	17	100%	425
50 or more miles	17	17	26	24	16	100%	458
Percent Highway Miles							
4% or less	31	13	19	21	16	100%	411
5% - 19%	21	14	24	25	16	100%	475
20% - 49%	14	14	26	31	15	100%	440
50% - 74%	17	15	26	25	17	100%	464
75% or more	20	15	28	24	13	100%	529
Monthly Cost of Gas							
$80 or less	30	14	23	19	14	100%	566
$81 - $130	21	14	20	28	17	100%	452
$131- $190	18	14	26	30	12	100%	452
$191 - $260	14	13	30	23	20	100%	411
$261 or more	17	15	26	27	15	100%	416
Monthly Trips to Gas Station							
One	34	13	19	20	14	100%	268
Two	22	14	25	25	14	100%	513
Three	21	12	22	30	15	100%	345
Four	18	13	28	23	18	100%	636
Five or more	16	17	25	27	15	100%	545
Number of Vehicles Owned							
One	27	13	21	23	16	100%	715
Two	19	13	24	27	17	100%	927
Three or more	17	16	28	26	13	100%	685

Table 7
Purchase Probabilities for HEVs: 25% Fuel Savings and $1,500 Premium

	Purchase Probabilities						
	Zero	1%-33%	34%-66%	67%-99%	100%	Total	Cases
All Households	18	13	25	29	15	100%	2327
Age							
18 - 34	13	13	28	32	14	100%	311
35 - 44	11	13	26	34	16	100%	397
45 - 54	10	12	26	36	16	100%	520
55 - 64	18	12	24	27	19	100%	500
65 and older	37	14	22	16	11	100%	595
Income							
Bottom fifth	39	12	22	16	11	100%	285
Second fifth	24	11	21	28	16	100%	394
Middle fifth	13	15	31	27	14	100%	505
Fourth fifth	11	13	30	32	14	100%	491
Top fifth	10	12	20	40	18	100%	504
Education							
High School or less	29	12	26	20	13	100%	694
Some College	18	14	26	27	15	100%	469
College degree	13	13	25	35	14	100%	676
Graduate school	9	11	23	38	19	100%	481
Gender							
Male	18	13	25	32	12	100%	1026
Female	18	13	25	27	17	100%	1301
Home Ownership							
Own	17	13	25	30	15	100%	1971
Rent	23	12	24	25	16	100%	355
Metropolitan Status							
City center	16	12	24	31	17	100%	651
In county of city center	20	15	24	27	14	100%	526
Suburban county	18	10	25	31	16	100%	567
MSA with no city center	17	18	29	30	6	100%	88
Not in MSA	20	14	27	26	13	100%	495
Region							
West	19	11	21	29	20	100%	489
North Central	17	14	27	30	12	100%	611
Northeast	17	11	25	31	16	100%	433
South	19	14	26	27	14	100%	794

The question was: If a hybrid vehicle reduced total fuel costs by twenty-five percent and the vehicle itself costs one thousand five hundred dollars more than an ordinary vehicle, what are the chances that you might buy a hybrid vehicle, using the same scale ranging from zero to one hundred, where zero means that you would definitely not buy and one hundred mean you definitely would buy sometime in the future?

Table 7 (continued)
Purchase Probabilities for HEVs: 25% Fuel Savings and $1,500 Premium

	Purchase Probabilities						
	Zero	1%-33%	34%-66%	67%-99%	100%	Total	Cases
Type of Vehicle							
Car	18	13	25	29	15	100%	1281
Pickup	23	15	25	27	10	100%	331
Van	16	10	25	33	16	100%	193
SUV	16	11	26	29	18	100%	504
Purchased New or Used							
New	16	12	25	31	16	100%	1454
Used	22	14	25	26	13	100%	850
Age of Vehicle							
0 - 2 years	14	12	27	30	17	100%	506
3 - 5 years	15	14	27	29	15	100%	600
6 - 9 years	16	13	25	30	16	100%	607
10 years or older	26	13	23	26	12	100%	597
Average Miles per Day							
9 miles or less	27	14	23	23	13	100%	432
10-19 miles	18	10	28	28	16	100%	511
20-29 miles	20	14	23	29	14	100%	491
30-49 miles	10	15	26	32	17	100%	426
50 or more miles	15	12	27	31	15	100%	458
Percent Highway Miles							
4% or less	29	13	21	24	13	100%	408
5% - 19%	16	13	25	28	18	100%	476
20% - 49%	15	14	24	33	14	100%	441
50% - 74%	15	11	27	31	16	100%	462
75% or more	17	13	28	28	14	100%	530
Monthly Cost of Gas							
$80 or less	28	15	21	22	14	100%	567
$81 - $130	19	12	23	32	14	100%	453
$131- $190	15	13	26	32	14	100%	448
$191 - $260	13	10	29	31	17	100%	412
$261 or more	13	14	26	32	15	100%	418
Monthly Trips to Gas Station							
One	32	14	20	19	15	100%	268
Two	21	13	23	28	15	100%	515
Three	17	12	23	34	14	100%	344
Four	15	12	28	28	17	100%	633
Five or more	13	14	27	32	14	100%	545
Number of Vehicles Owned							
One	25	14	23	22	16	100%	714
Two	17	11	24	32	16	100%	925
Three or more	14	14	28	31	13	100%	686

Table 8
Purchase Probabilities for PHEVs: No Mileage or Cost Data Given

	Purchase Probabilities						
	Zero	1%-33%	34%-66%	67%-99%	100%	Total	Cases
All Households	25	19	27	20	9	100%	2336
Age							
18 - 34	20	21	31	21	7	100%	311
35 - 44	19	18	30	25	8	100%	397
45 - 54	16	22	30	22	10	100%	522
55 - 64	23	19	28	19	11	100%	503
65 and older	44	17	20	11	8	100%	599
Income							
Bottom fifth	44	15	21	10	10	100%	290
Second fifth	35	15	26	14	10	100%	394
Middle fifth	20	20	30	20	10	100%	508
Fourth fifth	16	23	29	25	7	100%	491
Top fifth	14	21	30	26	9	100%	504
Education							
High School or less	35	19	26	11	9	100%	700
Some College	27	18	26	21	8	100%	471
College degree	20	22	25	24	9	100%	678
Graduate school	12	19	33	26	10	100%	480
Gender							
Male	23	20	26	22	9	100%	1029
Female	26	19	28	18	9	100%	1307
Home Ownership							
Own	23	20	28	20	9	100%	1979
Rent	31	17	25	16	11	100%	358
Metropolitan Status							
City center	23	19	27	21	10	100%	653
In county of city center	27	21	25	19	8	100%	527
Suburban county	24	18	27	20	11	100%	568
MSA with no city center	23	21	31	22	3	100%	88
Not in MSA	28	19	28	18	7	100%	500
Region							
West	24	17	27	18	14	100%	490
North Central	26	19	27	19	9	100%	615
Northeast	22	20	29	23	6	100%	433
South	26	21	27	18	8	100%	798

The question was: On a scale of zero to one hundred, where zero means that you would definitely not buy and one hundred means you definitely would buy, what are the chances that you might buy a plug-in hybrid vehicle sometime in the future?

Table 8 (continued)
Purchase Probabilities for PHEVs: No Mileage or Cost Data Given

	Purchase Probabilities						
	Zero	1%-33%	34%-66%	67%-99%	100%	Total	Cases
Type of Vehicle							
Car	26	20	25	19	10	100%	1288
Pickup	29	22	26	17	6	100%	331
Van	20	16	33	22	9	100%	193
SUV	19	18	32	22	9	100%	505
Purchased New or Used							
New	22	20	27	22	9	100%	1458
Used	29	19	27	16	9	100%	855
Age of Vehicle							
0 - 2 years	21	20	25	25	9	100%	504
3 - 5 years	21	19	31	20	9	100%	603
6 - 9 years	22	20	30	18	10	100%	610
10 years or older	34	19	23	16	8	100%	603
Average Miles per Day							
9 miles or less	33	18	24	16	9	100%	434
10-19 miles	24	17	31	17	11	100%	515
20-29 miles	25	22	25	19	9	100%	494
30-49 miles	20	18	29	25	8	100%	426
50 or more miles	24	21	27	22	6	100%	458
Percent Highway Miles							
4% or less	35	17	23	16	9	100%	411
5% - 19%	25	19	28	17	11	100%	478
20% - 49%	18	22	31	20	9	100%	442
50% - 74%	19	21	26	24	10	100%	464
75% or more	27	18	27	21	7	100%	531
Monthly Cost of Gas							
$80 or less	36	16	22	16	10	100%	570
$81 - $130	23	21	27	17	12	100%	451
$131- $190	21	21	26	24	8	100%	454
$191 - $260	18	22	29	22	9	100%	411
$261 or more	22	18	32	21	7	100%	418
Monthly Trips to Gas Station							
One	40	15	21	15	9	100%	269
Two	25	21	25	19	10	100%	516
Three	25	17	25	22	11	100%	345
Four	21	23	27	20	9	100%	638
Five or more	22	18	32	21	7	100%	546
Number of Vehicles Owned							
One	32	19	24	15	10	100%	720
Two	23	19	27	22	9	100%	928
Three or more	21	20	31	20	8	100%	686

Table 9
Purchase Probabilities for PHEVs: 75% Fuel Savings and $2,500 Premium

	Purchase Probabilities						
	Zero	1%-33%	34%-66%	67%-99%	100%	Total	Cases
All Households	23	16	26	25	10	100%	2334
Age							
18 - 34	17	16	29	29	9	100%	311
35 - 44	17	14	28	31	10	100%	396
45 - 54	13	18	28	29	12	100%	523
55 - 64	22	16	27	24	11	100%	502
65 and older	43	18	20	13	6	100%	598
Income							
Bottom fifth	44	19	18	11	8	100%	390
Second fifth	32	14	21	24	9	100%	395
Middle fifth	17	19	29	25	10	100%	507
Fourth fifth	14	16	31	30	9	100%	490
Top fifth	12	14	28	35	11	100%	503
Education							
High School or less	34	16	26	16	8	100%	699
Some College	24	18	23	26	9	100%	470
College degree	17	16	25	31	11	100%	678
Graduate school	12	15	31	31	11	100%	480
Gender							
Male	21	15	27	28	9	100%	1028
Female	25	17	25	23	10	100%	1306
Home Ownership							
Own	21	17	26	26	10	100%	1976
Rent	32	16	23	19	10	100%	357
Metropolitan Status							
City center	21	17	25	26	11	100%	653
In county of city center	24	19	25	24	8	100%	526
Suburban county	22	13	27	27	11	100%	568
MSA with no city center	22	17	31	23	7	100%	88
Not in MSA	26	17	25	23	9	100%	499
Region							
West	22	16	24	24	14	100%	491
North Central	24	16	27	25	8	100%	615
Northeast	19	17	29	26	9	100%	431
South	25	17	24	25	9	100%	797

The question was: If a plug-in hybrid reduced total fuel costs by seventy-five percent and cost two thousand five hundred dollars more than an ordinary vehicle, what are the chances you might buy the plug-in hybrid, using the scale ranging from zero to one hundred, where zero means that you would definitely not buy and one hundred means you definitely would buy?

Table 9 (continued)
Purchase Probabilities for PHEVs: 75% Fuel Savings and $2,500 Premium

	Purchase Probabilities						
	Zero	1%-33%	34%-66%	67%-99%	100%	Total	Cases
Type of Vehicle							
Car	25	18	23	24	10	100%	1286
Pickup	26	19	28	20	7	100%	331
Van	19	11	27	34	9	100%	193
SUV	18	13	32	27	10	100%	505
Purchased New or Used							
New	20	17	27	26	10	100%	1457
Used	27	16	25	23	9	100%	853
Age of Vehicle							
0 - 2 years	17	16	25	32	10	100%	504
3 - 5 years	20	16	28	26	10	100%	601
6 - 9 years	20	16	28	25	11	100%	611
10 years or older	31	18	23	20	8	100%	601
Average Miles per Day							
9 miles or less	33	19	18	21	9	100%	435
10-19 miles	22	16	29	22	11	100%	514
20-29 miles	24	17	25	22	12	100%	495
30-49 miles	15	17	28	30	10	100%	424
50 or more miles	20	12	29	31	8	100%	457
Percent Highway Miles							
4% or less	33	17	22	18	10	100%	435
5% - 19%	24	16	24	24	12	100%	477
20% - 49%	17	17	30	27	9	100%	442
50% - 74%	18	19	26	26	11	100%	465
75% or more	23	14	27	29	7	100%	529
Monthly Cost of Gas							
$80 or less	36	15	20	19	10	100%	571
$81 - $130	20	20	26	22	12	100%	452
$131- $190	20	19	26	28	7	100%	450
$191 - $260	16	16	26	30	12	100%	412
$261 or more	18	13	33	28	8	100%	418
Monthly Trips to Gas Station							
One	38	15	19	18	10	100%	270
Two	25	17	23	24	11	100%	515
Three	24	16	23	27	10	100%	345
Four	18	19	28	26	9	100%	636
Five or more	18	15	30	28	9	100%	546
Number of Vehicles Owned							
One	32	19	22	18	9	100%	719
Two	21	15	26	28	10	100%	928
Three or more	18	16	29	27	10	100%	685

Table 10
Purchase Probabilities for PHEVs: 75% Fuel Savings and $5,000 Premium

	Purchase Probabilities						
	Zero	1%-33%	34%-66%	67%-99%	100%	Total	Cases
All Households	33	27	26	11	3	100%	2330
Age							
18 - 34	24	27	32	15	2	100%	311
35 - 44	23	27	34	11	5	100%	399
45 - 54	23	34	26	14	3	100%	522
55 - 64	33	25	29	9	4	100%	501
65 and older	58	22	14	3	3	100%	593
Income							
Bottom fifth	56	24	13	3	4	100%	286
Second fifth	43	24	22	8	3	100%	395
Middle fifth	30	28	28	10	4	100%	507
Fourth fifth	23	32	31	12	2	100%	491
Top fifth	18	27	34	17	4	100%	504
Education							
High School or less	45	25	21	6	3	100%	698
Some College	35	26	26	10	3	100%	470
College degree	26	29	29	13	3	100%	675
Graduate school	20	29	32	14	5	100%	480
Gender							
Male	31	27	28	11	3	100%	1026
Female	34	27	25	10	4	100%	1304
Home Ownership							
Own	32	27	27	11	3	100%	1974
Rent	39	25	23	8	5	100%	355
Metropolitan Status							
City center	31	26	29	10	4	100%	653
In county of city center	34	29	23	10	4	100%	523
Suburban county	30	27	29	11	3	100%	569
MSA with no city center	31	32	20	15	2	100%	88
Not in MSA	38	26	23	10	3	100%	497
Region							
West	31	23	28	12	6	100%	489
North Central	34	28	25	11	2	100%	613
Northeast	28	31	29	9	3	100%	432
South	36	27	25	9	3	100%	796

The question was: What if a plug-in hybrid that reduced total fuel costs by seventy-five percent cost five thousand dollars more than an ordinary vehicle, what are the chances you might buy the plug-in hybrid, using the scale ranging from zero to one hundred, where zero means that you would definitely not buy and one hundred means you definitely would buy?

Table 10 (continued)
Purchase Probabilities for PHEVs: 75% Fuel Savings and $5,000 Premium

	Purchase Probabilities						
	Zero	1%-33%	34%-66%	67%-99%	100%	Total	Cases
Type of Vehicle							
Car	34	27	26	10	3	100%	1285
Pickup	39	26	24	10	1	100%	330
Van	29	27	27	14	3	100%	193
SUV	27	27	30	12	4	100%	503
Purchased New or Used							
New	30	27	28	11	4	100%	1456
Used	37	27	24	9	3	100%	850
Age of Vehicle							
0 - 2 years	25	28	32	11	4	100%	505
3 - 5 years	31	27	26	12	4	100%	602
6 - 9 years	31	29	26	11	3	100%	608
10 years or older	42	25	22	8	3	100%	598
Average Miles per Day							
9 miles or less	41	27	19	11	2	100%	432
10-19 miles	33	30	26	7	4	100%	513
20-29 miles	35	25	26	10	4	100%	493
30-49 miles	28	27	30	12	3	100%	425
50 or more miles	28	27	30	12	3	100%	458
Percent Highway Miles							
4% or less	42	27	20	8	3	100%	410
5% - 19%	34	26	26	9	5	100%	478
20% - 49%	26	31	28	12	3	100%	439
50% - 74%	29	27	29	12	3	100%	464
75% or more	33	25	29	11	2	100%	530
Monthly Cost of Gas							
$80 or less	47	21	21	8	3	100%	568
$81 - $130	32	29	26	9	4	100%	451
$131- $190	31	28	26	13	2	100%	450
$191 - $260	25	28	31	12	4	100%	412
$261 or more	26	31	29	11	3	100%	418
Monthly Trips to Gas Station							
One	46	20	23	8	3	100%	270
Two	38	25	24	9	4	100%	514
Three	31	27	27	11	4	100%	346
Four	29	32	26	11	2	100%	633
Five or more	27	28	30	12	3	100%	545
Number of Vehicles Owned							
One	43	27	20	7	3	100%	714
Two	31	26	29	11	3	100%	928
Three or more	27	29	28	12	4	100%	686

Table 11
Purchase Probabilities for PHEVs: 75% Fuel Savings and $10,000 Premium

	Purchase Probabilities						
	Zero	1%-33%	34%-66%	67%-99%	100%	Total	Cases
All Households	56	28	13	2	1	100%	2333
Age							
18 - 34	46	34	16	4	0	100%	311
35 - 44	45	37	15	2	1	100%	399
45 - 54	49	33	15	2	1	100%	521
55 - 64	58	23	14	3	2	100%	502
65 and older	77	15	6	1	1	100%	596
Income							
Bottom fifth	72	17	8	1	2	100%	287
Second fifth	62	22	12	3	1	100%	394
Middle fifth	57	28	12	2	1	100%	508
Fourth fifth	49	35	14	2	0	100%	490
Top fifth	41	37	16	4	2	100%	505
Education							
High School or less	67	21	9	2	1	100%	698
Some College	58	25	14	2	1	100%	471
College degree	49	34	14	2	1	100%	678
Graduate school	44	36	15	4	1	100%	479
Gender							
Male	55	29	13	2	1	100%	1027
Female	56	28	13	2	1	100%	1306
Home Ownership							
Own	55	29	13	2	1	100%	1976
Rent	61	24	12	2	1	100%	356
Metropolitan Status							
City center	50	33	14	2	1	100%	653
In county of city center	61	24	10	3	2	100%	525
Suburban county	54	31	12	2	1	100%	589
MSA with no city center	49	31	18	2	0	100%	88
Not in MSA	62	22	13	2	1	100%	498
Region							
West	52	28	15	3	2	100%	491
North Central	55	30	12	2	1	100%	612
Northeast	56	30	11	2	1	100%	434
South	58	27	12	2	1	100%	796

The question was: What if a plug-in hybrid that reduced total fuel costs by seventy-five percent cost ten thousand dollars more than an ordinary vehicle, what are the chances you might buy the plug-in hybrid, using the scale ranging from zero to one hundred, where zero means that you would definitely not buy and one hundred means you definitely would buy?

Table 11 (continued)
Purchase Probabilities for PHEVs: 75% Fuel Savings and $10,000 Premium

	Purchase Probabilities						
	Zero	1%-33%	34%-66%	67%-99%	100%	Total	Cases
Type of Vehicle							
Car	58	26	12	3	1	100%	1286
Pickup	61	26	11	1	1	100%	330
Van	49	32	15	3	1	100%	193
SUV	49	33	15	2	1	100%	505
Purchased New or Used							
New	55	29	13	2	1	100%	1457
Used	57	27	13	2	1	100%	852
Age of Vehicle							
0 - 2 years	51	32	14	2	1	100%	506
3 - 5 years	54	28	13	3	2	100%	601
6 - 9 years	54	31	13	1	1	100%	609
10 years or older	63	23	11	2	1	100%	600
Average Miles per Day							
9 miles or less	62	25	11	1	1	100%	435
10-19 miles	56	31	9	2	2	100%	513
20-29 miles	58	26	12	3	1	100%	493
30-49 miles	52	29	15	3	1	100%	426
50 or more miles	51	29	16	3	1	100%	457
Percent Highway Miles							
4% or less	65	24	9	1	1	100%	409
5% - 19%	57	28	12	1	2	100%	478
20% - 49%	45	36	15	3	1	100%	441
50% - 74%	53	26	17	3	1	100%	464
75% or more	58	28	10	3	1	100%	531
Monthly Cost of Gas							
$80 or less	68	21	9	1	1	100%	569
$81 - $130	55	30	10	3	2	100%	453
$131- $190	55	27	14	4	0	100%	451
$191 - $260	48	32	16	2	2	100%	412
$261 or more	48	33	16	2	1	100%	417
Monthly Trips to Gas Station							
One	68	19	12	1	0	100%	270
Two	60	27	9	2	2	100%	515
Three	52	29	15	3	1	100%	345
Four	54	31	11	3	1	100%	635
Five or more	50	30	17	2	1	100%	546
Number of Vehicles Owned							
One	65	23	9	2	1	100%	716
Two	54	29	14	2	1	100%	929
Three or more	50	31	15	3	1	100%	686

Table 12
Five Year Gas Price Expectations Among Demographic Subgroups

	Expected Price of Gasoline							
	$0.01-$3.299	$3.30-$3.919	$3.92-$4.499	$4.50-$5.339	$5.34 or more	Total	Cases	Mean
All Households	20	20	20	20	20	100%	2477	$ 4.352
Age								
18 - 34	20	21	20	21	18	100%	341	$ 4.316
35 - 44	21	19	22	21	17	100%	408	$ 4.335
45 - 54	17	18	20	23	22	100%	544	$ 4.466
55 - 64	17	18	20	23	22	100%	525	$ 4.501
65 and older	26	20	18	19	17	100%	655	$ 4.173
Income								
Bottom fifth	24	18	18	17	23	100%	376	$ 4.317
Second fifth	20	19	21	21	19	100%	416	$ 4.411
Middle fifth	20	22	19	21	18	100%	516	$ 4.298
Fourth fifth	16	21	20	20	23	100%	492	$ 4.455
Top fifth	20	21	21	20	18	100%	506	$ 4.332
Education								
High School or less	23	20	19	18	20	100%	783	$ 4.300
Some College	23	21	20	18	18	100%	494	$ 4.302
College degree	16	21	22	22	19	100%	700	$ 4.040
Graduate school	19	19	18	22	22	100%	489	$ 4.446
Gender								
Male	19	19	20	21	21	100%	1073	$ 4.421
Female	21	21	20	19	19	100%	1404	$ 4.296
Home Ownership								
Own	19	21	20	20	20	100%	2020	$ 4.374
Rent	25	19	20	17	19	100%	454	$ 4.269
Metropolitan Status								
City center	20	20	19	21	20	100%	724	$ 4.328
In county of city center	19	20	21	19	21	100%	536	$ 4.376
Suburban county	21	22	18	18	21	100%	594	$ 4.392
MSA with no city center	21	22	18	18	21	100%	95	$ 4.089
Not in MSA	19	20	20	21	20	100%	528	$ 4.362
Region								
West	20	21	20	18	21	100%	517	$ 4.367
North Central	18	18	23	20	21	100%	644	$ 4.411
Northeast	22	20	17	20	20	99%	476	$ 4.310
South	21	21	19	20	19	100%	840	$ 4.325

Table 12a
Five Year Gas Price Expectations Among Demographic Subgroups

	Expected Price of Gasoline							
	$0.01-$3.299	$3.30-$3.919	$3.92-$4.499	$4.50-$5.339	$5.34 or more	Total	Cases	Mean
Type of Vehicle								
Car	21	19	18	20	22	100%	1277	$ 4.376
Pickup	15	20	21	24	20	100%	326	$ 4.452
Van	20	20	23	17	20	100%	191	$ 4.395
SUV	21	24	21	19	15	100%	503	$ 4.242
Purchased New or Used								
New	20	22	20	19	19	100%	1444	$ 4.327
Used	19	19	19	22	21	100%	848	$ 4.409
Age of Vehicle								
0 - 2 years	18	23	20	19	20	100%	503	$ 4.394
3 - 5 years	20	20	19	21	20	100%	592	$ 4.368
6 - 9 years	22	23	19	18	18	100%	607	$ 4.247
10 years or older	19	18	20	22	21	100%	597	$ 4.427
Average Miles per Day								
9 miles or less	22	20	23	14	21	100%	425	$ 4.331
10-19 miles	21	22	20	21	16	100%	513	$ 4.273
20-29 miles	20	21	20	20	19	100%	490	$ 4.304
30-49 miles	19	21	18	24	18	100%	422	$ 4.343
50 or more miles	17	19	17	21	26	100%	456	$ 4.555
Percent Highway Miles								
4% or less	20	20	19	21	20	100%	406	$ 4.362
5% - 19%	21	22	21	20	16	100%	474	$ 4.266
20% - 49%	18	21	21	20	20	100%	437	$ 4.385
50% - 74%	22	19	20	21	18	100%	464	$ 4.263
75% or more	18	21	18	19	24	100%	525	$ 4.482
Monthly Cost of Gas								
$80 or less	23	22	21	18	16	100%	561	$ 4.216
$81 - $130	21	22	18	20	19	100%	452	$ 4.302
$131- $190	21	20	19	20	20	100%	448	$ 4.324
$191 - $260	18	22	19	21	20	100%	410	$ 4.389
$261 or more	14	18	20	21	27	100%	415	$ 4.579
Monthly Trips to Gas Station								
One	23	22	22	16	17	100%	265	$ 4.307
Two	19	25	18	20	18	100%	511	$ 4.281
Three	20	18	22	21	19	100%	340	$ 4.283
Four	21	21	19	21	18	100%	636	$ 4.292
Five or more	18	17	19	20	26	100%	544	$ 4.542
Number of Vehicles Owned								
One	30	15	22	12	21	100%	741	$ 4.274
Two	22	22	19	18	19	100%	938	$ 4.357
Three or more	21	20	20	19	20	100%	682	$ 4.448

Table 13
Monthly Expenditures on Gasoline Among Demographic Subgroups

	Monthly Expenditure on Gasoline								
	$1 - $80	$81 - $130	$131 - $190	$191 - $260	$261 or more	Total	Cases	Median	Mean
All Households	23	20	20	18	19	100%	2312	150.0	188.5
Age									
18 - 34	14	21	19	22	24	100%	308	177.8	216.9
35 - 44	11	16	22	23	28	100%	397	198.2	232.6
45 - 54	16	19	20	20	25	100%	518	168.4	217.5
55 - 64	28	22	19	17	14	100%	498	132.0	164.7
65 and older	46	21	18	8	7	100%	587	90.3	119.2
Income									
Bottom fifth	46	17	14	11	12	100%	285	93.3	137.1
Second fifth	24	26	22	11	17	100%	390	131.7	175.0
Middle fifth	21	20	23	17	19	100%	503	151.2	187.7
Fourth fifth	18	17	21	22	22	100%	490	164.7	202.9
Top fifth	13	18	18	27	24	100%	502	195.3	227.9
Education									
High School or less	27	19	19	16	19	100%	686	143.1	187.1
Some College	27	20	20	13	20	100%	467	139.5	180.6
College degree	19	20	21	21	19	100%	673	152.9	196.1
Graduate school	20	21	18	22	19	100%	478	158.3	187.4
Gender									
Male	20	20	18	19	23	100%	1016	159.2	208.8
Female	26	20	21	17	16	100%	1296	140.3	171.6
Home Ownership									
Own	23	19	20	18	20	100%	1960	150.5	192.0
Rent	29	21	17	17	16	100%	352	130.9	171.3
Metropolitan Status									
City center	25	22	20	17	16	100%	646	139.8	176.6
In county of city center	23	19	22	18	18	100%	523	152.1	181.8
Suburban county	20	22	20	17	21	100%	561	150.8	199.4
MSA with no city center	18	15	21	29	17	100%	87	173.8	202.3
Not in MSA	26	16	17	18	23	100%	495	156.6	196.0
Region									
West	28	22	19	16	15	100%	482	132.5	168.7
North Central	26	19	20	16	19	100%	609	142.9	185.9
Northeast	21	20	19	20	20	100%	433	157.9	189.0
South	20	18	21	19	22	100%	788	160.3	201.6

The questions were: In a typical month, how often do you usually get gasoline for the [MAKE/MODEL]?
In the past month, on average how much did you spend on gasoline each time you got gas for the [MAKE/MODEL]?

Table 13a
Monthly Expenditures on Gasoline Among Demographic Subgroups

	Monthly Expenditure on Gasoline								
	$1 - $80	$81 - $130	$131 - $190	$191 - $260	$261 or more	Total	Cases	Median	Mean
Type of Vehicle									
Car	30	24	19	16	11	100%	1275	120.1	152.8
Pickup	20	15	12	17	36	100%	328	200.6	251.6
Van	16	12	25	22	25	100%	192	178.3	223.3
SUV	13	16	24	22	25	100%	501	180.3	217.5
Purchased New or Used									
New	24	19	20	18	19	100%	1447	150.2	186.8
Used	23	20	20	17	20	100%	846	149.6	190.0
Age of Vehicle									
0 - 2 years	18	17	20	21	24	100%	501	175.4	206.0
3 - 5 years	18	19	23	21	19	100%	600	161.1	196.9
6 - 9 years	22	20	20	18	20	100%	610	150.2	192.6
10 years or older	34	21	17	13	15	100%	589	118.9	161.3
Average Miles per Day									
9 miles or less	54	25	10	6	5	100%	425	79.6	101.9
10 - 19 miles	32	24	24	13	7	100%	509	118.6	140.1
20 - 29 miles	20	24	27	19	10	100%	493	144.9	164.9
30 - 49 miles	9	17	21	28	25	100%	425	199.0	216.3
50 or more miles	5	8	15	23	49	100%	456	260.9	314.9
Percent Highway Miles									
4% or less	41	20	18	13	8	100%	402	101.4	131.3
5% - 19%	29	24	21	14	12	100%	473	121.3	154.0
20% - 49%	21	19	20	19	21	100%	441	158.4	201.6
50% - 74%	16	22	21	20	21	100%	461	161.6	201.0
75% or more	13	14	20	22	31	100%	530	199.8	242.2
Monthly Trips to Gas Station									
One	94	5	1	0	0	100%	268	44.4	47.3
Two	44	39	13	3	1	100%	515	91.0	97.8
Three	10	32	37	17	4	100%	345	147.3	149.4
Four	7	15	30	32	16	100%	638	180.8	196.2
Five or more	1	6	12	25	56	100%	546	296.1	340.7
Number of Vehicles Owned									
One	34	21	19	13	13	100%	713	119.2	153.7
Two	19	21	21	19	20	100%	922	159.7	195.8
Three or more	19	17	19	20	25	100%	675	162.9	210.6

Table 14
Average Daily Miles Driven Among Demographic Subgroups

	Average Miles Driven Per Day								
	9 miles or less	9 - 19 miles	20 - 29 miles	30 - 49 miles	50 miles or more	Total	Cases	Median	Mean
All Households	19	22	21	18	20	100%	2335	20.3	29.4
Age									
18 - 34	14	21	19	21	25	100%	310	24.8	33.2
35 - 44	12	18	22	21	27	100%	399	25.8	35.1
45 - 54	14	21	19	22	24	100%	520	24.8	34.0
55 - 64	21	23	21	17	18	100%	501	19.6	26.0
65 and older	30	26	23	11	10	100%	601	14.7	19.8
Income									
Bottom fifth	33	25	20	10	12	100%	290	13.4	20.2
Second fifth	21	24	21	17	17	100%	394	19.4	25.5
Middle fifth	17	23	23	20	17	100%	508	20.2	29.2
Fourth fifth	14	21	19	20	26	100%	491	25.0	33.8
Top fifth	11	17	21	23	28	100%	505	28.8	35.9
Education									
High School or less	22	22	20	16	20	100%	700	20.0	28.1
Some College	22	23	19	18	18	100%	469	19.6	28.0
College degree	15	22	22	18	23	100%	678	20.5	30.6
Graduate school	14	19	23	24	20	100%	480	24.7	31.2
Gender									
Male	13	20	22	19	26	100%	1026	25.0	34.6
Female	23	23	20	18	16	100%	1309	19.4	24.9
Home Ownership									
Own	18	21	21	19	21	100%	1979	20.4	29.9
Rent	22	23	21	16	18	100%	355	19.3	26.7
Metropolitan Status									
City center	20	25	21	16	18	100%	654	20.0	27.0
In county of city center	17	23	20	21	19	100%	526	21.9	29.1
Suburban county	14	21	22	19	24	100%	569	24.7	33.0
MSA with no city center	24	16	19	22	19	100%	87	20.9	29.4
Not in MSA	21	20	21	18	20	100%	499	19.8	28.6
Region									
West	25	22	19	16	18	100%	490	19.0	25.9
North Central	20	24	20	16	20	100%	613	20.0	28.3
Northeast	20	22	20	20	18	100%	436	20.3	28.9
South	13	21	23	20	23	100%	796	24.6	32.3

The question was: Approximately, how many miles do you typically drive the [MAKE/MODEL] in an average day, including going to and from work, doing errands, household tasks, or for any other reason?

Table 14a
Average Daily Miles Driven Among Demographic Subgroups

	Average Miles Driven Per Day								
	9 miles or less	9 - 19 miles	20 - 29 miles	30 - 49 miles	50 miles or more	Total	Cases	Median	Mean
Type of Vehicle									
Car	20	23	19	18	20	100%	1291	20.1	28.7
Pickup	18	19	18	18	27	100%	330	24.8	33.9
Van	18	23	22	17	20	100%	193	19.9	27.7
SUV	14	22	25	22	17	100%	505	23.1	28.5
Purchased New or Used									
New	18	21	21	18	22	100%	1461	20.5	30.3
Used	20	23	20	18	19	100%	854	20.2	28.2
Age of Vehicle									
0 - 2 years	11	18	22	20	29	100%	507	27.1	36.0
3 - 5 years	14	23	22	21	20	100%	602	20.5	30.7
6 - 9 years	21	21	22	19	17	100%	610	20.3	27.1
10 years or older	26	25	18	14	17	100%	603	17.9	25.4
Percent Highway Miles									
4% or less	33	32	19	9	7	100%	411	10.4	17.0
5% - 19%	23	29	26	15	7	100%	478	16.4	19.6
20% - 49%	17	21	24	20	18	100%	442	20.5	28.2
50% - 74%	13	19	19	24	25	100%	466	27.9	33.3
75% or more	8	11	17	23	41	100%	532	37.0	45.5
Monthly Cost of Gas									
$80 or less	42	29	18	7	4	100%	571	10.0	14.2
$81 - $130	23	27	26	16	8	100%	453	19.5	20.3
$131- $190	9	26	29	20	16	100%	454	20.3	26.9
$191 - $260	6	17	22	29	26	100%	413	30.0	34.5
$261 or more	5	8	11	23	53	100%	417	49.8	55.0
Monthly Trips to Gas Station									
One	58	25	12	2	3	100%	268	5.3	9.9
Two	26	32	25	13	4	100%	517	14.8	17.9
Three	16	26	29	18	11	100%	345	19.8	23.0
Four	8	22	22	27	21	100%	639	25.3	30.8
Five or more	7	10	15	21	47	100%	548	41.7	49.7
Number of Vehicles Owned									
One	24	25	22	15	14	100%	719	19.6	23.5
Two	18	21	20	21	20	100%	931	21.3	29.7
Three or more	14	20	21	19	26	100%	683	24.8	34.1

Table 15
Percent of Total Mileage Driven on Highways Among Demographic Subgroups

	Percent Highway Miles								
	4% or less	5% to 19%	20% to 49%	50% to 74%	75% or more	Total	Cases	Median	Mean
All Households	18	20	19	20	23	100%	2334	28.8	37.6
Age									
18 - 34	15	19	23	18	25	100%	311	33.9	39.9
35 - 44	18	18	17	22	25	100%	399	40.0	40.1
45 - 54	17	19	20	20	24	100%	523	30.7	39.1
55 - 64	16	22	18	21	23	100%	500	28.5	37.8
65 and older	25	23	16	17	19	100%	598	19.9	31.9
Income									
Bottom fifth	29	23	18	14	16	100%	291	15.1	28.4
Second fifth	21	25	20	16	18	100%	394	21.2	32.5
Middle fifth	17	19	18	20	26	100%	508	30.8	40.3
Fourth fifth	14	18	20	21	27	100%	491	41.2	42.0
Top fifth	11	18	20	25	26	100%	505	45.8	43.1
Education									
High School or less	24	20	15	18	23	100%	698	24.0	35.8
Some College	19	20	21	18	22	100%	469	25.0	36.2
College degree	15	21	21	19	24	100%	679	30.4	38.2
Graduate school	12	19	21	24	24	100%	481	39.2	41.0
Gender									
Male	12	18	19	23	28	100%	1025	49.1	43.4
Female	23	22	19	17	19	100%	1309	21.3	32.7
Home Ownership									
Own	18	18	19	21	24	100%	1974	30.8	39.0
Rent	21	29	19	15	16	100%	359	18.6	30.3
Metropolitan Status									
City center	19	22	20	22	17	100%	656	27.3	34.6
In county of city center	19	21	17	20	23	100%	528	28.7	37.1
Suburban county	16	18	22	19	25	100%	567	29.8	39.4
MSA with no city center	17	23	15	24	21	100%	87	32.3	37.0
Not in MSA	19	20	17	16	28	100%	496	29.1	39.8
Region									
West	18	21	17	22	22	100%	492	31.2	37.7
North Central	17	20	20	18	25	100%	613	29.3	38.4
Northeast	22	23	16	20	19	100%	436	22.1	33.3
South	17	18	21	19	25	100%	793	29.4	39.1

The question was: About what percent of the total miles that you drive the [MAKE/MODEL] are highway or freeway miles, on average?

Table 15a
Percent of Total Mileage Driven on Highways Among Demographic Subgroups

	Percent Highway Miles								
	4% or less	5% to 19%	20% to 49%	50% to 74%	75% or more	Total	Cases	Median	Mean
Type of Vehicle									
Car	19	21	18	20	22	100%	1293	27.6	36.7
Pickup	17	18	16	21	28	100%	327	41.2	41.7
Van	19	21	21	19	20	100%	193	25.8	35.2
SUV	17	19	22	18	24	100%	506	29.3	37.9
Purchased New or Used									
New	17	20	19	22	22	100%	1461	30.7	38.3
Used	20	21	19	16	24	100%	853	24.5	36.5
Age of Vehicle									
0 - 2 years	11	18	19	25	27	100%	507	46.1	43.9
3 - 5 years	17	20	19	19	25	100%	602	30.5	38.7
6 - 9 years	19	21	21	20	19	100%	611	24.4	34.5
10 years or older	24	22	16	16	22	100%	601	21.7	34.7
Average Miles per Day									
9 miles or less	33	25	18	14	10	100%	432	10.4	23.8
10 - 19 miles	26	27	18	17	12	100%	516	10.4	26.9
20 - 29 miles	17	26	21	18	18	100%	496	21.6	33.3
30 - 49 miles	9	17	20	26	28	100%	426	46.9	45.9
50 or more miles	7	6	17	24	46	100%	459	68.6	58.4
Monthly Cost of Gas									
$80 or less	31	25	17	14	13	100%	570	10.6	25.7
$81 - $130	19	24	19	21	17	100%	453	24.9	33.2
$131- $190	16	22	19	20	23	100%	454	29.0	37.9
$191 - $260	13	16	20	22	29	100%	412	45.4	43.4
$261 or more	8	13	21	21	37	100%	418	50.1	51.4
Monthly Trips to Gas Station									
One	35	25	16	12	12	100%	269	10.2	22.8
Two	28	23	19	16	14	100%	516	15.7	28.8
Three	16	26	19	21	18	100%	344	24.0	34.0
Four	13	20	19	22	26	100%	640	40.9	41.7
Five or more	9	13	21	21	36	100%	548	48.9	49.4
Number of Vehicles Owned									
One	23	25	19	16	17	100%	721	19.7	30.9
Two	16	19	20	21	24	100%	929	31.3	39.4
Three or more	17	17	19	21	26	100%	683	39.7	41.3

Table 16
Location Where Regularly Park Among Demographic Subgroups

	Location Where Regularly Park						
	Attached Garage	Unattached Garage	Carport	Driveway	Street, lot	Total	Cases
All Households	32	8	10	40	10	100%	2322
Age							
18 - 34	20	5	10	48	17	100%	308
35 - 44	34	8	5	46	7	100%	397
45 - 54	29	8	8	46	9	100%	521
55 - 64	35	9	12	37	7	100%	500
65 and older	39	11	17	25	8	100%	593
Income							
Bottom fifth	17	9	19	40	15	100%	290
Second fifth	25	8	11	45	11	100%	392
Middle fifth	29	8	13	41	9	100%	506
Fourth fifth	36	9	7	39	9	100%	487
Top fifth	45	8	3	38	6	100%	504
Education							
High School or less	21	9	14	45	11	100%	694
Some College	32	8	10	41	9	100%	470
College degree	38	7	8	39	8	100%	674
Graduate school	43	9	8	31	9	100%	477
Gender							
Male	29	9	9	41	12	100%	1023
Female	35	7	11	39	8	100%	1299
Home Ownership							
Own	36	9	10	39	6	100%	1964
Rent	14	4	13	45	24	100%	357
Metropolitan Status							
City center	34	8	9	36	13	100%	650
In county of city center	35	9	10	36	10	100%	521
Suburban county	34	5	10	42	9	100%	568
MSA with no city center	27	7	10	49	7	100%	87
Not in MSA	26	11	13	45	5	100%	496
Region							
West	36	6	15	32	11	100%	486
North Central	43	13	5	30	9	100%	613
Northeast	21	10	4	54	11	100%	427
South	27	5	15	45	8	100%	796

The question was: When at home, do you regularly park the [MAKE/MODEL]in a garage that is attached to your home, in an unattached garage, in a carport, in your driveway or lot, on the street, or in a nearby parking lot or structure?

Table 16a
Location Where Regularly Park Among Demographic Subgroups

	Location Where Regularly Park						
	Attached Garage	Unattached Garage	Carport	Driveway	Street, lot	Total	Cases
Type of Vehicle							
Car	35	8	11	35	11	100%	1279
Pickup	19	8	11	53	9	100%	328
Van	31	8	5	49	7	100%	193
SUV	35	9	10	40	6	100%	503
Purchased New or Used							
New	39	9	10	35	7	100%	1447
Used	21	8	11	48	12	100%	852
Age of Vehicle							
0 - 2 years	43	7	8	35	7	100%	501
3 - 5 years	36	9	11	39	5	100%	597
6 - 9 years	34	7	9	40	10	100%	609
10 years or older	19	10	12	44	15	100%	599
Average Miles per Day							
9 miles or less	29	11	12	36	12	100%	429
10 - 19 miles	32	8	14	36	10	100%	513
20 - 29 miles	36	9	9	35	11	100%	491
30 - 49 miles	35	6	9	44	6	100%	423
50 or more miles	28	8	8	49	7	100%	457
Percent Highway Miles							
4% or less	31	8	12	38	11	100%	407
5% - 19%	32	8	10	37	13	100%	477
20% - 49%	37	8	9	37	9	100%	439
50% - 74%	33	8	9	42	8	100%	461
75% or more	29	9	10	45	7	100%	529
Monthly Cost of Gas							
$80 or less	34	11	14	30	11	100%	563
$81 - $130	35	7	11	34	13	100%	451
$131- $190	33	9	10	41	7	100%	453
$191 - $260	34	5	8	43	10	100%	409
$261 or more	24	8	7	54	7	100%	415
Monthly Trips to Gas Station							
One	35	11	15	31	8	100%	265
Two	37	10	11	32	10	100%	512
Three	33	10	12	36	9	100%	344
Four	35	6	9	41	9	100%	634
Five or more	24	7	7	52	10	100%	545
Number of Vehicles Owned							
One	28	10	13	36	13	100%	714
Two	37	8	9	38	8	100%	923
Three or more	28	8	10	46	8	100%	683

Table 17
Availability of Standard Electrical Outlet to Plug-In PHEV

	Availability of Outlet			
	Yes	No	Total	Cases
All Households	77	23	100%	2316
Age				
18 - 34	66	34	100%	308
35 - 44	80	20	100%	395
45 - 54	82	18	100%	517
55 - 64	80	20	100%	499
65 or older	77	23	100%	593
Income				
Bottom fifth	66	34	100%	288
Second fifth	70	30	100%	389
Middle fifth	76	24	100%	506
Fourth fifth	84	16	100%	486
Top fifth	84	16	100%	502
Education				
High School or less	74	26	100%	695
Some College	77	23	100%	470
College degree	79	21	100%	671
Graduate school	81	19	100%	473
Gender				
Male	83	17	100%	1025
Female	72	28	100%	1291
Home Ownership				
Own	82	18	100%	1961
Rent	50	50	100%	354
Metropolitan Status				
City center	74	26	100%	646
In county of city center	77	23	100%	521
Suburban county	75	25	100%	565
MSA with no city center	80	20	100%	88
Not in MSA	82	18	100%	496
Region				
West	78	22	100%	488
North Central	81	19	100%	608
Northeast	72	28	100%	430
South	76	24	100%	790

The question was: If you owned a plug-in hybrid vehicle, is there a standard electrical outlet where you regularly park at home that you could plug it in to recharge the battery?

Table 17a
Availability of Standard Electrical Outlet to Plug-In PHEV

	Availability of Outlet			
	Yes	No	Total	Cases
Type of Vehicle				
Car	73	27	100%	1276
Pickup	85	15	100%	328
Van	80	20	100%	191
SUV	81	19	100%	502
Purchased New or Used				
New	80	20	100%	1444
Used	73	27	100%	848
Age of Vehicle				
0 - 2 years	81	19	100%	501
3 - 5 years	81	19	100%	598
6 - 9 years	77	23	100%	607
10 years or older	71	29	100%	593
Average Miles per Day				
9 miles or less	75	25	100%	432
10-19 miles	75	25	100%	507
20-29 miles	76	24	100%	487
30-49 miles	80	20	100%	424
50 or more miles	80	20	100%	457
Percent Highway Miles				
4% or less	75	25	100%	403
5% - 19%	73	27	100%	473
20% - 49%	76	24	100%	438
50% - 74%	81	19	100%	463
75% or more	80	20	100%	529
Monthly Cost of Gas				
$80 or less	75	25	100%	564
$81 - $130	72	28	100%	448
$131- $190	77	23	100%	452
$191 - $260	81	19	100%	410
$261 or more	81	19	100%	413
Monthly Trips to Gas Station				
One	74	26	100%	265
Two	78	22	100%	510
Three	75	25	100%	340
Four	76	24	100%	637
Five or more	79	21	100%	543
Number of Vehicles Owned				
One	66	34	100%	712
Two	81	19	100%	919
Three or more	82	18	100%	683

Table 18
Willingness to Rechange PHEV in Evening Hours Among Demographic Subgroups

	Recharge PHEV When Electricity Discounted after 9pm					
	Always	Most of the time	Some of the time	No effect on when charge	Total	Cases
All Households	35	39	5	21	100%	2290
Age						
18 - 34	33	41	5	21	100%	309
35 - 44	36	48	3	13	100%	397
45 - 54	39	41	8	12	100%	518
55 - 64	38	36	5	21	100%	493
65 and older	29	29	5	37	100%	570
Income						
Bottom fifth	31	28	4	37	100%	276
Second fifth	41	29	5	25	100%	383
Middle fifth	35	43	7	15	100%	501
Fourth fifth	37	42	6	15	100%	486
Top fifth	30	49	4	17	100%	504
Education						
High School or less	36	29	6	29	100%	678
Some College	35	37	6	22	100%	463
College degree	35	46	5	14	100%	668
Graduate school	33	46	6	15	100%	475
Gender						
Male	34	38	6	22	100%	1009
Female	36	39	5	20	100%	1281
Home Ownership						
Own	36	39	5	20	100%	1939
Rent	30	37	6	27	100%	350
Metropolitan Status						
City center	32	39	5	24	100%	642
In county of city center	38	37	5	20	100%	518
Suburban county	35	41	6	18	100%	561
MSA with no city center	40	44	1	15	100%	87
Not in MSA	34	38	6	22	100%	482
Region						
West	39	36	5	20	100%	480
North Central	34	39	7	20	100%	603
Northeast	36	42	5	17	100%	425
South	33	38	5	24	100%	782

The question was: If there were discounted rates for recharging the battery after 9 P.M. , would you always recharge the vehicle after 9 P.M., recharge it most of the time after 9 P.M., some of the time after 9 P.M., or would it not not make any difference when you would recharge the battery?

Table 18a
Willingness to Rechange PHEV in Evening Hours Among Demographic Subgroups

	Recharge PHEV When Electricity Discounted after 9pm					
	Always	Most of the time	Some of the time	No effect on when charge	Total	Cases
Type of Vehicle						
Car	34	39	5	22	100%	1258
Pickup	34	34	5	27	100%	320
Van	32	47	4	17	100%	192
SUV	38	39	7	16	100%	501
Purchased New or Used						
New	35	41	5	19	100%	1433
Used	36	35	6	23	100%	833
Age of Vehicle						
0 - 2 years	35	43	5	17	100%	496
3 - 5 years	34	40	7	19	100%	599
6 - 9 years	37	40	5	18	100%	597
10 years or older	35	33	5	27	100%	581
Average Miles per Day						
9 miles or less	33	37	5	25	100%	418
10 - 19 miles	37	36	4	23	100%	508
20 - 29 miles	33	39	6	22	100%	486
30 - 49 miles	33	44	7	16	100%	418
50 or more miles	37	40	6	17	100%	452
Percent Highway Miles						
4% or less	38	31	3	28	100%	399
5% - 19%	32	41	5	22	100%	467
20% - 49%	36	42	6	16	100%	436
50% - 74%	34	40	6	20	100%	458
75% or more	35	40	6	19	100%	522
Monthly Cost of Gas						
$80 or less	33	33	5	29	100%	551
$81 - $130	39	38	6	17	100%	445
$131- $190	36	42	5	17	100%	444
$191 - $260	35	42	4	19	100%	412
$261 or more	33	41	7	19	100%	409
Monthly Trips to Gas Station						
One	33	32	4	31	100%	260
Two	34	40	6	20	100%	506
Three	34	41	6	19	100%	336
Four	39	37	5	19	100%	630
Five or more	33	42	5	20	100%	537
Number of Vehicles Owned						
One	35	32	6	27	100%	699
Two	36	40	5	19	100%	911
Three or more	33	43	5	19	100%	678

Table 19
Advantage of Recharging PHEV at Home Instead of Refueling at Gas Station by Demographic Subgroups

	Advantage of Recharging PHEV at Home					
	Very Important	Somewhat Important	Not Very Important	Not at all Important	Total	Cases
All Households	67	23	5	5	100%	2314
Age						
18 - 34	64	28	5	3	100%	309
35 - 44	70	22	5	3	100%	398
45 - 54	70	23	4	3	100%	519
55 - 64	67	23	4	6	100%	499
65 and older	63	20	6	11	100%	586
Income						
Bottom fifth	61	26	4	9	100%	287
Second fifth	65	18	8	9	100%	391
Middle fifth	66	26	4	4	100%	506
Fourth fifth	69	24	4	3	100%	487
Top fifth	72	22	4	2	100%	502
Education						
High School or less	63	23	6	8	100%	693
Some College	69	21	4	6	100%	472
College degree	68	24	5	3	100%	670
Graduate school	70	23	4	3	100%	475
Gender						
Male	66	23	6	5	100%	1023
Female	67	23	4	6	100%	1291
Home Ownership						
Own	69	22	4	5	100%	1960
Rent	59	26	7	8	100%	353
Metropolitan Status						
City center	68	23	4	5	100%	645
In county of city center	68	21	7	4	100%	521
Suburban county	68	23	4	5	100%	563
MSA with no city center	66	25	6	3	100%	87
Not in MSA	64	25	4	7	100%	498
Region						
West	67	20	6	7	100%	484
North Central	63	26	5	6	100%	608
Northeast	66	27	3	4	100%	431
South	69	21	5	5	100%	791

The question was: Now I will ask you about some potential advantages of plug-in hybrid vehicles. First, you can recharge a plug-in hybrid battery at home and don't need to go to a gas station as often. Would you say that this advantage is very important, somewhat important, not very important, or not at all important?

Table 19a
Advantage of Recharging PHEV at Home Instead of Refueling at Gas Station by Demographic Subgroups

	Advantage of Recharging PHEV at Home					
	Very Important	Somewhat Important	Not Very Important	Not Important	Total	Cases
Type of Vehicle						
Car	65	24	5	6	100%	1274
Pickup	64	22	6	8	100%	328
Van	75	21	3	1	100%	192
SUV	70	22	4	4	100%	501
Purchased New or Used						
New	69	22	4	5	100%	1439
Used	64	25	5	6	100%	851
Age of Vehicle						
0 - 2 years	71	22	4	3	100%	500
3 - 5 years	68	23	5	4	100%	599
6 - 9 years	68	22	4	6	100%	602
10 years or older	62	25	6	7	100%	596
Average Miles per Day						
9 miles or less	64	24	5	7	100%	429
10 - 19 miles	68	22	4	6	100%	509
20 - 29 miles	66	23	4	7	100%	488
30 - 49 miles	68	23	5	4	100%	425
50 or more miles	68	23	6	3	100%	454
Percent Highway Miles						
4% or less	63	24	5	8	100%	406
5% - 19%	68	22	5	5	100%	471
20% - 49%	67	25	5	3	100%	440
50% - 74%	68	24	5	3	100%	460
75% or more	68	20	6	6	100%	527
Monthly Cost of Gas						
$80 or less	66	21	5	8	100%	560
$81 - $130	67	24	4	5	100%	448
$131- $190	63	25	7	5	100%	451
$191 - $260	70	23	4	3	100%	410
$261 or more	70	22	4	4	100%	416
Monthly Trips to Gas Station						
One	66	21	5	8	100%	263
Two	67	23	5	5	100%	511
Three	64	25	5	6	100%	342
Four	67	23	5	5	100%	634
Five or more	68	23	4	5	100%	543
Number of Vehicles Owned						
One	63	25	5	7	100%	705
Two	69	20	6	5	100%	923
Three or more	67	25	4	4	100%	684

Table 20
Minimum All-Electric Range For Daily Needs Among Demographic Subgroups

	Minimum All-Electric Range						
	< 20 miles	20 - 39	40 - 59	60 - 79	80+ miles	Total	Cases
All Households	12	24	27	14	23	100%	2224
Age							
18 - 34	9	22	25	16	28	100%	306
35 - 44	6	22	33	16	23	100%	392
45 - 54	9	25	27	17	22	100%	509
55 - 64	15	21	27	13	24	100%	485
65 and older	21	28	21	11	19	100%	528
Income							
Bottom fifth	22	31	18	11	18	100%	265
Second fifth	15	24	25	12	24	100%	360
Middle fifth	10	25	25	17	23	100%	491
Fourth fifth	8	24	29	16	23	100%	478
Top fifth	8	19	33	15	25	100%	500
Education							
High School or less	14	25	21	12	28	100%	651
Some College	15	25	23	14	23	100%	449
College degree	10	21	32	17	20	100%	655
Graduate school	9	24	33	15	19	100%	463
Gender							
Male	8	19	28	17	28	100%	991
Female	15	28	26	13	18	100%	1233
Home Ownership							
Own	11	23	27	15	24	100%	1884
Rent	17	26	23	14	20	100%	339
Metropolitan Status							
City center	12	26	28	16	18	100%	625
In county of city center	11	25	28	14	22	100%	501
Suburban county	12	22	28	13	25	100%	545
MSA with no city center	8	29	27	7	29	100%	83
Not in MSA	14	21	22	17	26	100%	470
Region							
West	12	25	27	14	22	100%	470
North Central	14	25	25	14	22	100%	587
Northeast	12	26	28	12	22	100%	408
South	11	22	26	16	25	100%	759

The question was: For commuting to work and other daily errands, what is the minimum number of daily miles that a plug-in hybrid vehicle would need to be able to go on battery power alone in order for you to consider buying one – would you say less than twenty miles per day, twenty to thirty-nine, forty to fifty-nine miles, sixty to seventy-nine miles, or more than eighty miles per day?

Table 20a
Minimum All-Electric Range For Daily Needs Among Demographic Subgroups

	Minimum All-Electric Range						
	< 20 miles	20 - 39	40 - 59	60 - 79	80+ miles	Total	Cases
Type of Vehicle							
Car	14	26	26	12	22	100%	1214
Pickup	9	16	26	18	31	100%	314
Van	14	27	26	16	17	100%	185
SUV	9	24	28	17	22	100%	493
Purchased New or Used							
New	12	25	27	14	22	100%	1389
Used	12	23	25	15	25	100%	813
Age of Vehicle							
0 - 2 years	9	21	28	15	27	100%	487
3 - 5 years	12	27	24	14	23	100%	582
6 - 9 years	11	26	30	15	18	100%	582
10 years or older	15	22	24	15	24	100%	558
Average Miles per Day							
9 miles or less	31	26	19	10	14	100%	391
10 - 19 miles	16	30	25	11	18	100%	489
20 - 29 miles	11	32	28	10	19	100%	474
30 - 49 miles	2	23	39	18	18	100%	412
50 or more miles	1	8	23	24	44	100%	450
Percent Highway Miles							
4% or less	21	26	21	11	21	100%	375
5% - 19%	16	29	27	11	17	100%	454
20% - 49%	11	26	34	14	15	100%	426
50% - 74%	7	22	31	16	24	100%	456
75% or more	7	19	20	19	35	100%	505
Monthly Cost of Gas							
$80 or less	24	31	20	9	16	100%	516
$81 - $130	13	26	28	13	20	100%	432
$131- $190	12	27	29	12	20	100%	439
$191 - $260	6	19	34	17	24	100%	402
$261 or more	3	15	23	23	36	100%	410
Monthly Trips to Gas Station							
One	32	24	19	11	14	100%	244
Two	16	32	26	8	18	100%	484
Three	12	24	32	12	20	100%	329
Four	8	24	28	16	24	100%	615
Five or more	5	17	25	22	31	100%	534
Number of Vehicles Owned							
One	16	30	23	12	19	100%	672
Two	11	22	29	15	23	100%	887
Three or more	9	21	27	17	26	100%	663

Table 21
Main Advantage of PHEVs Among Demographic Subgroups

	Main Advantage of PHEVs				
	Reduce Money Spent on Gas	Reduce Vehicle Emissions	Reduce Dependence on Foreign Oil	Total	Cases
All Households	31	15	54	100%	2301
Age					
18 - 34	43	12	45	100%	310
35 - 44	36	14	50	100%	396
45 - 54	31	13	56	100%	517
55 - 64	28	18	54	100%	495
65 and older	21	15	64	100%	579
Income					
Bottom fifth	29	14	57	100%	283
Second fifth	29	16	55	100%	388
Middle fifth	34	11	55	100%	505
Fourth fifth	35	14	51	100%	482
Top fifth	30	18	52	100%	502
Education					
High School or less	31	12	57	100%	684
Some College	28	14	58	100%	465
College degree	33	15	52	100%	672
Graduate school	32	20	48	100%	476
Gender					
Male	33	14	53	100%	1016
Female	30	15	55	100%	1285
Home Ownership					
Own	31	14	55	100%	1949
Rent	32	15	53	100%	351
Metropolitan Status					
City center	31	19	50	100%	639
In county of city center	33	14	53	100%	521
Suburban county	31	13	56	100%	560
MSA with no city center	27	12	61	100%	85
Not in MSA	31	12	57	100%	496
Region					
West	31	19	50	100%	482
North Central	31	12	57	100%	602
Northeast	29	16	55	100%	428
South	32	13	55	100%	789

The question was: Please tell me which of the next three advantages of a plug-in hybrid that I mention is the most important – reducing the amount of money spent on fuel, reducing vehicle emissions, or reducing dependence on foreign oil?

Table 21a
Main Advantage of PHEVs Among Demographic Subgroups

	Main Advantage of PHEVs				
	Reduce Money Spent on Gas	Reduce Vehicle Emissions	Reduce Dependence on Foreign Oil	Total	Cases
Type of Vehicle					
Car	30	16	54	100%	1265
Pickup	32	10	58	100%	327
Van	31	19	50	100%	192
SUV	33	13	54	100%	499
Purchased New or Used					
New	30	14	56	100%	1433
Used	33	15	52	100%	844
Age of Vehicle					
0 - 2 years	27	14	59	100%	500
3 - 5 years	29	16	55	100%	596
6 - 9 years	34	13	53	100%	599
10 years or older	33	15	52	100%	589
Average Miles per Day					
9 miles or less	29	17	54	100%	422
10 - 19 miles	29	15	56	100%	512
20 - 29 miles	31	12	57	100%	485
30 - 49 miles	35	16	49	100%	421
50 or more miles	32	12	56	100%	452
Percent Highway Miles					
4% or less	28	16	56	100%	397
5% - 19%	30	14	56	100%	473
20% - 49%	30	14	56	100%	440
50% - 74%	34	14	52	100%	459
75% or more	33	14	53	100%	523
Monthly Cost of Gas					
$80 or less	24	17	59	100%	555
$81 - $130	32	13	55	100%	447
$131- $190	30	16	54	100%	445
$191 - $260	37	14	49	100%	411
$261 or more	35	12	53	100%	414
Monthly Trips to Gas Station					
One	24	15	61	100%	261
Two	27	14	59	100%	511
Three	34	15	51	100%	341
Four	29	17	54	100%	627
Five or more	39	12	49	100%	541
Number of Vehicles Owned					
One	29	17	54	100%	702
Two	32	14	54	100%	919
Three or more	33	12	55	100%	678

Table 22
Purchase of PHEV Demonstates Environmental Commitment Among Demographic Subgroups

	Importance of PHEV Purchase to Show Environmental Commitment					
	Very Important	Somewhat Important	Not Very Important	Not at all Important	Total	Cases
All Households	50	35	9	6	100%	2313
Age						
18 - 34	48	35	12	5	100%	310
35 - 44	48	41	7	4	100%	395
45 - 54	50	37	8	5	100%	520
55 - 64	56	27	9	8	100%	496
65 and older	49	35	7	9	100%	588
Income						
Bottom fifth	58	27	6	9	100%	287
Second fifth	53	31	8	8	100%	389
Middle fifth	53	34	8	5	100%	507
Fourth fifth	47	38	10	5	100%	485
Top fifth	42	41	11	6	100%	502
Education						
High School or less	52	33	8	7	100%	693
Some College	53	34	7	6	100%	472
College degree	50	35	9	6	100%	669
Graduate school	45	38	11	6	100%	475
Gender						
Male	44	37	11	8	100%	1019
Female	56	32	7	5	100%	1294
Home Ownership						
Own	49	36	9	6	100%	1960
Rent	55	30	8	7	100%	352
Metropolitan Status						
City center	53	33	9	5	100%	644
In county of city center	49	36	8	7	100%	520
Suburban county	51	33	9	7	100%	566
MSA with no city center	44	41	10	5	100%	86
Not in MSA	49	36	8	7	100%	497
Region						
West	48	33	10	9	100%	483
North Central	51	34	8	7	100%	605
Northeast	49	39	9	3	100%	431
South	51	34	8	7	100%	794

The question was: A plug-in hybrid vehicle would demonstrate your commitment to buying products that are friendly to the environment.

Table 22a
Purchase of PHEV Demonstates Environmental Commitment Among Demographic Subgroups

	Importance of PHEV Purchase to Show Environmental Commitment					
	Very Important	Somewhat Important	Not Very Important	Not Important	Total	Cases
Type of Vehicle						
Car	51	34	9	6	100%	1271
Pickup	45	36	8	11	100%	328
Van	60	29	8	3	100%	193
SUV	48	37	9	6	100%	502
Purchased New or Used						
New	51	35	8	6	100%	1444
Used	49	35	9	7	100%	845
Age of Vehicle						
0 - 2 years	49	37	7	7	100%	500
3 - 5 years	48	38	9	5	100%	597
6 - 9 years	52	32	9	7	100%	601
10 years or older	51	33	8	8	100%	598
Average Miles per Day						
9 miles or less	49	32	10	9	100%	431
10-19 miles	56	30	7	7	100%	507
20-29 miles	46	38	9	7	100%	487
30-49 miles	50	38	8	4	100%	425
50 or more miles	50	36	8	6	100%	454
Percent Highway Miles						
4% or less	51	31	9	9	100%	407
5% - 19%	52	33	9	6	100%	469
20% - 49%	52	36	8	4	100%	439
50% - 74%	47	37	9	7	100%	460
75% or more	49	37	8	6	100%	528
Monthly Cost of Gas						
$80 or less	53	31	9	7	100%	560
$81 - $130	51	35	8	6	100%	448
$131- $190	51	33	9	7	100%	450
$191 - $260	48	38	8	6	100%	409
$261 or more	48	38	8	6	100%	416
Monthly Trips to Gas Station						
One	48	36	8	8	100%	263
Two	52	31	10	7	100%	513
Three	49	36	8	7	100%	341
Four	53	32	9	6	100%	631
Five or more	47	40	8	5	100%	544
Number of Vehicles Owned						
One	55	31	7	7	100%	707
Two	51	34	9	6	100%	922
Three or more	45	39	10	6	100%	682

Table 23
Frequency Purchased Fluorescent Light Bulbs Among Demographic Subgroups

	Frequency of Purchase of Fluorescent Light Bulbs					
	All the time	Most of the time	Some of the time	Never Purchased	Total	Cases
All Households	24	22	30	24	100%	2284
Age						
18 - 34	24	20	29	27	100%	306
35 - 44	24	23	30	23	100%	391
45 - 54	23	25	32	20	100%	515
55 - 64	23	22	32	23	100%	490
65 and older	26	20	25	29	100%	578
Income						
Bottom fifth	25	15	24	36	100%	280
Second fifth	27	19	26	28	100%	383
Middle fifth	25	21	30	24	100%	504
Fourth fifth	24	26	32	18	100%	481
Top fifth	21	29	32	18	100%	492
Education						
High School or less	25	18	27	30	100%	680
Some College	26	21	27	26	100%	463
College degree	22	25	32	21	100%	665
Graduate school	23	27	32	18	100%	472
Gender						
Male	23	23	32	22	100%	1011
Female	25	21	28	26	100%	1273
Home Ownership						
Own	24	22	31	23	100%	1931
Rent	23	23	25	29	100%	352
Metropolitan Status						
City center	23	24	29	24	100%	637
In county of city center	26	22	26	26	100%	514
Suburban county	23	21	33	23	100%	552
MSA with no city center	17	25	33	25	100%	85
Not in MSA	26	20	30	24	100%	496
Region						
West	27	26	29	18	100%	479
North Central	23	23	31	23	100%	599
Northeast	23	22	28	27	100%	426
South	24	19	30	27	100%	780

The question was: When you replace light bulbs, would you say that you buy compact fluorescent light bulbs all the time, most of the time, some of the time, or do you never buy compact florescent light bulbs?

Table 23a
Frequency Purchased Fluorescent Light Bulbs Among Demographic Subgroups

	Frequency of Purchase of Fluorescent Light Bulbs					
	All the time	Most of the time	Some of the time	Never Purchased	Total	Cases
Type of Vehicle						
Car	25	22	28	25	100%	1250
Pickup	23	20	32	25	100%	324
Van	23	23	30	24	100%	190
SUV	23	24	31	22	100%	501
Purchased New or Used						
New	24	23	30	23	100%	1420
Used	24	20	29	27	100%	840
Age of Vehicle						
0 - 2 years	26	21	30	23	100%	488
3 - 5 years	23	25	29	23	100%	591
6 - 9 years	23	23	31	23	100%	600
10 years or older	24	18	29	29	100%	588
Average Miles per Day						
9 miles or less	30	20	27	23	100%	419
10 - 19 miles	24	24	26	26	100%	506
20 - 29 miles	22	23	31	24	100%	485
30 - 49 miles	20	25	30	25	100%	422
50 or more miles	24	18	35	23	100%	442
Percent Highway Miles						
4% or less	28	18	25	29	100%	398
5% - 19%	21	22	30	27	100%	472
20% - 49%	21	23	33	23	100%	433
50% - 74%	22	27	31	20	100%	453
75% or more	28	21	29	22	100%	518
Monthly Cost of Gas						
$80 or less	30	21	23	26	100%	551
$81 - $130	22	22	30	26	100%	443
$131- $190	24	26	31	19	100%	448
$191 - $260	19	27	29	25	100%	403
$261 or more	22	16	37	25	100%	410
Monthly Trips to Gas Station						
One	33	24	21	22	100%	256
Two	24	24	27	25	100%	506
Three	25	23	31	21	100%	343
Four	24	21	31	24	100%	622
Five or more	20	21	33	26	100%	536
Number of Vehicles Owned						
One	24	19	26	31	100%	701
Two	24	24	29	23	100%	908
Three or more	24	22	34	20	100%	673

Table 24
Willingness to Own New Technology Among Demographic Subgroups

	Want to be 1st to Own New or Advanced Technology						
	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree	Total	Cases
All Households	7	34	2	43	14	100%	2321
Age							
18 - 34	9	36	1	42	12	100%	309
35 - 44	6	36	1	42	15	100%	398
45 - 54	7	36	2	43	12	100%	522
55 - 64	7	34	1	42	16	100%	501
65 and older	8	30	2	46	14	100%	587
Income							
Bottom fifth	10	38	1	36	15	100%	287
Second fifth	9	30	3	44	14	100%	393
Middle fifth	6	33	1	47	13	100%	507
Fourth fifth	6	35	1	46	12	100%	486
Top fifth	7	37	1	42	13	100%	502
Education							
High School or less	8	38	1	40	13	100%	692
Some College	8	33	1	43	15	100%	472
College degree	6	35	2	44	13	100%	673
Graduate school	6	29	2	47	16	100%	480
Gender							
Male	10	37	1	39	13	100%	1026
Female	5	32	2	46	15	100%	1295
Home Ownership							
Own	7	34	1	44	14	100%	1964
Rent	7	37	3	38	15	100%	356
Metropolitan Status							
City center	8	33	2	44	13	100%	650
In county of city center	7	31	1	43	18	100%	520
Suburban county	6	38	2	42	12	100%	566
MSA with no city center	5	39	0	45	11	100%	86
Not in MSA	8	35	0	44	13	100%	499
Region							
West	8	32	1	44	15	100%	487
North Central	6	33	1	44	16	100%	610
Northeast	7	37	2	41	13	100%	430
South	8	35	2	43	12	100%	794

The question was: Now please tell me how strongly you agree or disagree with the following statement: I want to be the first to own new or advanced technology. Would you say you strongly agree, agree, disagree, or strongly disagree?

Table 24a
Willingness to Own New Technology Among Demographic Subgroups

	Want to be 1st to Own New or Advanced Technology						
	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree	Total	Cases
Type of Vehicle							
Car	7	34	1	44	14	100%	1276
Pickup	7	38	2	40	13	100%	329
Van	7	31	1	43	18	100%	193
SUV	8	34	1	44	13	100%	504
Purchased New or Used							
New	7	33	2	45	13	100%	1446
Used	7	36	1	40	16	100%	851
Age of Vehicle							
0 - 2 years	8	34	1	46	11	100%	502
3 - 5 years	6	35	2	44	13	100%	601
6 - 9 years	7	35	2	42	14	100%	606
10 years or older	8	33	1	42	16	100%	595
Average Miles per Day							
9 miles or less	7	34	1	41	17	100%	428
10 - 19 miles	7	34	2	43	14	100%	511
20 - 29 miles	6	34	1	45	14	100%	491
30 - 49 miles	8	32	2	46	12	100%	426
50 or more miles	8	37	1	41	13	100%	455
Percent Highway Miles							
4% or less	7	30	1	46	16	100%	408
5% - 19%	9	32	2	43	14	100%	476
20% - 49%	7	35	1	43	14	100%	440
50% - 74%	6	40	2	41	11	100%	460
75% or more	8	33	2	43	14	100%	526
Monthly Cost of Gas							
$80 or less	6	32	1	43	18	100%	562
$81 - $130	9	33	2	43	13	100%	451
$131- $190	7	35	2	45	11	100%	450
$191 - $260	5	38	1	44	12	100%	412
$261 or more	9	34	2	40	15	100%	416
Monthly Trips to Gas Station							
One	6	33	1	43	17	100%	263
Two	6	32	1	44	17	100%	515
Three	10	36	2	41	11	100%	345
Four	6	34	2	46	12	100%	632
Five or more	9	35	1	41	14	100%	545
Number of Vehicles Owned							
One	8	34	2	42	14	100%	709
Two	7	33	1	44	15	100%	927
Three or more	7	37	1	43	12	100%	683