

Marketing Clean and Efficient Vehicles:  
A Review of Social Marketing and Social Science Approaches

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The contents of this report reflect the views of the authors who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views of any sponsor. This report does not constitute a standard, specification, or regulation of any sponsor.

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## Introduction

This report is designed as a resource for engineers, economists, physical scientists, as well as agency, NGO, and legislative staff, and others who may be unfamiliar with marketing and marketing research methods but are working on transforming the automobile market to clean and efficient vehicles. Many may find themselves either working with marketing researchers or using marketing research data to design social marketing campaigns. We wish to introduce marketing and social marketing research and theoretical approaches to such readers. In particular, we focus upon the application of marketing research to guide long term marketing efforts with iterative research and monitoring of change. We discuss theories and research approaches in the social marketing stream that can guide multi-year research efforts and a “transformation of the automobile-market.” Additionally, we discuss selection of data collection techniques, such as focus groups and Internet surveys, to aid in identifying and selecting appropriate research methods.

### I. From Regulating to Marketing Clean and Efficient Vehicles

“There is strong evidence to suggest that people’s concern for environmental issues is growing, but little evidence that this has translated into appropriate changes in pro-environmental behavior.” (Lee and Holden, 1999)

“For most automobile shoppers in the U.S., environmental pluses and minuses rate somewhere below the number and location of cup holders in the hierarchy of reasons to buy a particular vehicle.” (Los Angeles Times, 29 March 2000)

These two quotes convey widely held beliefs about what the general population knows about environmental problems and their responses to those problems. To wit, people perceive environmental problems exist and profess a degree of concern, but they fail to take these concerns into account when making consumption decisions that could address both the environmental problem and their concern for it. Scientific efforts to understand this apparent disconnect, between attitude and action, point to a number of possible reasons. These include the possibility of a real disconnect between attitude and behavior, errors by researchers in measuring perception, attitude, concern, or behavior, or a lack of theoretical explanation for why connections between these things should exist.

Our goal in this review is to explore what might be done to connect pro-environmental beliefs to behavior; to discover the means by which we may encourage and help car and truck buyers to put the environment above cup-holders. Opinions about these goals—professional and lay—vary. There are those who believe the potential for change is small, that the disconnect between concern for the environment and household purchases is a predictable natural phenomena. A conservative viewpoint says “wake up and look around—the normal, red-blooded American, given enough money has and always will buy the biggest and most powerful vehicle—ten out of ten times.” (Others might label this a “realist” viewpoint because it is based on an appeal to present conditions, or reality as it is currently constructed.)

On the other side are those who think change is possible. Some believe it might be a matter of educating the public about the impact of their purchases. Some attitude-behavior theorists might point out that such a disconnect leads to dissonance, and that in order for people to sustain images of themselves, something—behavior or belief—will have to change. There might be a few out there who imagine that with the right marketing campaign, and a shift in cultural climate, consumers would start to cooperate as a group or network of decision makers, putting the environment higher on their list of reasons for making consumption choices. Additionally, there are the potential connections between attitudes, values, beliefs, consumption choices and politics – that is as consumers become better educated, they may also develop a greater interest and support for policies that in turn support their consumption choices. This aspect of social marketing is far less studied. Finally, it may not be individuals and their beliefs and behaviors that are the problem; the problem may be structural. It may be that people can't choose behaviors in accordance with pro-environmental beliefs because of constraints on their freedom to act, and a lack of real behavioral options.

We discuss in this report the potential role of *social marketing* research and programs to increase consumer demand for clean and efficient vehicles. Cleaner and more efficient vehicle technologies have been developed and are being sold. However, in the noisy and highly competitive arena of automobile sales, consumers are poorly informed about the reasons and options for clean and efficient vehicles. Sales of vehicles designed to minimize emissions and energy consumption are yet a tiny niche. In fact, during the economic boom of the 1990's vehicle sizes increased and fuel efficiency decreased. The federal Corporate Average Fuel Economy standards have not been increased in years; proposed increases face bitter opposition (and so far successful opposition) every time they are debated in Congress. Air quality standards have been tightened both by California (and those states that have adopted California's standards) and by the federal government. But consumer knowledge about cleaner vehicles remains thin.

Marketing, and especially a variant known as *social marketing*, is being explored as one strategy in a more market-oriented approach to increasing the rate at which cleaner and more efficient vehicles make their way into the fleet. As a review of home energy use makes clear, moving to a market-based approach takes policy making beyond engineering and economic approaches:

“...as the energy efficiency community has shifted from a resource acquisition model of promoting energy efficiency (which focuses on installing improved technologies and capturing kilowatt hour savings) to a market transformation model (which focuses on market operations and removing market barriers in order to create a sustained supply and demand for efficient products and services), individual and organizational decision making have emerged as critical to program and policy success.” (Egan and Brown, 2001)

Most definitions of *social marketing* contain two central ideas: (1) the “product” being marketed is a behavior, and (2) the behavior will result in a benefit to the individual and their society to whom the behavior is being marketed. Like most disciplines, social marketing has grown through the interplay between specific applications and conceptual (theoretical) development. Most of the formative applications of social marketing have been in the field of

public health. In these cases, the value to individuals is usually clear—campaigns to increase disease awareness, to promote nutrition and exercise, or to convince people with contaminated water supplies to boil drinking water—all entail benefits that can be captured by individuals who adopt the new behaviors.

One area in which there has been little conceptual development is the connection between *social marketing*, *public goods*, and *collective benefits*. We take *collective benefits* to be the subset of public goods that no one gets unless many people—a community—act in concert to acquire them. Some authors wish to reserve the use of the label *social marketing* for efforts to change behavior; reserving *green marketing* or simply, *marketing*, for the promotion of less polluting or more efficient products. Regardless of the label, many tenets of marketing have been applied to promote recycling, water conservation, and the promotion of more efficient appliances, heating, and lighting for homes and businesses. But there has been scant application of social marketing research and techniques to clean and efficient vehicles. We will argue that the definition of social marketing include the application of conventional marketing techniques to the promotion of products that confer socially sanctioned positive externalities, public goods, and specifically, collective benefits.

Also, we believe further development of definitions, concepts, and practices are necessary because the behavior in this case is a market transaction for automobiles. Automobile purchases are important, expensive and complex decisions for individuals and households. Vehicle choices involve many variables including cost, reliability, safety, practicality, appearance, and performance. The market is ever changing and many buyers have limited knowledge of even the most popular models of conventional vehicles, of which there are now over 600. Automobile marketing is a large and noisy business—approximately 14 billion dollars per year are spent marketing light-duty cars and trucks in the US. In the face of such complexity and high stakes, automobile buying can be a long and complex process that can take months; and, it can also be an impulsive act completed in a day.

When it comes to new technologies and vehicle models that are clean and efficient, consumers have even more limited knowledge, even among the most interested buyers. Thus far, only a few such vehicles are on the road or in automobile show rooms; only a small amount of advertising is aimed at educating consumers about fuel economy, reduced emissions, or other benefits these cars might offer. Given their diverse priorities, automobile companies cannot devote much effort to educating the public and may be disinclined to promote such a technology if it competes with other product lines that earn high profits. Additionally, government has spurred the development and commercialization of clean and efficient vehicle technologies through regulatory inducements and requirements, but it has done comparatively little to inform the public why such vehicles are important. Nor has government explained that rather than continuing to rely solely on regulation, it is now relying on consumers to make “better” choices.

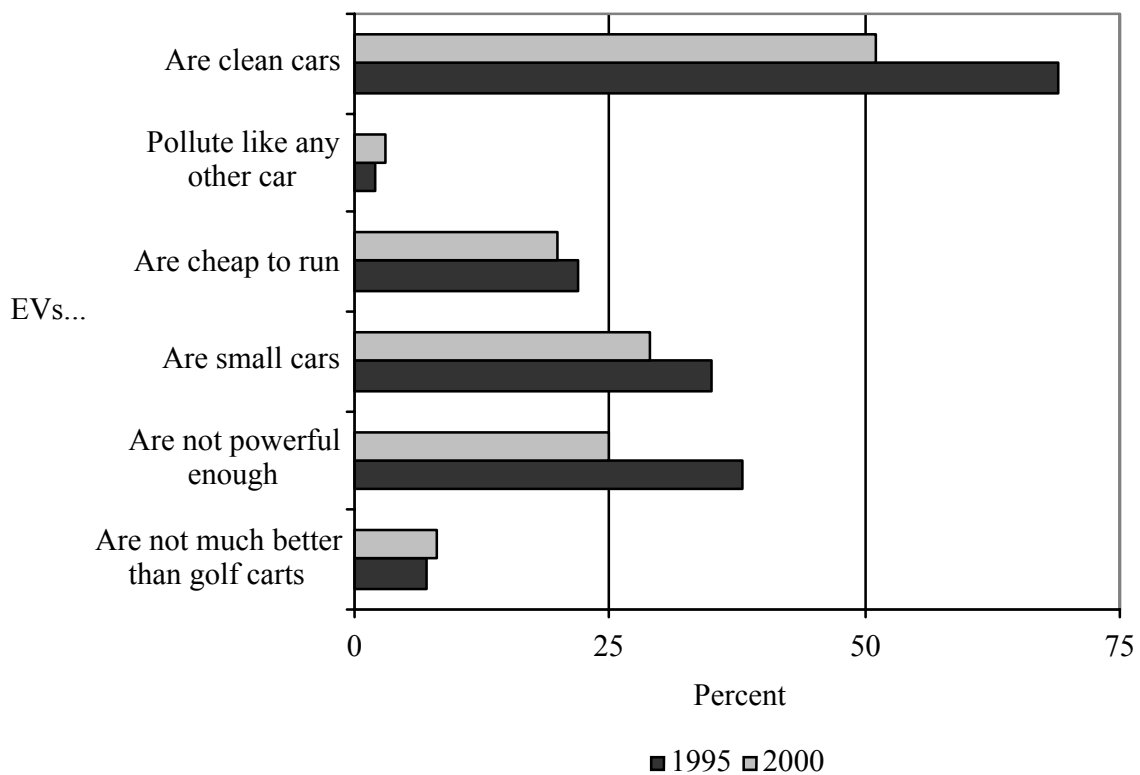
Commenting on the recent decision by the states of Massachusetts and New York to delay their requirements for zero-emission vehicles (ZEVs), a spokesman for the California Air Resources Board said that those states should wait, that they were not yet ready for ZEVs. In contrast, he said, more work has been done to California for ZEVs. In addition to efforts to

deploy recharging infrastructure, the spokesman said, "... the public in California is more familiar with electric cars. We've been bombarding them with information for 10 years."

A critical look at the impacts of this information campaign suggests it has had little effect on the general knowledge citizen/consumers in California have about electric vehicles. Figure 1 summarizes data from two surveys of California households. In both, the samples are of households who buy new motor vehicles. The 1995 survey was conducted by mail; the 2000 survey was conducted via the Internet. We see little evidence of change in the perception of EVs by these households in California. What evidence we do see indicates Californians are being convinced that EVs are not clean.

Not only do Californians appear to have shifted away from knowing that EVs are clean, but the magnitude of the marketing effort waged for conventional vehicles dwarfs spending on information and advertising for EVs. If Californians have been bombarded with information about EVs, these surveys show the opposite; Californians had almost no understanding of EVs. If we want clean and efficient vehicles to make in the marketplace, we will need to take marketing, social marketing, and research more seriously.

**Figure 1: Californians' opinions of electric vehicles. Percent in agreement.**





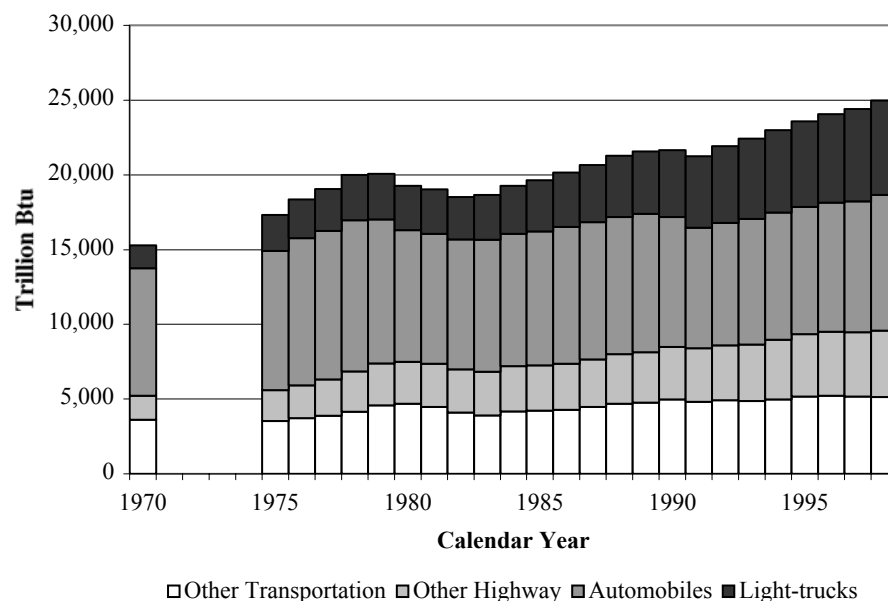
## II. Environmental Problems in Transportation: A few things every motorist should know—but most do not

The adverse environmental impacts of motor vehicles are many; the adverse environmental impacts of automobility, which relies on both automobiles and dense and extensive networks of roads and refueling infrastructure, are more. Some motorists are aware of some, but not all, of these problems, and certainly not of the specifics, e.g., the list of criteria pollutants or greenhouse gases, their primary sources, and how (or whether) they are regulated. Below we outline the current issues that would be relevant to a social marketing campaign. We limit this discussion to those adverse environmental impacts related to, and therefore amenable to policies aimed at curtailing, vehicle emissions of criteria pollutants and greenhouse gases.

### **Overall trends in energy consumption and emissions**

Consider the following macroscopic trends in energy consumption, emissions of greenhouse gases, and criteria pollutants from transportation—light-duty cars and trucks in particular—in the United States. As shown in Figure 2, energy consumption in the transportation sector has continued to grow over the past three decades. However, total energy consumption by *cars* has remained fairly constant during this time period. Energy consumption has increased for other modes; the greatest absolute and percentage increase in energy consumption has been from the growing number of light-duty trucks. Motorists should know something about the rate of increase of energy use, especially as it relates to oil imports and emissions of CO<sub>2</sub>.

**Figure 2: U.S. Transportation Energy Consumption by Mode, 1970 to 1998**

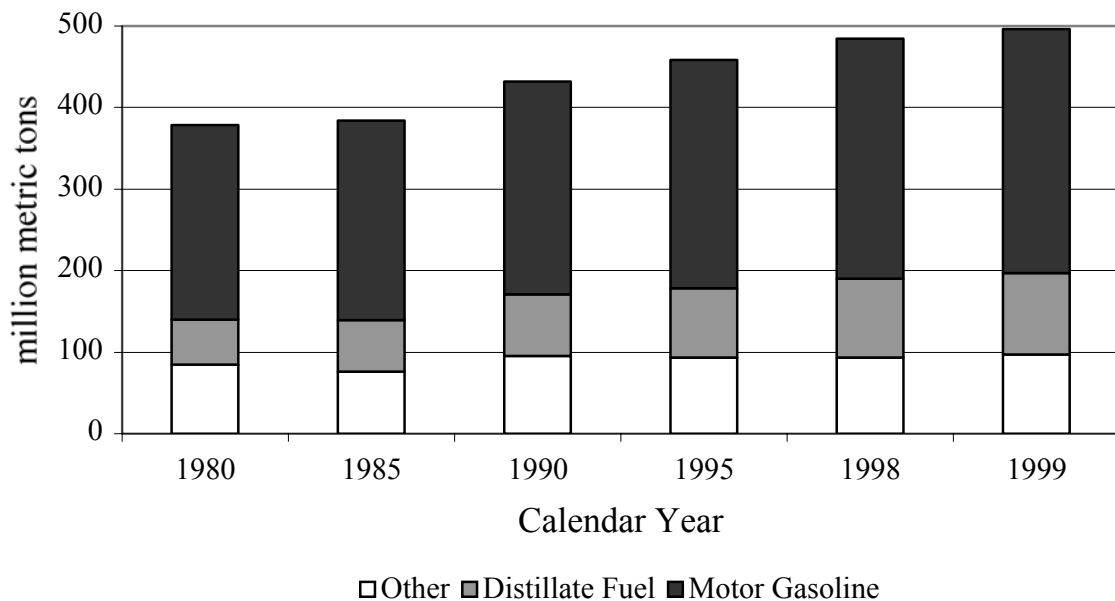


Source: Davis, 2000. Table 2.7.

The share of total CO<sub>2</sub> emissions from burning fossil fuels in the U.S. in any given year due to transportation remained relatively constant from 1984 to 1998, but total CO<sub>2</sub> emissions

from burning fossil fuel increased by 22 percent over this time. Increases in energy consumption lead directly to the continued increases in carbon dioxide emissions shown in Figure 3. While total emissions of CO<sub>2</sub> and many other greenhouse gases continues to grow, we are particularly concerned with emissions from light-duty vehicles—cars and trucks. CO<sub>2</sub> emissions from burning motor gasoline—almost all of which is burned in light-duty cars and trucks—grew at an average 14.8 million metric tons per year during the period 1980 to 1998. This is higher than the growth of emissions from burning distillate fuel (10.5 million metric tons per year) or all other energy sources in transportation (3.4 million metric tons per year). Motorist should know the role of CO<sub>2</sub> in global warming, the growing importance of transport in CO<sub>2</sub> emissions, as well as the overall need to control CO<sub>2</sub> emissions.

**Figure 3: U.S. Carbon Dioxide Emissions from Energy Use in the Transportation Sector, 1980 to 1999, million metric tons carbon**



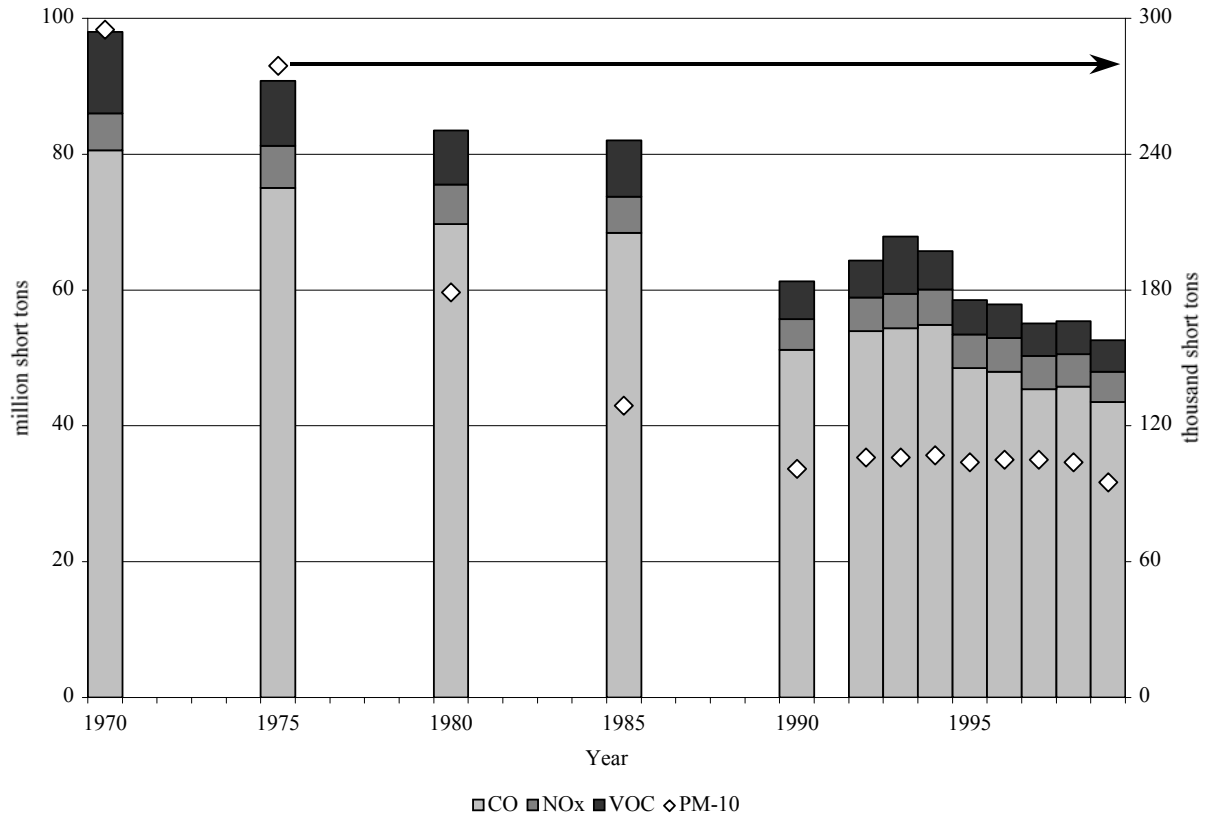
Source: Davis, 2000. Table 3.6.

Note: X-axis is not scalar.

A look at the macroscopic trends in emissions of criteria pollutants initially appears more hopeful. As shown in Figure 4, emissions of criteria pollutants from transportation have generally fallen since the Clean Air Act was enacted in the early 1970s. However, the downward trend has leveled off, especially for particulates. Growth in vehicle miles of travel (VMT) and a shift to more polluting light trucks are beginning to slow progress. (For a review of the causes of increases in VMT, see Schaper and Patterson, 1998.) Further, by judging our progress toward clean air against year 1970 emissions levels we fall into a trap often set by opponents of continued reductions in vehicle emissions. The trap is set by the admonition to “look how much progress we have made, today’s cars are 90 (95, 97, 99—pick your own version of the story) percent cleaner.” The trap is avoided by keeping clearly in mind that where we have been is not the measure of our progress. The correct measure is

how close are we to where would we like to be. That goal is driven by primary and secondary ambient air quality standards. Vehicle (as well as point source and area) emission standards are tactical measures to achieve the strategic goal of clean air. The success or failure of the tactic must be measured against the strategic goal, not simply the tactic itself.

**Figure 4: Emissions of Carbon Monoxide (CO), Nitrogen Oxides (NOx), volatile organic compounds (VOC), and Particulate Matter (PM-10) from Highway Vehicles, 1970 to 1999**



Source: Davis (2000). Tables 4.3, 4.5, 4.7, and 4.9.

Note: Data are for gasoline-powered light-duty cars, trucks, and motorcycles, except the data for PM-10 which include both gasoline and diesel vehicles.

So, how are we doing on the strategic goal of clean air? The American Lung Association (ALA) is not pleased. According to their analysis of air quality monitoring data spanning three years in the late 1990s, millions of Americans who are at risk of negative health effects caused by exposure to ozone live in cities where health-based ambient ozone concentration standards are exceeded on some days.

“More than 132 million Americans live in areas that received an “F” in this report. That is approximately 72 percent of the nation’s population who live in counties where there are ozone monitors.

“Living within the counties that received a “Failing” grade, there are an estimated 16 million Americans over 65, over 7 million asthmatics (5 million adults and 2 million children with asthma), 29 million children under age 14, and 7 million adults with chronic bronchitis.” (ALA, 2000).

The ALA’s grade system assigns grades based on both peak ozone concentration and the number of days the ozone standards were exceeded. The ALA does give credit for progress made over the past few decades, but points out that ambient air quality is something of a moving target; as we learn more about the effects of pollutants on health, standards may need to become more, not less, stringent.

“While emissions of some air pollutants have generally gone down and the nation’s overall air quality has improved over the past 30 years, much of that progress has been in eliminating obvious pollution and sources—bans on open burning, for example. Many of the pollutants that are literally invisible, such as ozone, have been reduced far less, and as understanding of the health effects of air pollution has advanced, it has become clear that much of the nation still faces major air pollution problems.” (ALA, 2000)

### **III. The Context for a Social Marketing Effort: The Existing Market for Light-Duty Vehicles**

Thus far, clean and efficient (C&E) vehicles are offered in a limited number of models and at very low volumes. The market for C&E vehicles must be understood in the context of the whole vehicle market. The whole market for light-duty vehicles can be viewed in a number of ways. It can be categorized by manufacturer (e.g., Ford, GM, Toyota), body styles (trucks, sports cars, minivans and sport utility vehicles), models that have more subtle differences in design (e.g., two, four door, and hatchback), or legal definitions such as those promulgated by the National Highway Traffic Safety Administration. Additional differences within models can include color, engines, transmissions, two, four, or all-wheel drive, interior materials, accessories, exterior trim packages, and safety features. According to one industry trade publication, there were 263 makes and models of vehicles marketed in the US in 1999 (Crain, 2000). This does not include drive train and option packages within any given make and model. In addition to the above distinctions, the industry distinguishes vehicles price and market intent. Interior volume and gross body shape determine the federal EPA’s vehicle classes.

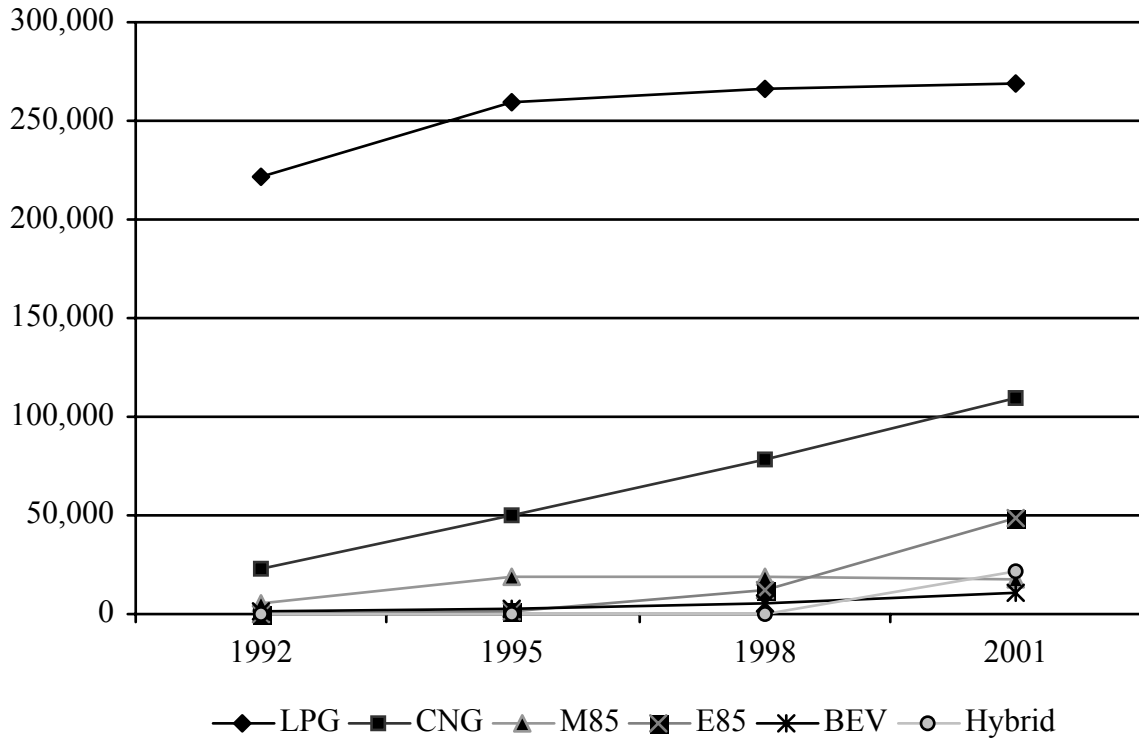
Nowadays, some buyers can choose vehicles by differences in emissions of criteria pollutants including (LEV, ULEV, SULEV) and alternative fuels including: liquid petroleum gas (LPG), compressed natural gas (CNG), and ethanol (E85), methanol (M85), hybrid- and battery-electric vehicles (BEVs).<sup>1</sup> Figure 5 shows the total number of such AFVs on the road over the last decade. However, if we were to re-plot these data on a scale showing all light-

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<sup>1</sup> Leaving aside the fact that if consumers throughout the country knew that light-duty trucks were allowed to emit more criteria pollutants per mile than passenger cars, then consumers everywhere could make choices between vehicles with different emissions levels. Choices between cars and trucks are different from the choices we refer to in the text, which are choices between two otherwise similar vehicles.

duty vehicles, then AFVs, HEVs, and EVs combined could not be distinguished from zero. The point is that these vehicles are barely a blip on the perceptual field of consumers.

**Figure 5: Total Number of AFVS on Road.**



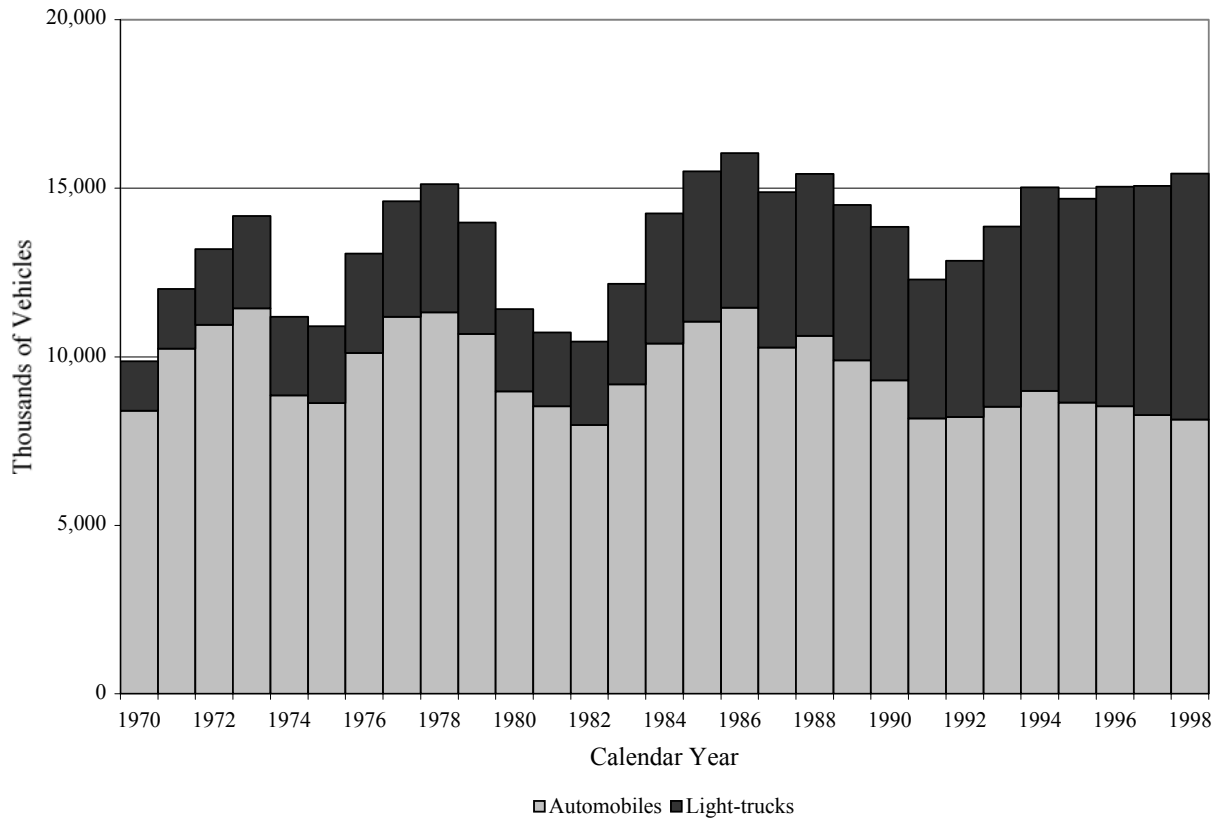
Source: Davis, (2001)

### ***Cars and truck sales trends***

Vehicles classified as “cars” have been regulated differently than those classified as “trucks” for efficiency and emissions.<sup>2</sup> Light-duty trucks have been regulated less stringently. This is a contributing reason why automakers earn higher per vehicle profits for trucks than cars—they need spend less for efficiency and emissions improvements. Data on sales of light-duty vehicles for the period 1970 to 1998 are plotted in Figure 6 below. In addition to automobiles, the data include “light-duty trucks” with Gross Vehicle Weights (GVW) of 10,000 lbs. or less. Therefore, these data include not only cars and trucks, but they include some trucks that exceed 8,500 lbs. GVW and are therefore exempt from even the emissions and efficiency regulations that apply to light-duty trucks. These include some models of “full-size” SUVs marketed as household vehicles.

<sup>2</sup> Cars and truck safety were also regulated differently. As with efficiency and emissions, trucks were regulated less stringently. Further, some vehicles, notably minivans, were classified as trucks for some regulatory purposes, but as cars for others.

**Figure 6: New Retail Automobile and Light-truck Sales in the US, 1970 to 1998.**



Source: Davis, 2000. Tables 7.3 and 7.4.

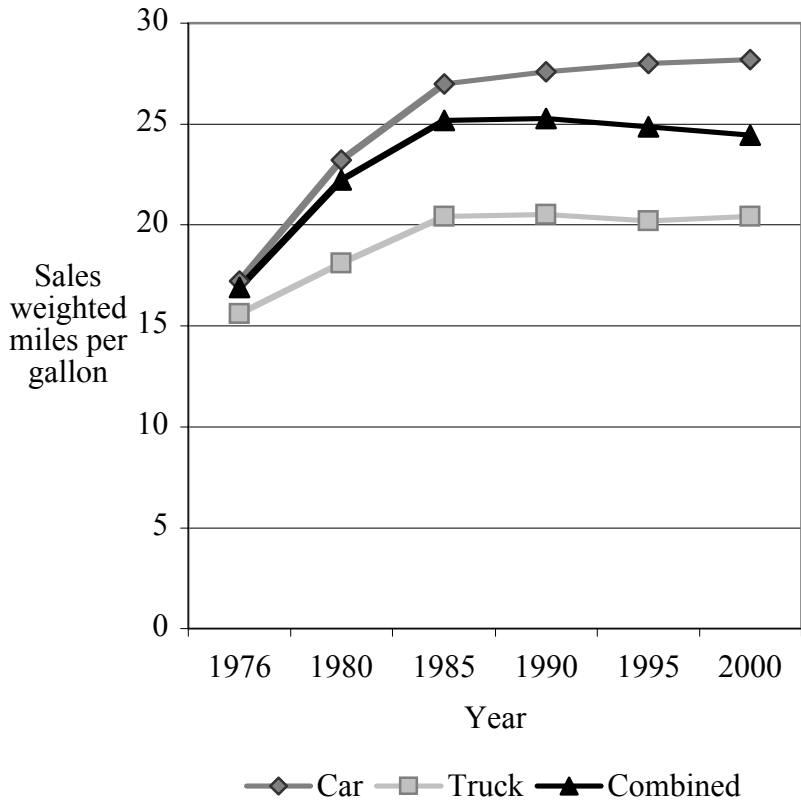
The growing importance of light-duty trucks to overall trends in light-duty vehicle emissions and efficiency is highlighted by the fact that all of the growth in light-duty vehicle retail sales from 1970 to 1998 can be attributed to growth of sales of light-duty trucks. Retail sales of light-duty vehicles (cars plus trucks) were more than 50 percent higher than in 1970; sales of light-duty cars were 0.1 percent less in 1998 than in 1970.

***Trends in New Vehicle Efficiency***

While the sales weighted efficiency of the new cars and trucks sold in the US increased through the mid-1980s and remained fairly constant in the 1990s, the sales weighted efficiency of the entire fleet of new light-duty vehicles sold each year started to decline in 1990. The increasing number of truck sales explains this decline in efficiency of the whole fleet, both absolutely and in comparison to the number of new cars sold each year. These trends are illustrated in Figure 7.

Therefore, a social marketing effort confronts both consumer ignorance of the basic issues, and a market context in which truck-like vehicles have grown to dominate the market trends and have run counter to fuel efficiency goals. These combined trends have stalled regulatory attempts; can social marketing approaches help?

**Figure 7: Sales-weighted Fuel Economy of New Vehicle Sales**



Source: Davis, 2001. Tables 7.5 and 7.6.

#### **IV. A Primer on Social Science Approaches to Marketing Clean and Efficient Vehicles**

Those engaged in social marketing efforts may receive data and reports from social scientists with greatly varied outlooks and training. In this section we briefly sort out some of the differing sensibilities and theories so that practitioners can make the best use of social science research on clean and efficient vehicles and consumers. But first, we note that the single most striking finding we offer on the application of social science to the problems of marketing clean and efficient vehicles is that so little has been done.<sup>3</sup> Much of the application

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<sup>3</sup> Other reviewers and we have reached a similar conclusion with regard to automobility and travel in general. Sheller and Urry (2000) introduce their discussion of automobiles and urban life by noting: "...the social sciences have generally ignored the motor car and its awesome consequences for social life."

Kurani and Kitamura (1996) conclude that an expanded array of social science theory is being brought to bear on the problem of understanding household travel. However, they further conclude that, aside from rational decision-making models (and adjustments thereto), these developments are recent and incomplete.

of social sciences to energy conservation and other environmental problems has centered on the home and home-based behaviors, e.g., home energy use, composting, and recycling. A number of previous reviews of energy conservation in particular conclude that the inquiries of social scientists into energy consumption have been focused on household energy and ignored transportation energy. Stern (1992) writes “Most psychological studies of energy use and conservation have addressed household behavior—most frequently, energy use in homes.” In their review article Rosa et al (1988) present a history of energy sociology. It highlights the importance of understanding household energy consumption, the lessons to be learned from the application of social science, and the absence of attention to household transportation energy. The relevant portion of this history begins with the OPEC oil embargo in 1973.

“Very early research in the area was guided by the singular assumption, derived from an engineering perspective, that household energy consumption could easily be explained by physical variables... The assumption was embarrassed severely... Because they clearly revealed the importance of life-styles to energy consumption practices, these findings stimulated detailed examination investigations of how life-styles shaped energy usage, and paved the way for justifying the importance of social science research to a skeptical policy establishment dominated by an engineering orientation.

“Once underway, microsociological energy studies, representing the bulk of contemporary social science research, produced a wealth of findings. *Despite the near-equal potential for reduced energy use in transportation, however, the lion’s share of this research was devoted to household energy use.*” [Emphasis added.]

### **Conventional Marketing**

Before discussing the theoretical wisdom social science can offer a market transformation, we acknowledge the contributions of conventional marketing (CM), which developed outside the academic disciplines through practice. Marketing does not have a single primary social science approach; marketing develops out of the perspectives of several disciplines, including economics, psychology, sociology, and anthropology. Each of these disciplines has particular theories and sensibilities about the nature of human behavior and historical processes. Additionally, each has its own standards and traditions of research. Because relatively few in the transportation research community have a background in social sciences (with the most common exception of economics), we review briefly the disciplinary sensibilities and types of data collection.

Perhaps the most important contribution from CM is the time-honored “Four P’s of Marketing” taught to marketing students everywhere: Product, Price, Placement, and Promotion. The mnemonic reminds marketers of the consumer-oriented approach of

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Kurani and Turrentine (2002) and Turrentine and Kurani (1998) provide overviews of their efforts to weave together social theory, household activity analysis approaches to travel demand, and research methodologies based on games and simulations in their analysis of potential markets for battery electric vehicles.



marketing and to pay attention to many different aspects of the marketing challenge. Marketers (of all varieties) use the four P's, as described by Andreasen (1995).

- Product: the marketer must identify benefits of the product to consumers, and maybe redesign it based on consumer response
- Price: refers to all the costs, including money, time, convenience, and comfort
- Place: the means of product distribution
- Promotion: advertising and education efforts

There is wisdom in these mnemonics and in practical, conventional marketing—though it tends to be firmly rooted in what consumers have been doing and less attuned to what they might do under novel circumstances. Conventional marketers are often in close and continuous contact with consumers; they watch a wide variety of people interact with a particular product over time. One example of a key insight from conventional marketing comes from Traeger's (2001) on-line article on the clean and efficient vehicle options currently available. Her informant from an automotive research firm discusses both automobile purchase and use behavior.

““When shopping for a new vehicle, people rank good gas mileage only slightly higher than cupholders,’ he says. But after they buy the car, gas mileage becomes a customer satisfaction issue. ‘People always want better gas mileage,’ he says. ‘They resent spending money on gas.’”

This distinction between product purchase and product use is relatively unexplored, including why it would be that dissatisfaction with current fuel use would not be reflected in a subsequent purchase decision.

Also at the core of conventional marketing is the idea of “market segmentation,” the idea that the market place for any set of products is divided among lifestyles, tastes, culture, social class, or some other discriminating factors. Market segmentation models are ubiquitous in marketing. Large marketing firms may develop their own models of how the public is segmented. Some divide the American population into as many as twenty segments. Segments are often given a clever name –such as “Back-to-basics boomers” or “Down-on-their-luck dot-commers.” Roper Starch Worldwide divides consumers into True-Blue Greens, Greenback Greens, Sprouts, and Grouzers according to their pro-environmental behaviors.<sup>4</sup> Influential clients, such as automakers, may develop their own segmentation model, and tailor their product line to satisfy tastes of each segment.

Market segmentation models are usually developed through what has been called “psycho-demographics,” a survey-based, statistical process that identifies clusters of values, consumer tastes, and identities in a population. Such models are usually ad hoc identifications of clusters, and not based in social theory that would explain why or how such clusters exist. Also they are usually cross-sectional and do not model any process of social change, i.e.,

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<sup>4</sup> For a discussion using these green consumer categories, see for example, Speer, T.L (1997).

they are a snapshot of society at one point in time, rather than a movie showing change over time. Because they are based in description and not theory, in cross-section and not process, such segmentation models are not as useful to marketing novel products or when considering the development of social markets. The idea, however, that markets can be segmented remains central, and is considered below in the section entitled “Stage Models.”

## ***Economics***

Compared to other social sciences, economists share a far more singular core set of assumptions about human behavior. The cornerstone of economic thought is that firms, individuals, and households act in their own interest and make rational decisions when making choices. Consumers are assumed to have stable, ranked preferences for goods, or features of goods, and good information about all their options. Choices are constrained by budgets and consumer research is often framed around prices—how much will people pay for what amount of which products. Individualistic decision-makers—be they firms, individual people, or households—will not put collective, or socially-constructed, benefits above their private wants. Therefore research on “consumers” focuses on measuring demand; policy prescriptions focus on structuring the market with taxes and other fiscal instruments. More than other social scientists, economists attempt to operationalize their assumptions in mathematical models, and conduct experiments within these models.

This review is motivated in part by concern that the model of people as rational consumers offers an incomplete explanation and therefore an imperfect basis for policy and social marketing. We quote one such motivating statement at length.

“Past policy responses to these [environmental and social] impacts have been based on three fundamental assumptions:

- a) There exists an innate human need for mobility and movement;
- b) Economic growth and, as a corollary, increased welfare, necessarily entail greater mobility for people and goods; and,
- c) Individuals’ travel preferences are expressed through their economic decisions—e.g., through deliberate and reasoned allocations of resources in more or less clearly defined markets.

“...The third assumption—that individuals act rationally, in more or less clearly defined markets, in order to maximize their utility, has formed the basis for much government action to manage transport demand. Policy instruments such as fuel and road pricing, internalization of external social and environmental costs through these and other means, and improved information provision, have been envisaged and/or implemented in order to lead individuals to modify their travel behaviour. Thus far, however, the results of the policies have been mixed, and they have notably failed to curb the growth in CO<sub>2</sub> emissions and land use for transport infrastructure.” (OECD, 1997)

While economics is not a central perspective in marketing, its theories and methods historically have formed a baseline of sensibilities and data in transportation. Further, economics has provided much of the language, theory, and practice shaping policies relevant

to energy consumption, air pollution control, and greenhouse gas emissions. We briefly review some of these concepts here.

*Social benefits* are the sum of private benefits and any positive externalities associated with the creation of those private benefits. *Externalities* arise when events external to, i.e., not under the control of, a decision-maker enter into their decision-making. Externalities may be either positive (the decision-maker receives a benefit for which they do not have to pay) or negative (a cost is imposed on the decision-maker for which they are not compensated). Examples of products or activities that produce positive externalities include public health programs (especially those aimed at reducing infectious disease); education; and clean air or reduced risk of global warming resulting from a market transaction to invest in a cleaner or more efficient vehicle.

Products and services, or more generally *goods* are *public goods* if (1) it is difficult to exclude any one from consuming them, (2) consumption of the good by one person does not prevent others from similarly consuming it, and (3) the marginal cost of an additional unit of consumption is zero. *Common-pool resources* are distinguished from public goods in that consumption of a common-pool resource by one person does measurably subtract from what is available to others.

Positive externalities and public goods lead to market failures. Ideally, market demand reflects the private benefits to the buyer. When there are positive externalities, some consumers receive benefits for which they do not pay. Thus their consumption is not reflected in market demand, that is; too little of the good or service that provides positive externalities is produced. When there are public goods, no one can be excluded from consuming the good; no one can practically be excluded from receiving benefits for which they do not pay. Again, their consumption would not be reflected in market demand, and again too little of the public good will be produced.

Therefore, those working toward market transformation in clean and efficient vehicles cannot ignore the “market operation” portion of Egan and Brown’s definition (cited in Section I). It won’t be enough to create a sustained supply and demand for efficient products and services; market operations must also be altered so that enough of the public good is created. In a market where cleaner and more efficient vehicles are available, we are still liable to get too little clean air, reduced risk of global climate change, and reduced reliance on petroleum. Revisiting the tragedy of the commons, suppose we recognize the commons (the atmosphere in this case) is filling with CO<sub>2</sub> and increasing the risk of global climate change. Cars and trucks that emit less CO<sub>2</sub> are made available in the market place. Some people start to buy them. CO<sub>2</sub> emissions decline, as does the risk of global climate change. That reduced risk is a positive externality. It is created by the market transactions of those people who do buy vehicles that emit less CO<sub>2</sub>. People who continue to drive vehicles that emit more CO<sub>2</sub> will benefit from the reduced risk without paying for it. Unless further intervention is made, even in the presence of vehicles that emit less CO<sub>2</sub> the market will produce too little CO<sub>2</sub> reduction.

The concepts of externalities and public goods are framed within the assumptions of individualistic rational consumers and competitive producers, so that even if car buyers

wanted clean air, it is assumed they are unable to coordinate their choices with other consumers to achieve clean air, akin to the prisoner's dilemma situation in game theory. Hardin (1968) notes that if you iterate the prisoner's dilemma game, eventually, participants will coordinate, a central opening for social marketing efforts and the idea of education and learning theory.

In following paragraphs of this section, we will describe theories and approaches to decision making other than rationality. Whether or not non-rational actors would produce too little or too much of a given externality would likely depend on the nature of the deviation from individualistic rationality.

## ***Psychology***

While there may be no single central social science foundation to marketing, psychology is "more central" than most. Unlike economics, there is no unified psychological perspective, but rather a large number of approaches and models of behavior. Three of the more influential—attitude-behavior research, reasoned action theory, and cognitive dissonance—will be discussed further.

Most importantly, and in contrast to economics, psychologists do not assume that people act with rational self-interest. Psychologists investigate the role of perception, emotion, learning, and other psychological processes in shaping decisions (and other behaviors) of individuals. Of the social sciences, psychologists (especially clinical psychologists) tend to be the most experimental in their research, comparing behavior in controlled environments. Even a single person's behavior, thought, and values are not necessarily assumed to be consistent.

Many social scientists critique the economic model of rational decision-making. One example from psychology is research into the origin and nature of the preference structure economists assume underlies decision-making. We have previously described psychological research into decision processes that argues that preferences are often constructed—not merely revealed—in responding to a choice (Turrentine and Kurani, 1998). We note also that a distinction can be made between attributes of objects which can be immediately assessed and attributes which can only be judged through either extended exposure and use or some other process, e.g., simulation, that reveals the salience of such attributes and allows assessment of them. Only after people have had the opportunity to assess both types of attributes would they be able to construct preference sets for all a novel objects attributes and make an overall evaluation of the object itself.

### **Attitude-Behavior Models: (Dis)Connecting Attitudes and Behavior**

One widely used approach to understanding environmentally motivated behavior is to attempt to map environmental attitudes onto behavior. The quotes that open the first section of this review appear to describe a disconnection between attitudes and behavior. People say they want to protect the environment, that clean air is important to them; few consider emissions or fuel economy when they buy a car or truck.

If we expect that attitudes and behavior ought to be consistent, inconsistencies such as those cited present us with difficulty. However, the real difficulty would appear to be with our expectation of such consistency. Tedeschi, Cann, and Siegfried (1982) found no difference in attitudes toward, or knowledge of, air pollution between people who did and did not participate in voluntary vehicle emission inspections. Archer et al (1987) found that people with strong attitudes in favor of home energy conservation were not more likely to engage in energy conserving behaviors. McKenzie-Mohr and Smith (1999) cite numerous other examples related to home energy consumption, recycling, littering, and a number of other environmentally motivated behaviors. Lee and Holden (1999) and Bang et al (2000) provide additional examples. Hini et al (1995) conclude their examination of links between environmental attitudes and behaviors by stating

“...no evidence was found that environmental attitudes (at least those examined here) are useful predictors of behavior, if by useful we mean consistently able to predict behaviour.”

Lee and Holden (1999) summarize and cite a number of approaches taken to address the weak relationships discovered between attitude and behavior. They cite the incorporation of affect (how people feel), cost-benefit measures, self-perceived consumer effectiveness, faith in others, and demographic characteristics. In their own work, they define environmentally motivated behaviors as prosocial behaviors. They extend Batson's (1987) model of prosocial behavior—which distinguishes between egoistic and altruistic motivations—from helping behaviors to environmentally motivated behaviors. They conclude that if empathy—the perception of the needs of others and the adoption of their perspective—can be invoked, this is a strong motivator of pro-environmental behaviors.

### Reasoned Action Theory

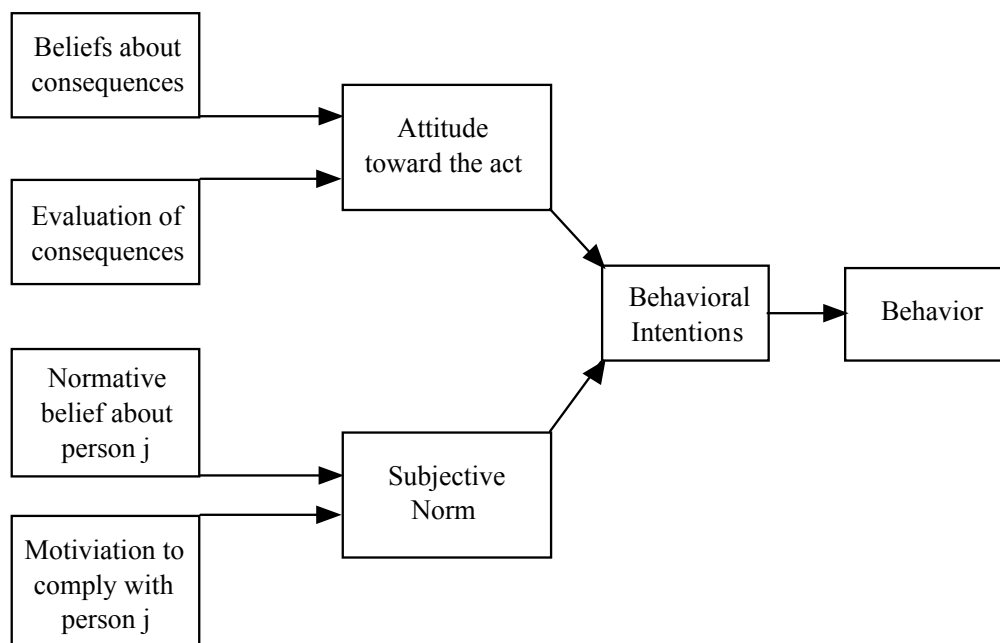
Fishbein and Ajzen's (1975) *reasoned action theory* states that individual's actions are based on their beliefs about the decision they are contemplating. Beliefs underlie both attitudes and subjective norms. Reasoned action theory is invoked by Andreasen (1995, p. 151) in his discussion of the Contemplation stage of decision-making processes (see the section on Stage Models from Marketing and Social Marketing below). He states there is ample evidence that the relevant beliefs are those at a micro-level that relate to the specific behavior at hand. Applying this idea, we would expect that beliefs about the desirability of a specific automobile weigh more heavily in a purchase decision than beliefs about whether cars and trucks in general should be cleaner and more efficient. In effect, one way to improve the performance of attitude-behavior models is to measure attitudes specific to a behavior, not generally.

In the model of behavior described by reasoned action theory, a person's intentions regarding a behavior determine whether the behavior is undertaken. Attitudes and norms are assumed to shape behavioral intentions. Figure 8, simplified from Bang et al (2000), illustrates these relationships. Attitudes and norms are assumed to be determined by salient beliefs, a valuation of each belief, and a summation of some product of beliefs and their value. Thus both positive and negative beliefs are individually weighted, then summed to yield an overall attitude and an overall subjective norm. Beliefs themselves are determined by knowledge—

facts or things believed to be factual. This knowledge may also determine which beliefs are salient and establish the value of the beliefs.

The model provides one immediate explanation as to why efforts to estimate relationships between attitudes and behavior often show only slight correlation—they may be ignoring social norms that also shape behavioral intention. The relative importance of norms as compared to attitudes may vary across behaviors, and across people with respect to the same behavior. Andreasen (1995, p. 260) discusses how Reisman’s categories of inner-directed and outer-directed people relate to this model. People who are highly inner-directed will be less affected by social norms; people who are outer-directed will be more affected.

**Figure 8: A Schematic of Reasoned Action Theory**



Source: Modified from Bang et al (2000).

Summarizing research on the connection between attitude and behavior, clearly we should not expect too much. Hini et al (1995) caution, “...that when attitudes are measured as they commonly are, their predictive ability is unlikely to be higher than about 30%, and could be much lower.” Among the problems with the common forms of measurement are that attitudes are often measured at the level of general concepts; their predictive power is improved if measured with regard to a specific behavior. Further, there are far too many other explanatory variables—cultural norms, constraints on freedom to act, income (especially if the behavior involves the purchase of an expensive consumer durable), family life stage, and more—for us to believe that attitude alone will be a powerful predictor of behavior.

### Cognitive Dissonance

Festinger (1962) offers the following summary of the theory of cognitive dissonance.

“This theory centers around the idea that if a person knows various things that are not psychologically consistent with one another, he will, in a variety of ways, try to make them more consistent.

“A person can change his opinion; he can change his behavior, thereby changing the information he has about it; he can even distort his perception and his information about the world around him.”

This theory may be relevant to marketing both prior to, and after, purchases. Prior to purchase, marketers may attempt to invoke dissonance or promise reduced dissonance to prompt purchase. Following purchase, buyers are reassured (i.e., their dissonance is reduced) by advertising messages. Based on this, one approach to marketing clean and efficient vehicles is to explore the desire for a cleaner environment among users of a polluting, inefficient technology.

Cognitive dissonance can be invoked to prompt purchase. But as Festinger's summary implies, the outcome of a person's effort to reduce cognitive dissonance may not be the marketer's desired outcome; purchase of the advertised product is only one way a person might reduce their dissonance.

The purchase of an expensive durable good such as an automobile may produce significant post-purchase cognitive dissonance. In their examination of automobile purchasers, Ehrlich et al, (1957) argued there may be two sources of dissonance. One source is the superior features of any competing model that was considered for purchase, but not purchased; the other is the poorer features of the purchased model. Both of these sets of features are dissonant with ownership of the purchased automobile. They hypothesized that recent purchasers of a particular automobile would be more likely to read product advertisements for that automobile than people who purchased some other automobile, or no automobile, recently. Their analysis supported this hypothesis. In effect, they found that in addition to any role in prompting people to buy a particular automobile, another role of advertising is to make people who have already purchased a specific automobile feel better about their purchase.

## **Sociology**

Compared to economics and psychology, sociology is focused upon group behavior and social constructions such as institutions, cities, social classes, and social values. Sociologists tend to be interested in social change such as that resulting from the shift from traditional, rural society to modern, industrial and urbanized life, and the continuing evolution of societies. Sociologists view values, decisions, and other behaviors as shaped by the historical and structural aspects of society. Rosa et al (1988) describe a sociological perspective on the study of energy use:

“Energy, though fundamentally a physical variable, penetrates significantly into almost all facets of the social world. Life-styles, broad patterns of communication and interaction, collective activities, and key features of social structure and change are conditioned by the availability of energy, the technical means for converting energy into usable forms, and the ways energy is ultimately used.”

In marketing, sociological approaches have focused upon identifying consumer patterns according to ethnicity, social class, gender, and other social groups. From a social marketing perspective, sociologists may develop very different messages and programs for different groups in society in order to elicit behavior change. Additionally, social marketing itself can be viewed as a social process in which new values and behaviors are developed.

Demography is one branch of sociology. Demographers study the structure of overall populations in terms of size, density, and distribution. Typically demographic inquiries concern population growth (and decline) including immigration and emigration, the age structure of the population, formation and composition of smaller social units such as households, and distributions of income, educational attainment, and other measures.

Cramer (1998) conducted an analysis of changes in air quality in California that included population growth as one explanatory variable. He concluded, within the limits of available data, that whether or not population growth was a significant explanatory variable of emissions in California depends on the emission in question. Of particular interest to readers of this report, emissions of the ozone precursors reactive organic gases (ROG) and NO<sub>x</sub>, as well as carbon monoxide (CO), are strongly and positively correlated with population growth: as population grows, ROG, NO<sub>x</sub>, and CO emissions (which are disproportionately from transportation (vehicle) sources) grow too.

Taschian, Taschian, and Slama (1983) conducted an analysis of preferred policies to promote gasoline conservation. They studied whether the distribution of hypothetical choices of policies could be explained by household structure. Their study is not truly demographic in that they did not study an entire population per se. They did examine a demographic variable—family life stage—in a small (compared to a true demographic analysis) sample. Family life stage is a measure of the structure of family units according to marital status and age of household heads and the presence (or absence) and age of children. They argue for the use of this measure, noting previous research supporting their argument that

“...a person’s stage of the family life cycle is a better indicator of his or her discretionary income than is age. Furthermore, the tendency to consume varies as one’s needs change across specific stages of the family life cycle.”

They found the rank orders of preferred policies (or combination of policies—including no policy to encourage or enforce energy conservation) are distinctly different across a six-category typology of family life stage. This result suggests that the entire population will not favor any one policy; the choice will have to be contested or negotiated. The authors did not explore whether additional educational/informational intervention would convince members of any family life stage of the desirability of a particular policy or package of policies.

## ***Anthropology***

Anthropologists have focused upon understanding cultural differences between human groups, not only industrial societies, but also pre-capitalist farming, hunting, and gardening societies. The diversity of human experience confronting anthropologists has resulted in a broader sense of the possibilities of human behavior than in the other sciences. Because of this broader sense of humanity, anthropologists may view behaviors that are assumed to be



natural or universal aspects of human reality by the other social sciences as particular or transitional. For example, anthropologists who investigate decision-making find many types of decision processes, most shaped by traditions, beliefs, and constraints.

Because anthropologists often study small-scale, non-technological communities, they have used simple observation, face-to-face interviews, and personal participation in local activities to gather data. These techniques have been adapted to marketing research in recent years. From a social marketing perspective, anthropologists tend to explore in greater detail the shared beliefs, sensibilities, and routines that shape behaviors of particular groups.

Anthropological methods and approaches have been applied, for example, to understanding differences in knowledge and models between different groups of “experts” and between “expert” and “lay” groups. Kempton and Montgomery, (1982) and Kempton, Boster, and Hartley (1995) explored such models of environmental values, energy efficiency, and global climate change. They concluded that experts tend to be isolated from each other; experts in any given group (e.g., automotive engineers, legislative staff, energy industry lobbyists, and environmental groups) tend to get information from within their own organizations and not from each other. They also report that lay and expert populations do not share a common mental model of global climate change and its causes, perhaps explaining why lay populations tend not to support policy and technology options suggested by experts.

### **Consumer Research**

A specialized branch of social science—consumer research—is directly devoted to the purchase behavior of consumers. It is largely based on models of personal motivation and decision-making from the field of psychology.

#### **Do Consumers Make Purchase Decisions?**

Given the many varieties of such models, perhaps the most radical suggestion from consumer research (and in clear contradiction to much of the work in many fields of social science) is that consumers may not make purchase decisions at all. The less radical version of this suggestion is that there are a variety of ways in which people make purchase choices. Variation may occur across people—different people have different styles—and within people—the same person may make choices differently depending on the choice contexts.

In the title to their article, Olshavsky and Granbois (1979) bluntly ask—“Consumer decision making—Fact or fiction?” They characterize *decision processes* as having four stages:

- “1. Two or more alternative actions exist and, therefore, choice must occur.
- “2. Evaluative criteria facilitate the forecasting of each alternative's consequences for the consumer's goals or objectives.
- “3. The chosen alternative is determined by a decision rule or evaluative procedure.
- “4. Information sought from external sources and /or retrieved from memory is processed in the application of the decision rule or evaluation procedure.”

Their overall conclusion is that

“...a synthesis of research on consumers’ prepurchase behavior suggests that a substantial proportion of purchases do not involve decision making, not even on the first purchase.”

Further,

“Purchases can occur out of necessity; they can be derived from culturally-mandated lifestyles or from interlocked purchases; they can result from simple conformity to group norms or from imitation of others; they can reflect preferences acquired in early childhood; purchases can be made exclusively on recommendations from personal or non-personal sources; they can be made on the base of surrogates of various types; or they can even occur on a random or superficial basis.”

We might ask whether these results apply to the specific case of automotive purchase. In discussing whether households “decide” to allocate income across broad categories of goods and services we see many ways in which decision processes regarding automotive purchases may not fit the four steps of decision processes.

Automobiles are one category of good whose ownership is strongly compelled. We have built a society in which full participation requires automobility. Automobiles also belong to what Riesman and Roseborough (1955, cited in Olshavsky and Granbois, 1979) “...termed the ‘standard package,’ a set of products uniformly represented throughout American society.” Thus most Americans don’t have any real choice between owning or not owning automobiles—though which ones they own may still involve a decision. Still, how much we spend on automobiles is not a function of vehicle purchase decisions alone. Automobiles belong to an interlocked group of products and services, including insurance, registration, gasoline, maintenance, repair, garaging, and parking. Even the most dedicated decision-maker can only estimate with varying accuracy the cost (quantity and price) and quality of all of these.

Discussing efforts to categorize “differences in the cognitive and motivational patterns associated with the many products and services involved in consumption,” Olshavsky and Granbois (1979) cite Woods’ (1961) three-fold scheme for categorizing goods and services according to (1) sensory stimulus, (2) important symbolic meaning (ego involvement), and (3) functional performance. Olshavsky and Granbois state, “...prepurchase choice processes are more likely when functional performance dominates.” This suggests to us that if the marketing of automobiles stresses functional performance, this may stimulate decision processes; marketing that stresses sensory perception and ego-involvement may not.

In closing their article, Olshavsky and Granbois note:

“In view of the tremendous interest in consumer purchasing behavior it is surprising, to say the least, that there have been so few studies of prepurchase processes that involve actual consumers in actual settings using methodologies that permit observation of behaviors contrary to those predicted by models of choices and decision processes....”

The methods to which they refer may be found in the toolbox of applied market researchers, anthropologists, ethnographers, and perhaps even clinical psychologists discussed above.

### ***Stage Models of Change***

Each of the disciplines of social science has something to contribute as we probe, plan, and predict the transformation of the automotive market to a green market. Such a transformation will undoubtedly be complex, with changes in product prices, consumer knowledge, technological performance, tax structures, public values, and historical events. This transformation will likely to be described as a process with several stages, steps, or phases. Stage models of change are, for the most part, common sense; we believe that people and households become aware of new options, then deliberate their pros and cons, make a decision, and implement that decision. Furthermore, this individual or household process will happen over time across the population according to income, association, exposure, taste, or sensibilities about the new options. Therefore, market transformation will be discussed as taking place in a series of stages or steps.

In addition to their heuristic value, stage models provide a practical schema for the design of a marketing program. Marketing research, messages, and media can be designed around such stages. Viewing the market as developing in stages allows marketers to measure progress of specific efforts and implement new or redesigned efforts as the “market” (i.e., consumer-citizens, social institutions, and technologies) either advance through the stages or stall. That is, stage models may describe population level, market-wide (macro-level) changes, as well as the behavior of individuals (micro-level).<sup>5</sup>

Each social science discipline has its own sensibilities for describing both change and stability. Economics for the most part assumes that values and preferences are (more) stable, and that prices, technical options, and income are the variables that drive change. In psychology, there are stage models of learning, decision-making, conflict resolution, and values change. In sociology, the most famous model for social marketing has been the diffusion of innovation (DOI) model (see for example, Rogers, 1983). While anthropologists were among the first to conduct DOI studies and DOI research has been carried out within almost all disciplines of social science, the commonly recognizable foundations of most DOI research are in rural sociology. There the model was first developed to describe the adoption of hybrid corn by American farmers. The DOI framework has since been adapted to almost every type of introduced change. Rogers discusses a stage model of innovation adoption for individuals; the basic DOI stage model is illustrated in Figure 9. This basic model has been modified to show larger decision contexts and feed back loops, e.g., re-invention of the innovation during the implementation stage.

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<sup>5</sup> Perhaps not surprising given their skepticism about the (general) existence of consumer prepurchase decision processes, Olshavsky and Granbois (1979; 96) cite evidence that stage models of individuals’ decision processes are little more than artifacts of data collection methods. Even if this is so, we believe it likely that the use of a stage model at a macro-level to organize the marketing effort will be valuable.

**Figure 9: A Basic Diffusion of Innovation Model**

Knowledge→ Persuasion→ Decision→ Implementation→ Confirmation

Source: Rogers (1983).

We will explicitly address this larger framework when we explore the question of when to apply social marketing. The connections between marketing and DOI are obvious and many. Rogers (1983), in a typology that evolves as different areas of emphasis rise and fall, ranks marketing as one of the most active areas of DOI research. This activity is less influential than it might be because, as Rogers observes, “a large proportion of these diffusion research reports, however, are found only in the secret files of the sponsoring companies.”

Another famous marketing model of change is Stanford Research Institute’s Values, Attitudes, and Lifestyles (VALS) model reported by Arnold Mitchell in his book *Nine American Lifestyles* (Mitchell, 1983) This work was influential because of its contemplation of the impact on product marketing of the cultural changes that occurred across the American population in the 1960s. Mitchell segmented the population along a process of changed lifestyles. In retrospect, the model overestimated the transformation effect of new values on consumption patterns.

The mechanisms that drive change, in particular whether such mechanisms are endogenous or exogenous to the decision-maker, distinguish many stage models. For example, dissonance theories from psychology propose that individuals may change their values when they become aware of contradictions that demand resolution between their behavior and their beliefs. In contrast, the mechanisms in Rogers’ DOI model are primarily education and communication, and rely upon development of new ideas, technologies, and options, i.e., innovations, to stimulate change in individuals (and organizations). Many issues in the automobile market are large-scale ecological, political, and economic events exogenous to individuals and households. The fuel economy of their vehicles is a consumer choice that has been affected at times by grand scale historical events including wars, oil embargoes by political-economic cartels, and other market disruptions. These historical events can challenge the use of stage models, disrupting the “normal” progress of a market transformation.

## V. Social Marketing

“Why can’t you sell brotherhood like you sell soap?”  
(Wiebe, 1952)

“To sell brotherhood like soap, there must be soap.”  
(Rothschild, 1999)

Rothschild’s reply to Wiebe’s question calls our attention to the differences between brotherhood and soap, some of which are instructive to the case of clean and efficient

vehicles.<sup>6</sup> A transaction for soap is usually a specific, readily identifiable act; brotherhood is a way of behaving. Soap can confer immediate and noticeable benefits; the benefits of brotherhood are uncertain and may not occur until some time in the future. Some of the benefits of soap can be inferred prior to purchase—smelling the soap may make us think about being clean even before we buy it. It may be hard to explain the benefits of brotherhood in a compelling way. Rothschild goes on to chastise many practitioners of social marketing, claiming they have forgotten about marketing, and rely too heavily on education and regulation.

“Too often, managers of public health behaviors, in effect, tell the target to stop being dirty or threaten to fine those who remain dirty, rather than offering the target a brand of soap and a rationale as to why the soap’s benefits and rewards are superior to remaining dirty.” (Rothschild, 1999)

The purpose of this section is to define *social marketing*. We start with a basic, and widely referenced, definition. We explain it from a variety of viewpoints—what is it, how do you do it, upon what social science is it based? We then move on to emphasize some of the differences between social and commercial marketing. These include the attention to community and the particular ethical obligation in social marketing. We discuss what social marketing is if the “behavior” being marketed is a market transaction—in effect, exploring whether clean and efficient vehicles are more like brotherhood or soap. Finally, we return to the question implicit in Rothschild’s remarks above—when do we educate, when do we market, and when do we regulate?

### ***A Basic Definition***

“Social marketing is the application of commercial marketing technologies to the analysis, planning, execution, and evaluation of programs designed to influence the voluntary behavior of target audiences in order to improve their personal welfare and that of their society.” (Andreasen, 1995)

Social marketing offers a framework to organize the application of social science to the problem of transforming markets. Most of its early applications were in the fields of public health and education. It is inspired by conventional marketing, but is focused primarily on behavior change rather than market choices. It focuses on benefits that accrue to the consumer-citizen to whom the behavior is marketed, rather than on the benefits to the producer of any product or service. Marketing in general utilizes several models and precepts from the social sciences. Social marketing further refines and advances the application of social science through its explicit treatment of research as integral to the marketing process, and most importantly through its stated goal of benefiting individuals and their social groups. And as we mentioned in the discussion of sociology, social marketing itself can be viewed as a social process in which new values and behaviors are developed.

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<sup>6</sup> Wiebe asks the question rhetorically, and does provide his own answer.

## ***Eight P's of Social Marketing***

Recalling the “Four P’s of Marketing,” Nedra Weinrich adds four more P’s to further describe social marketing: Publics, Partnerships, Policy, and Purse-strings (1999). Here is a quick summary of Weinrich’s Eight P’s of social marketing (including the original Four P’s of commercial marketing).

- Product: Marketer must identify benefits of the product to consumers, and maybe redesign it based on consumer response
- Price: refers to all the costs, including money, time, convenience, and comfort
- Place: the means of product distribution
- Promotion: advertising and education efforts
- Publics: social goods involve connecting with communities and other groups
- Partnerships: For social marketing, many organizations must band together to effect a long term education and promotional effort
- Policy: For social marketing, government must back efforts with laws, tax incentives, and other policies
- Purse Strings: Social marketing must find a source of funding, since a private profit motive may be limited or lacking

## ***Steps in a Social Marketing Process***

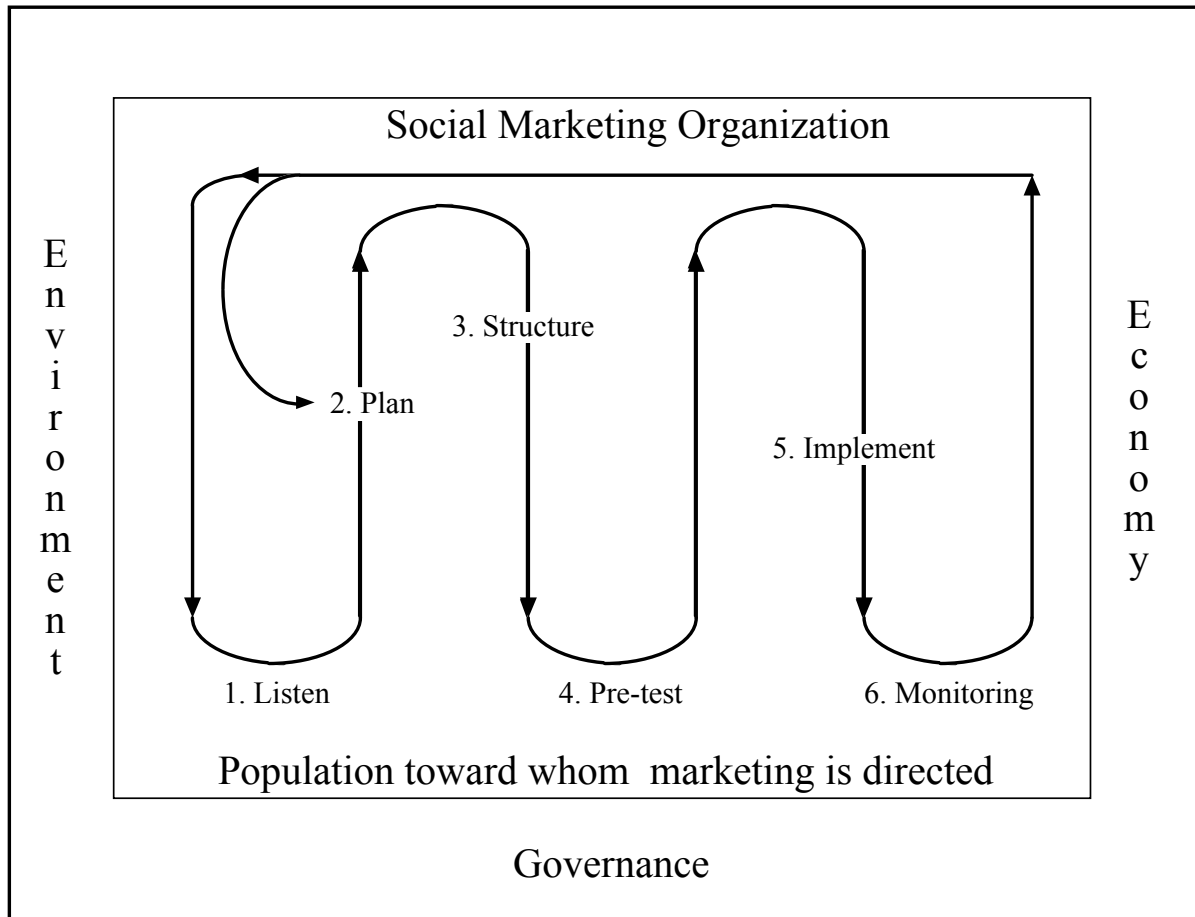
Andreasen (1995) offers a six stage, recursive model of the social marketing process. His model defines and emphasizes the role of research in designing, monitoring, and modifying a social marketing campaign. A modification of his illustration of these six steps is shown in Figure 9. The six steps are as follows:

- 1) Listening: Background analysis, especially of “customers,” but perhaps also of competitors.
- 2) Planning: Setting mission, objectives, and goals; defining marketing strategy
- 3) Structuring: Establishing a marketing organization, procedures, benchmarks, and feedback mechanisms to carry out the strategy
- 4) Pretesting: Testing key elements
- 5) Implementing: Putting the strategy into effect
- 6) Monitoring: Tracking program progress, adjusting strategy and tactics as necessary

Stages 1, 4, and 6 are stages during which research is conducted. Social marketing, at this micro-level, aims to change the choices of consumers through education, persuasion, and marketing. Its initial goals are to understand current consumer behavior, consumer decision processes, beliefs, intentions, preferences around (in the present case, vehicle) purchases and use, i.e., listening. Then, social marketing must investigate and design the best ways to change consumer decisions i.e., planning, structuring, and pre-testing. Next, the program is

implemented. Finally, social marketing must install a monitoring program, to study the impact of marketing efforts on consumers over a long period of time, and provide information to modify messages, media, and strategies as required.

**Figure 9: Andreasen’s six-stage model of social marketing, as modified by Kurani and Turrentine**



As shown in Figure 9, we have slightly modified this framework. First, Andreasen’s original consists of only the inner box containing the social marketing organization, the population toward whom the social marketing campaign is directed, and the six-phase model of a social marketing campaign. Social marketers certainly implicitly recognize that their activities exist in some larger setting. In developing a definition of social marketing that includes the promotion of market transactions, i.e., products, we believe it is worthwhile making this larger context explicit; therefore we add the outside box representing the environment, economy, and systems of governance. We will explicitly address this larger framework in subsequent sections in which we explore the role of community and the question of when to apply social marketing.

Also, following arguments we have developed elsewhere incorporating sociologist Anthony Giddens' *structuration approach* into vehicle market research (Turrentine and Kurani, 1998), we explicitly place researchers (the social marketing organization) in a collaborative relationship with respondents (the population).<sup>7</sup> Within such a framework, people are not simply passive "targets" for marketers; rather they are empowered to participate in the processes such as technology development, policy formation, and marketing. The modified representation of the model places both the marketing organization and the market inside a single box (rather than separate boxes) and situates Stage 2 (Planning) more nearly between the organization and the market (rather than squarely within the marketing organization). These modifications emphasize that the organization and the market do not exist apart, but exist within a framework in which they are collaborators.

Andreasen's definition of social marketing serves as a launching point for further discussion of social marketing. We review a number of these discussions here, and add a bit of our own effort to define what social marketing means when the behavior being marketed is a purchase choice in the market for clean and efficient vehicles.

### ***Micro- and Macro-level Social Marketing***

Social marketing can act at two levels. At a "micro-level," social marketing is one of the three types of actions, identified by Rothschild (1999) to "manage public health and social issues behaviors." The other two are educational programs and legal requirements. At a "macro-level," social marketing provides the framework to organize all three types of activities. As Marks (1998) describes it,

"[Social marketing] offers strategic perspectives and methods for creating social marketing interventions that elicit voluntary exchanges with people... The strategies and methods of social marketing include: segmentation of the public; targeting of critical segments; tailoring interventions to the reality of each segment; and the designing a marketing mix that optimally influences the segment members... Thus, social marketing is the mechanism for configuring a social marketing intervention.

"Secondly, at "macro-level," the very same social marketing strategies and methods can be used to configure the overall mix of the three approaches [education, marketing, and law] in behavioural management efforts. Thus, social marketing is also a mechanism for configuring the whole behavioural management mix of educational, marketing and legal interventions."

Social marketing then is an overall process to manage behavior change (as illustrated above in Figure 9). It provides a framework for choosing the mix of messages, media, and methods, i.e., education, marketing, and law. It is also one of the specific methods to influence behavior (as described in the following section on Stage Models from Marketing and Social Marketing and described in Table 2.)

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<sup>7</sup> Giddens has developed his approach over the course of several years, and we have drawn from several of his texts. In particular though, see Giddens (1984) and Giddens (1991).



## **Society and Community**

Andreasen refers to the society of the consumer-citizens who are the objects of a social marketing campaign. The relevant definition of “society” may depend on the particular behavior or product being marketed—and the choice of an appropriate and effective definition is crucial to the success of social marketing. In the case of transportation, energy, and sustainability we—as analysts—might frame the problem in terms of a “global society” as the underlying problem has been framed in terms of global climactic disruption. Effective social marketing may require the linking of the disruption of global climates to smaller, more personal social settings in which the consumer/citizens whom we hope to influence feel their own lives are most firmly embedded. Alternatively, global warming may eventually catalyze a global awareness, embedded in other processes of the globalization of modern life.

Andreasen’s definition also emphasizes the subject-object relationship between policy and consumer/citizens. The concept of sustainability—no matter how narrowly or broadly defined—translates into a slate of policies that would affect all our daily lives. Banister (1998), in developing an expansive definition of sustainability within the transport field includes *participation* as an objective of sustainability. He opines, “. . .too often in the past, decisions have been made without the participation of the affected parties.” It is also likely that too often *no* decision has been taken, because of real or perceived lack of participation and support of the affected parties. Richardson, (1998), explicitly recognizes the political dimension of sustainability. Therefore it is necessary to enlist consumer/citizens in the process of policy formation. Social marketing is one mechanism to do so.

### **Community-based Social Marketing**

One variant of social marketing is *community-based social marketing*. McKenzie-Mohr and Smith (1999) describe it thus:

“Community-based social marketing draws heavily on research in social psychology which indicates that *initiatives to promote behavior change are often most effective when they are carried out at the community level and involve direct contact with people*. The emergence of community-based social marketing over the last several years can be traced to a growing understanding that conventional social marketing, which often relies heavily on media advertising, can be effective in creating public awareness and understanding of issues related to sustainability, but is limited in its ability to foster behavior change.” [Emphasis added.]

Parallels to the DOI literature are apparent in this definition. Invoking “community” implies social networks; a good deal of the DOI literature concerns itself with the movement of information through such networks. Similarly, while community-based social marketing often relies on “direct contact with people,” within the DOI framework a “change agent” is charged with introducing an innovation into a social network.

Defining communities as the social network through which a new product, service, or behavior is spread depends on the new thing being supported by values shared by members of the community. Success depends on community support, not solely on individual adoption or purchase. The listening phase of social marketing must be designed to listen to individuals

and their communities. We cover some methodological issues regarding research on individuals and groups in the penultimate section.

### ***Ethics in Social Marketing***

Though she is not the first to point out the particular ethical burden of social marketing, Marks (1998) does put it in sharp contrast with conventional marketing. (The definition of social marketing to which she refers is Andreasen's that we quote above as our basic definition.)

“This definition highlights the fact that social marketers differ from other marketers in that they take a prescriptive, focused ethical stance toward what the outcomes of their efforts should be. Social marketers constrain themselves to trying to influence behaviours that contribute to individual and collective welfare. Specification of what constitutes that individual and collective welfare is usually derived from the professional standards and norms of the arena of impact.”

Further,

“Social marketers, therefore, differ from other marketers in that they do not focus only on unleashing and amplifying the forces of the free market so that individual needs, wants and interests are met. *They also try to change some of those forces so that their outcomes conform to socially sanctioned definitions of human welfare, and contribute to an optimal balance between individual and social welfare.*” [Emphasis added.]

### **Who decides what's good for us?**

Within the realm of public health, arbiters of “socially sanctioned definitions of human welfare” and the “optimal balance between individual and social welfare” are readily identifiable. They are found in law, government agencies (e.g., state and federal departments of health, the Centers for Disease Control), extra-governmental agencies (e.g., the World Health Organization), as well as professional organizations (e.g., the American Medical Association) and practices (e.g., the Hippocratic Oath).

In the case of clean and efficient vehicles, air quality is most like public health (in that arbiters are more readily identified). Since the primary ambient air quality standards are based on public health, some of the arbiters are those mentioned above. At the level of policy implementation, the federal and state agencies include the federal EPA, state environmental agencies, and local/regional air quality management districts. The case of energy and greenhouse gas emissions is more complex. The primary reason is the problem is global in nature, and the present-day US administration has rejected the currently negotiated international framework for addressing greenhouse gas emissions. The US Congress has recently rejected proposals to increase CAFE standards. Conversely, the State of California has just enacted a new law—Assembly Bill 1493, signed by the Governor on July 22, 2002—empowering the California Air Resources Board to promulgate standards for carbon dioxide emissions from automobiles. The automobile industry has promised to challenge the law in the courts.

Further, within the current discussion of marketing clean and efficient vehicles, one of the competing behaviors is for people to continue buying the cars and trucks being produced today, and that will be produced under currently planned requirements for continued reduction of criteria pollutants. That is, people will be buying cleaner vehicles regardless of any new social marketing campaign. Who decides how much cleaner vehicles need to be? The California Air Resources Board continues to believe that vehicles with zero, on-road emissions of criteria pollutants will be required to bring most of the existing and likely future urban areas of California into compliance with ambient air quality standards. At least a few states in the Northeast believe they too need zero emission vehicles, as evidenced by their adoption of California's vehicle emissions standards.

In short, there is conflict among the arbiters of socially sanctioned goals for cleaner and more efficient vehicles. This is obvious to those involved, but this fact does have repercussions for social marketing. We explore some of these throughout the remainder of this section.

### ***From Public Health to Public Goods: Social marketing of market transactions?***

As noted above, most definitions of social marketing stress the marketing of ideas or behaviors, rather than objects or products. Andreasen's definition cited above stresses the marketing of behaviors. This is consistent with other definitions.

The expansion of the definition to social marketing we offer extends others' efforts to define the scope of social marketing. We would include in a definition of social marketing *the application of conventional marketing techniques to the promotion of goods and services that create socially sanctioned positive externalities, public goods, and specifically, collective benefits*. Therefore, while doing most of the things marketers do—characterizing markets, educating potential buyers, and persuading buyers when possible—social marketers are focused on exploring buyer commitment to community, beliefs about what is good for the community, and willingness of consumers to change behavior for the good of their community and ultimately themselves. The ties to community-based social marketing are obvious. Only community can create collective benefits—once the Commons is despoiled, no individual can restore it alone. For example, community, typically acting through government, acts to correct market failures caused by externalities.<sup>8</sup>

Like most disciplines, social marketing has grown through the interplay between specific applications and conceptual (theoretical) development. Most of the formative applications of social marketing were in the field of public health. In these cases, the value to individuals is usually clear—campaigns to increase disease awareness, to promote nutrition and exercise,

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<sup>8</sup> Herman Daly (1991) argues that community must go further than simply attempting to internalize externalities, to create mechanisms to limit growth rather than simply adjust prices.

“But internalization is insufficient in that it acts only on relative prices. Growth in population and per-capita consumption lead to increasing absolute scarcity, which is manifested in the increasing prevalence of external costs. . . . Aggregate physical limits must be placed on the causative factors of population and per-capita consumption growth, with the price system achieving the fine-tuning adjustment within those limits.”

or to convince people with contaminated water supplies to boil drinking water—all entail benefits that can be captured by individuals who adopt the new behaviors.

One area in which there has been little conceptual development is the connection between *social marketing*, *public goods*, and *collective benefits*. Some authors wish to maintain a distinction between social marketing, green marketing, and marketing based on what is being marketed. Most social marketers wish to reserve the use of the label *social marketing* for efforts to change behavior; reserving *green marketing* or simply, *marketing*, for the promotion of less polluting or more efficient products. Our experience doing market research for electric vehicles makes us question the usefulness of this distinction. EVs can be products with environmentally superior performance to gasoline (and diesel) powered internal combustion engine vehicles (ICEVs). They also embody new behaviors, especially recharging, driving, and travel behaviors. EVs store less energy than do comparably sized gasoline vehicles, but have the potential to replenish energy at both home and away from home locations. Thus EVs embody some behavioral changes and enable others. Is EV marketing green or social? More generally, what behaviors are in the purview of social marketing?

Regardless of the label, many tenets of marketing have been applied to promote recycling, water conservation, and more efficient appliances, heating, and lighting for homes and businesses. There has been scant application of social marketing research and techniques to clean and efficient vehicles, or even to automobility.

Clean and efficient vehicles—if widely adopted—would provide a number of public goods and positive externalities. Cleaner air and reduced risk of adverse health effects, lower greenhouse gas emissions and reduced risk of global warming, and the potential to reduce reliance on petroleum are all public goods or positive externalities. In the case of a market transformation model for clean and efficient vehicles we are equally interested in a subset of public goods we call *collective benefits*—benefits that no one gets unless many people act in concert to acquire them. Therefore, we would also characterize clean air, reduced risk of global climate change, and peace as collective benefits.

Government policy is one way we obtain public goods and collective benefits; positive externalities are results of market transactions. The question regarding social marketing is, other than political campaigns, what is the role of social marketing in creating collective benefits, public goods, and positive externalities? And does it matter if those benefits are secured through behavior change or new products?

### ***When to market; when to educate; when to regulate***

Rothschild (1999) develops a framework to guide the selection of what he classifies as the three means of social marketing—education, marketing, and law. This framework is shown in Table 1. It is based on (1) the principle that in democratic societies less coercive means are preferred to more coercive and (2) a model of information processing in which motivation, opportunity, and ability affect consumers' level of processing and provide guidance for selecting effective tactics. We review Rothschild's framework, then discuss its application to the marketing of clean and efficient vehicles.

We begin by paraphrasing Rothschild's definitions for the terms in Table 1.

- *Education* refers to messages of any type that attempt to inform or persuade a target to behave voluntarily in a particular manner, but do not themselves provide immediate reward or punishment. Education will be an appropriate tool when individual self-interest is strong and consistent with societal goals, but the target group or individual is uninformed or misinformed.
- *Marketing* attempts to manage behavior by offering reinforcing incentives and consequences within a context of voluntary exchange (promotion). The context is biased toward the desired behavior through the development of choices that offer comparative advantage (product), favorable cost-benefit relationships (price), and time and place utility enhancement (place). Marketing is appropriate when the level of self-interest is not consistent with societal goals.
- *Law* uses coercion to achieve desired behavior in a non-voluntary manner, such as threats of punishment for noncompliance with desired behavior. Law can also affect the probability of particular transactions that might not develop in a context of purely voluntary exchange, and in this way facilitate market solutions. Law will be appropriate when the pre-existing self interest of the target group or individual cannot be overcome by persuasion, additional rewards through voluntary exchange, when rewards are inconsistent with other societal goals, or when the rights of the target group or individual to participate in specified behaviors are judged to be less than the rest of the society.
- *Motivation* is goal-directed arousal. Individuals are motivated to behave in specified manner when they believe their self-interest will be served.
- *Opportunity* is a measure of the behavioral context—are there choices that can be made within the existing context to engage in the desired behavior?
- *Ability* is a measure of the individual's skills or proficiencies at solving problems.

With these definitions, the cells in Table 1 summarize behavioral disposition and the preferred or required means to promote the desired behavior. For example, a person who has the motivation, opportunity, and ability to engage in a behavior (cell 1) may only require some information (education) to prompt them to engage in it. A person who is not motivated to engage in a behavior, but has both the opportunity and ability (cell 3) may not engage in the behavior unless the force of law is brought to bear on them. It is likely that different people will be in different cells of the table, even with respect to the same behavior.

Can we apply this framework to the marketing of clean and efficient vehicles? While the framework is useful for organizing discussion, its ultimate usefulness in deciding which means to employ to market clean and efficient vehicles will depend on the resolution of those discussions. We raise a few topics next.

**Table 1: Application of Education, Marketing, and Law**

Motivation:	Yes		No	
Opportunity:	Yes	No	Yes	No
Ability: Yes	1 prone to behave <i>education</i>	2 unable to behave <i>marketing</i>	3 resistant to behave <i>law</i>	4 resistant to behave <i>marketing, law</i>
No	5 unable to behave <i>education, marketing</i>	6 unable to behave <i>education, marketing</i>	7 resistant to behave <i>education, marketing, law</i>	8 resistant to behave <i>education, marketing, law</i>

Source: Rothschild (1999)

Rothschild develops the role of law as coming from a position of strength; the law is a means to behavior change that can be imposed by managers.<sup>9</sup> That is not necessarily true in our case. Law may be strong regarding air quality. Despite being contested by a variety of industry, political, and libertarian groups, the federal Clean Air Acts have been repeatedly renewed. Standards for ambient air quality and source emissions are in place. California routinely adopts more stringent vehicle emission control standards than the federal standards; a small number of other states have adopted California’s standards too. Still, some standards and programs are being contested between some managers, e.g., the Bush Administration opposing new source review in regulating criteria pollutant emissions from power plants. Regarding fuel efficiency and other strategies to reduce GHG emissions, law is currently weaker. This is due in part to domestic politics, for example repeated failures to increase CAFE standards, as well as the Bush Administration abandoning campaign promises to regulate CO<sub>2</sub> emissions from power plants. It is due also in part to the fact that global climate change requires negotiation between nations, and the US has currently abandoned that process. The recent federal approach has been to substitute federal support for vehicle technology research and development in place of stronger performance regulation. This switch from ends to means is one impetus for adopting a market transformation approach. However, it is also evidence that “socially sanctioned” ends are highly contested. California’s recently adopted legislation to require reduction in CO<sub>2</sub> emissions will be contested by the affected industries, too.

What is at issue with respect to Rothschild’s framework is whether in designing a program to promote clean and efficient vehicles, we are choosing to use (or not use) the law according to Rothschild’s prescription. Or, are some managers, having been stymied in their use of law to

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<sup>9</sup> He defines *manager* as “a generic term that includes, but is not limited to various persons such as civil servants, nonprofit administrators, legislators, and/or private sector managers who attempt to direct the behavior of individuals for the good of society (as defined by the managers, the leaders, and/or the constituents of the society).”

shape the choice context by other managers, now looking for the “next best” means to promote a desired behavior (“better” choices within the given context)? If the application of law is highly contested, does social marketing have a role in rallying citizen support of law? Does the use of social marketing to create its own social sanction meet the ethical standards social marketers set for themselves?

If we examine *motivation*, *opportunity*, and *ability* we can determine where in Rothschild’s categories we think we are with respect to marketing clean and efficient vehicles. For now, we focus on marketing vehicle efficiency. Recall that motivation in this context is the result of a belief that our self-interest will be served by the behavior. Determining whether or not more efficient vehicles motivate consumers is crucial to determining whether Rothschild believes law is required. No behavior which consumers are motivated to undertake (cells 1,2, 5, and 6) requires the use of the law to promote that behavior.

However, based on the specifics of our desired behavior—purchasing more efficient vehicles—laws may still be required for three reasons. First, even if law may not be required to motivate consumers, it will be required to capture positive externalities or create collective benefits. Reduced risk from global climate change is a collective benefit. The key point is that voluntary exchanges in markets produce too little collective benefits; law may be required to address free rider problems. Two, because Rothschild does not explicitly recognize that other managers may champion competing behaviors, he doesn’t address whether law may be required to overcome their resistance, not that of the target market. Three, since an individual consumer buying a more efficient vehicle cannot buy reduced risk of global climate change, government policy may be an important signifier of collective, community commitment to reducing GHG emissions.

Let’s look at the case of reducing greenhouse gas emissions. Accepting for the moment the wisdom of the opening quotes—that people value cupholders more than fuel efficiency in their vehicle purchases—we argue that cost savings do not motivate consumers. Further, since reducing the risk of global climate change is a collective benefit that no single consumer can buy, we argue consumers are not motivated by a belief in a direct benefit to themselves. If either of these is true, then we are in cells 3, 4, 7, and 8 of Rothschild’s table. Thus, quite aside from the three reasons discussed in the previous paragraph, law would need to be invoked if we thought people had both the opportunity and ability to act (cell 3).

We also argue that opportunity is lacking, or at best, limited. More efficient vehicles and alternative fuel vehicles are available only in very small numbers, are not available at all dealerships, are not as widely promoted as conventional vehicles, are available only in limited body styles, and are disadvantaged by sales practices which do not reward sales people for the additional time it takes to educate themselves and consumers.<sup>10</sup>

If people lack motivation and opportunity, but have the ability to act, then we are in cell 4. In this case, Rothschild recommends we begin with marketing—given that marketing begins

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<sup>10</sup> Insights into selling clean and efficient vehicles in an automobile dealership were offered to participants at a workshop on marketing clean and efficient vehicles; see Turrentine and Kurani (2001) for the proceedings.

with making opportunities available. The automobile companies have contested virtually every requirement to make vehicles more efficient. They have welcomed only those federal programs, e.g., PNGV and FreedomCAR, which provide public monies for research and development in exchange for negotiable outcomes. Law may be required to create the opportunity for consumers to act, including overcoming the barriers listed above. If marketing fails to achieve the desired behavior, then laws may need to address the behavior of the target market, not simply other actors.<sup>11</sup>

If motivation and ability are lacking, then regardless of opportunity (cells 7 and 8) Rothschild recommends starting with education, but being prepared to have to apply marketing and law too. Some clean and efficient vehicles do require substantial learning, for example electric-drive vehicles.<sup>12</sup> We have used a variety of “reflexive” research methods (discussed briefly in the section on Data Quality and Methods) to assist household learning about the performance capabilities and limitations of EVs within the context of their own lifestyle goals.

In conclusion, we believe Rothschild’s framework is instructive but incomplete. It is highly focused on the citizen-consumer—fulfilling a mantra uttered by all authors of marketing and social marketing. But in doing so, it does not address the larger context in which citizen-consumers and managers act. Of the several concepts used in his matrix, only *opportunity* addresses the behavioral context. A broader framework would include more variables describing choice contexts. It would recognize that behaviors are contested; intermediaries (with their own managers) may need to be convinced or compelled to participate in the process of behavior change. In this regard, one of the social science perspectives missing from the discussion of social marketing is political science. Though much of the descriptive literature on how to conduct social marketing campaigns emphasizes the need to build coalitions and political partnerships, the converse need is to compete with interests who contest the creation of the social sanction which legitimizes a social marketing campaign, the macro-level design of the campaign, or the application of specific means.

## **VI. Stage Models from Marketing and Social Marketing**

One of the key insights Andreasen (1995) says came to him through listening to people talk about a proposed behavior change is that

“...consumers do not undertake high involvement behaviors rapidly and in one step. They move toward the desired outcome in definable stages.”

He goes on to review a number of stage models—some developed initially in conventional marketing and some in social marketing—and offers his own wisdom on what a generalized model of change looks like (Andreasen 1995; p. 148). These models focus primarily on the

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<sup>11</sup> This conclusion is subject to our earlier observation that while law may not be required to promote the desired behavior among the people to whom the behavior is being marketed, law may be required to shape the choice context or insure the achievement of strategic GHG emission reduction goals.

<sup>12</sup> Electric-drive vehicles include battery EVs, hybrid EVs, and fuel-cell EVs. Each has unique attributes requiring some level of education. The proliferation of all three—or at least information about all three—is already creating confusion about the distinctions between them, perhaps requiring still further education.



behavior of individuals and not groups. Below in Table 2 is a five-stage model of behavior change referenced by Andreasen. The similarities to the schematic of the DOI model in Figure 9 are apparent. Andreasen explains this simple model—and his belief in the usefulness of models based on reasoned action theory—in detail.<sup>13</sup> We move next to some criteria for formulating a specific stage model for the greening of the automobile market.

**Table 2: Prochaska and DiClemente’s Stage Model of Behavior Change**

Stage	Description
Precontemplation	• Consumers are not thinking about the behavior as being important to them at this point in their lives
Contemplation	• Consumers think about and evaluate recommended behaviors
Preparation	• Consumers have decide to act, are trying to put into place whatever they need to carry out the behavior.
Action	• Consumers are doing the behavior for the first time, or first several times.
Confirmation	• Consumers are committed to the behavior and have no desire or intention to return to earlier behavior.

Source: Prochaska and DiClemente (1983) cited in Andreasen (1995)

## VII. Some Criteria for Building a Social Marketing Program to Transform the Automobile Market

It is beyond this review to actually formulate a stage model for planning, implementing, and monitoring the transformation of the automotive market. But we can discuss some of the criteria for such a model. The model must address several types of potential changes illustrated in the examples below:

- A consumer shopping for a cleaner or more efficient vehicle within a size-body style class of vehicles that meets other lifestyle and personal goals.
- Someone previously not interested in fuel economy switching to the purchase of a more efficient vehicle for environmental reasons.
- A person already with environmental values learning for the first time about the role of fuel economy in global climate change.
- A person already with environmental values learning for the first time that all cars and trucks are not equal in terms of emissions of criteria pollutants.
- A car buyer getting more interested in the life cycle cost, prompted by an interest in new automotive technology

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<sup>13</sup> A discussion of reasoned action theory is included in the earlier section of this report describing psychology in marketing.

- A car buyer considering a large range of responses to new choices in the automobile market and information about fuel economy and global warming including bicycling more or living closer to work in order to buy the vehicle they like best.

The model should include the roles of:

- Price fluctuations (both price levels and uncertainty) in the oil market.
- Prices of fuel-efficient technologies in new vehicles (and the overall automobile market).
- Public support for policy (such as increased CAFE standards, actual targets for vehicle production dates and quantities in FreedomCar, support for accelerating unified federal standards for criteria pollutant emissions for cars and trucks)
- Public response to education about fuel economy and global climate change, ambient air quality and public health.
- Public responses to efficient non-ICE technologies, such as electric drive trains and improved fuel efficiency instrumentation.

## VIII. Data Quality and Methods

We address briefly a few issues of data quality and research methods. In conducting a search for relevant empirical research on consumer-citizen awareness, knowledge, consideration, and purchase of clean and efficient vehicles, we were struck by the number of telephone polls conducted with samples of approximately 1,000 adult Americans. One reason to conduct such a poll is, that if certain criteria rarely discussed by the polling or reporting agent are met, the results will be representative of the adult US population to the extent there is a 95 percent probability that the “true” response percentages (to certain types of questions) are within  $\pm$  three percentage points of the reported values. (Two of these rarely discussed criteria are the number of possible responses to the question and the actual distribution of responses.) Sample size and sampling error are often reported because they are easy to measure, but the accuracy and usefulness of polling results, and data in general, depends on so much more as we discuss below.

### ***Data Quality***

**Validity:** data is accurate and represents what the research needs it to represent. Research is conducted in a way that allows the researchers to believe that the data accurately represent the phenomena they which to describe. For example, if car buyers are asked whether they plan to purchase a new technology, has the research process created good questions and the right context in which to ask such a question, and therefore offer a good insight into possible future behaviors?

**Relevance:** data is germane to the goals of research. The research addresses those areas of behavior or belief that are relevant to the ideas being explored. Are the participants in the study the right people to be studying? For example, if the study is of future new car buyers, are used car buyers excluded from the sample?

**Reliability:** data is repeatable and can be reproduced within the same sampling framework. Is the sampling representative of wider populations, and is the sample size adequate to represent the proposed target population?

### ***Data Collection Methods***

Given the varying perspectives, sensibilities and traditions of the social science disciplines, each has preferred research methods. Economists prefer data that can be operationalized for mathematical modeling. Psychologists prefer experimental situations with tight controls. Sociologists prefer large data sets that allow statistically significant demographic analysis. Anthropologists often rely upon a few interviews to explore in greater depth the beliefs of a group. Also, a single research method might be viewed quite differently by different disciplines. For example psychologists might use focus groups to compare perceptions among a cohort group while an anthropologist might view the same focus group as a constructed social affair in which the participants compete or cooperate. In this section of this report, we review essential features of data and some data collection methods as they relate to the problems of social marketing research.

#### **Closed-ended or open-ended questions.**

Closed-ended questions are answerable only from a pre-specified list of answers. Examples include a simple yes or no, a short list of text answers, or points on a scale. Such questions are used when the researcher wishes to compare selections from a pre-determined set of answers across the sample. For example, a researcher may wish to know how many participant households' own minivans. One weakness of closed-ended questions is that the predetermined set of responses may not include the answer that is most accurate for a given participant. Another is the need to validate scales—do respondents share (across the sample and with the researchers) the same understanding of a scale? Open-ended questions allow for a more germane and sometimes more complete answer to a question. However, they require the respondent to provide this answer. For example, questionnaires may ask a participant what steps they took last time they bought a car, with the intention of exploring the variety of car buying decision processes households employ. This method can require significant time (from both subject and researcher) for data entry, analysis, and reporting.

#### **Face-to-face interviews**

Some research requires face-to-face contact to obtain valid data, appropriate survey context, and more accurate answers to questions.

**One-on-one interviews** can ensure that one is sampling properly. For example if one wished to interview only those in the process of shopping for vehicles, conducting “intercept” interviews with buyers at car lots is one way to ensure respondents are in the process of shopping for a vehicle. The survey context of a automobile dealer's lot would be a more accurate location to probe certain questions about buying a car, because of the immediacy of the behavior in that setting. However, even within the context of vehicle purchase behavior, some questions might be more appropriate to ask in a home location, at least for some

respondents, since only part of the automobile purchase decision is made at the car dealership.

**Household interviews** typically take place in the home. Multiple members of the household can be engaged as respondents (rather than interviewing only the increasingly rare “head of household”). It may be necessary to engage several members of a household in order to address all relevant decision-makers. In the past, automobile market researchers usually consulted male heads of households, as it was assumed they purchased vehicles for the household. Nowadays the relevant automobile purchase decision-maker could be equally the wife or others in the household. Evidence suggests that children influence household vehicle purchases, even beyond the simple requirement to accommodate them as passengers. In many cases, it is a combination of household members or the whole household that makes “joint decisions.” Therefore it has become more important in recent years to consult the whole household about purchases of vehicles. This research is usually conducted at the home, which is a comfortable location for the participants, reminds them throughout the interview of their roles within the household, and may even provide quick access to props and other materials to construct answers.

**Group Interviews (focus groups):** Focus groups are usually conducted with between six and twelve participants. For a variety of reasons, these participants are typically selected as a homogenous group (such as, “light truck owners who buy new vehicles”) who have shared experiences, use a common language, and are comfortable conversing together. The interviewer, or moderator, employs open-ended questions to promote discussion, typically moving from more general to more specific questions.

The strength of the focus group method is in creating small social groups. This is evidenced in some groups by the “snowball effect”—one respondent mentions something and rapidly the whole group becomes involved in the discussion. A focused discussion among participants with similar experiences allows researchers to probe more deeply for shared knowledge and opinions. When a topic is of particular importance, the conversation can quickly develop into a dynamic and spontaneous group conversation in which the moderator is relatively unimportant. The focus group becomes a conversation among the participants, rather than a one-to-many interview between the moderator and the respondents. The focus group is a particularly effective way to research response to policy and can reveal the relative strength or weakness of opinions.

Focus groups are not a good way to research individual preferences or high-involvement, high-value purchase decisions. A focus group is a social setting; therefore individual’s responses are shaped by social interaction. This is one reason why an existing formal or informal social hierarchy, e.g. a traditionally organized workplace, a military unit, some living arrangements, and others should be avoided in recruiting groups if one wishes to study individual behavior. When studying high-involvement high-value decisions, it is important to create groups with a higher degree of internal, than external, homogeneity. That is, differences in the behavior of interest should be less within any given focus group, than the differences across multiple groups.

In recent years, there has been growth in the use of focus groups. Much of this demand for focus groups is driven by the need for immediate results—focus groups can be convened quickly, and even by the end of each group discussion provide at least “first impression” results (since observers can sit and watch the “data” being created). Focus groups can provide rich anecdotal results that are more easily understood than survey and modeling results. Also, most commercial focus group facilities have observation rooms behind one-way mirrors that allow clients to witness first hand as consumers talk about products, voters talk about candidates or issues, etc. The special form of data collection in focus groups (usually videotape) also means it is easy to carry over a compelling “first person” quality to people who did not witness the group. All these increase the impact of the research on managers (in Rothschild’s (1999) sense of that word, see footnote 10). But for many of these same reasons, focus groups should not to be used as a quick and dirty substitute for large-sample survey techniques.

### Observation (ethnographic) research

Another more recent development is the use of ethnographic methods in marketing adapted from anthropology. Ethnography is the use of simple observation of behavior, often complemented by interviews. In marketing research, this can take the form of a researcher spending the day with a family while they do their shopping, or observing the use of products (such as watching or even video-taping people washing dishes to see how much detergent they use and how they use the detergent).

### Phone interviews

Telephone interviews have been a mainstay of marketing research for a long time. Like focus groups, phone interviews can be conducted on short notice and when integrated with immediate data entry on computers, can offer quick results. Questions however must be easily read and understood. (These criterion can be relaxed somewhat if questionnaires are mailed ahead for review by participants.) Thus the conversation between researcher and respondent is highly structured, even stilted. In recent years, the proliferation of telephone numbers, increased screening of in-coming calls through the use of answering machines and caller-id services, the proliferation of phone machines, fax machines, phone lines at least partially dedicated to internet dial-up service, cellular phones, and pagers, unlisted telephone numbers, and competition from telemarketing have made it increasingly difficult and expensive to obtain representative samples even using random dialing techniques.

### Mail back surveys.

In recent years, the proliferation of third-class (“junk”) mail and increased reluctance of people to complete written surveys has made mail back surveys more difficult and expensive. Response rates have dropped to less than five percent in many cases, invalidating survey results. Researchers must use advanced and expensive techniques to obtain good rates of return, with phone calls, incentives, and multiple mailings. In some stratified samples, achieving good returns is easier. Mail back surveys involve even more highly structured “conversations” between respondent and researcher. They tend to rely almost solely on closed-ended questions; question branching (where subsequent questions may depend on

responses to prior questions) cannot be as elaborate as in computer-aided phone interviews or internet-based surveys.

### Internet-based surveys

The Internet offers a new survey research medium. As access to, and use of, the Internet increases this new medium offers an alternative that is sometimes cheaper, more flexible, and more interactive than either phone or mail-back surveys. Some Internet survey firms have large pre-qualified lists of potential respondents for stratified sampling. Random sampling of the general population is still not possible. However, as the population of households with Internet access grows, that population becomes more appropriate for an expanding variety of research questions.

### Interactive methods (reflexive methods)

Another set of research tools is interactive methods, in which researchers and participants collaborate to guide the research process. Such methods attempt to simulate as much as possible of a decision context. For example, our PIREG was a simulation game for exploring potential household choices of electric vehicles with different driving ranges (Turrentine et al, (1992), Kurani et al (1994)). The interview, conducted with the whole household in their home, makes use of a set of seven-day driving diaries from each driver. The diaries were transcribed into a graphic representation of real driving activities for the household. This graphic is then used as a game board to explore potential travel constraints and opportunities in the household related to using electric vehicles. The intention was to uncover real and perceived decision criteria for purchase of electric vehicles.

The point of a game situation is to provide a realistic context for households to show researchers what is important. While these techniques are rich in insights, they are expensive and seldom used by profit-making firms.

### Panel Studies

All techniques mentioned previously have been used to predict or at least speculate about potential changes in consumer knowledge, beliefs, attitudes, or behavior. A panel study attempts to observe such change in an empirical way. *Panels* are sets of participants who are observed, interviewed, surveyed, or in some other way studied over time, so as to measure changes. As retaining members of a panel is difficult—more so the longer the panel exists—some panel studies will refresh their membership with new people who are like those who drop out on some criteria believed or demonstrated to be relevant to the topic or purpose of the panel.

### Special automotive research methods

Market research in automobile companies make use of several research methods, particular to the industry, including actual drive tests, as well as clinics, which model consumer response to vehicle appearance, drive feel, comfort, color, and other tangible attributes which can be tested under controlled experimental conditions. For example, researchers may wish to test consumer response to a new hood style, and will assemble that new design along with

several competitive designs under carefully conditions in which lighting, color and branding are carefully controlled (neutral).

### ***Modeling (statistical-based choice analysis).***

There are several statistical methods that have been developed for estimating probabilities of consumers making different choices. These include discrete choice and conjoint analysis. These methods require large sample sizes to reduce errors associated with statistical estimation of model parameters. Data is typically gathered from closed-ended choice sets. These models are largely based upon assumptions from economic theory. They often attempt to estimate the price consumers would be willing to pay for future products based upon what they have paid for products with similar attributes in the past or stated preferences for attributes that are not yet available in the market.

The goal of such demand modeling is laudable, but the accuracy of such predictions relies upon the validity of data inputs. Consumers can find it difficult to guess accurately what they would pay for a new product. While the outputs can be simple, useful demand predictions, the complex statistical methods employed hide the analytical process from non-experts.

## **IX. Conclusions**

Comparatively little public work has been done in applying the wide variety of social science theory to markets for automobiles in general and the market for clean and efficient vehicles in particular. Much of what our report reveals is that results can be context specific. One consequence of this is that extensions from the far larger literature on home-energy conservation ought to be made hypothetically. That is, that literature can serve as a source of hypotheses to study markets for more efficient vehicles. However, absent the confirmation or refutation of those hypotheses, we should not assume that any conclusions from that literature are an adequate basis for policy related to, or marketing of, cleaner and more efficient automobiles.

We have provided a primer on some social sciences, marketing, and its' variant known as social marketing. This has been done with the intention of describing a framework, some theoretical perspectives, and methods to answer the representative questions; do people really care more about cup-holders than fuel economy, and if so, how do we get people to consider air quality, fuel economy, and emissions of criteria pollutants and GHGs in their automobile purchases?

We have argued that in expanding the discussion of social marketing into the realm of purchase behaviors, the term *social marketing* should be restricted to the promotion of products that confer socially sanctioned positive externalities, public goods, and especially collective benefits. Most previous definitions of social marketing refer to benefits to the both individuals and society to which they belong. In talking about affecting choices of goods and services in a market, we believe it is worthwhile to stress this part of the definition. Marketing conducted solely to capture social benefits (defined as private benefits plus coincidental positive externalities) is marketing; marketing conducted to create collective benefits and public goods is social marketing. In marketing such goods and services, social

marketers can incorporate education about, promotional appeals to, and even the provision of, private benefits to promote the desired choices. However, social marketers' special ethical obligation requires that claims to positive externalities, public goods, and collective benefits be substantiated first and that the attainment of these be socially sanctioned. This definition may also involve "marketing" changes in decision-making behaviors—though we do not subscribe to the position that economic rationality is necessarily a "better" decision process than others.

### ***Marketing and Social Marketing***

Conventional marketing practices have developed the basis of a consumer-oriented approach to fostering demand. One summary of these practices is the "Four P's of Marketing:" product, price, place, and promotion. The concept of market segmentation also comes out of conventional marketing. Different products, promoted with different messages, are targeted at specific groups of people. Market segmentation schemes tend to be static—built on a snapshot of the population at one point in time. Though often compelling in their internal consistency (and colorful and evocative in their segment names), most segmentation models provide neither an explanation as to why segments exist as they do nor a basis for arguing that segments for existing products are suitable for identifying markets for novel products.

Though Gerhard Wiebe (1952) is widely referenced as a seminal author, it is primarily over the past thirty years that a large number of people have developed and applied the marketing variant of social marketing. The basic thrust of most definitions of social marketing are (1) to promote voluntary behavior change, that is (2) in the interest of the object of the social marketing campaign and their society. Social marketers add four more P's to the marketing mnemonic: Publics, Partnerships, Policy, and Purse Strings. Further, social marketing is an iterative design-implementation process, in which marketers are forced to learn not only the target population's initial state, but also to track the response of the individual and their society to the marketing campaign. Tracking the effectiveness of the campaign provides feedback for adjusting (re-designing) the campaign.

In this report we have highlighted some outstanding issues in applying social marketing to the process of marketing cleaner and more efficient vehicles. Some of these issues arise from definitions, concepts, and practices of social marketing; others arise from an effort to expand social marketing from non-market behaviors to market transactions for a complex and nearly obligatory tool for constructing lifestyles within a context of automobility, i.e., automobiles.

The social marketer takes on an ethical burden that does not face the commercial marketer. The social marketer takes on the responsibility to improve the welfare of both the individuals to whom they are marketing and their society. That welfare, and the balance of personal and societal welfare, must therefore be socially sanctioned. In the case of clean and efficient vehicles, that social sanction is currently contested by managers from government and industry, as well as non-governmental organizations representing both those who seek sanction for higher standards, e.g., environmental organizations and some governmental representatives, and those who seek to maintain the status quo in environmental and energy standards or even a role back of standards, e.g., labor unions, automobile and energy industries, and some other governmental representatives.



In addition to a tactical means, social marketing also provides a strategic framework to organize both its own tactical application and the application of other means for changing behavior, e.g., education and law. As it is describe by Rothschild (1999) though, we have argued that the strategic framework is too consumer-oriented and does not account for significant differences between the many social marketing applications in public health and education, and the application social marketing to market transactions for cleaner and more efficient vehicles. The framework for choosing between education, (social) marketing, and law must address the fact that the behavior to be marketed will produce collective benefits—in particular, reduced risk of global climate change—whose value is contested. Further, even if clean and efficient vehicles succeed in the market place, in the absence of means to correct market failure we are likely to get too little clean air and too little reduction in the risk of global warming (because these things are both positive externalities and collective benefits). Those means have in the past largely been enacted through government regulation. The desired level of improvement—and the importance of non-rational decision makers in determining the precise level of externalities and public goods created—will determine how far we fall short in the absence of intervention. With the exception of existing and agreed upon improvements in vehicle criteria emission standards and the stagnant requirements of CAFE, those targets are contested, i.e., we lack a clear social sanction.

Social marketing itself can be viewed as a social process in which new values and behaviors are developed. Therefore, the social marketing process must track not only changes in personal behavior, but also changes in supporting and competing norms as well, i.e., group behavior. To accomplish this, and to take advantage of community-based approaches to social marketing, communities (consisting of inter-personal, physical, market, and governance networks) must be studied too.

### ***Models of human behavior and behavior change***

It seems clear that we need alternatives to the economic assumption of rationality to become part of our understanding of consumer-citizens and our formulation of marketing and policy. Rationality has been assailed by every social science discipline outside economics. Even high-involvement decisions—which some authors insist invoke more detailed decision making processes that might approach rationality—are made, by some people, on the basis of past experience, personal recommendation, memories formed in childhood, a compulsion to conform to culturally-constructed norms, and a variety of other reasons that may diverge from rationality.

A wide variety of theories of decision-making, attitude-behavior correspondence, and cultural influence are available from various disciplines of social science. Those theories that are specifically concerned with dynamic processes—understanding events unfolding over time—often use a stage model. Stage models in general frame the problem of behavior change (and thus policies and programs to change behavior) as changing over time, both for individual decision-makers and across the population. Every stage model of individual decision-making starts with awareness of a problem or a new idea. It seems to us that our next step is to test the hypotheses that (1) the lay public does not understand the macro-statistics on energy use, emissions of criteria pollutants and GHGs, health impacts, and causal factors illustrated in the second section of this report and explored in detail by others,

e.g., Schaper and Patterson (1998), and (2) they do not understand that cleaner and more efficient alternatives are available to them. We illustrate our choice of these starting points with two further examples.

### Comparing expert and lay knowledge and mental models

1. “Research that has investigated public understanding of resource use demonstrates that the public has a poor understanding of household resource consumption. Householders grossly overestimate the resources used by visible devices such as lighting and greatly underestimate less visible resource consumption (e.g., water heaters and furnaces)... This lack of understanding is reasonable, given the dearth of information that utility bills provide regarding home resource use.” (McKenzie-Mohr and Smith, 1999)

If it is confirmed that households also have a poor understanding of automotive energy consumption and its impacts, the question arises, what do policy makers do when the knowledge and beliefs of lay households does not match that of experts? In the household case, policy makers have to confront the question of whether to promote compact florescent light bulbs because lay households think they will make a big difference, or to tackle the real energy users—household heating, ventilation, air conditioning, and major appliances? In the case of automobiles, do we start by promoting the choice of cleaner and more efficient vehicles within the classes of vehicles people wish to buy (for all the other complex reasons we buy motor vehicles)? Or, do we promote choices with larger energy outcomes, such as including only the cleanest and most efficient vehicles as the subjects of social marketing campaigns? Do we convince them to forego the four-wheel drive option on a truck, or to forego the truck for a car?

2. “The U.S. population feels that Los Angeles has the worst air pollution, followed closely by New York City. No other cities are mentioned as frequently as these, with over half of respondents saying LA [56 percent] and almost half saying NY [41 percent].” (IRC, 1999)

These perceptions are only partially correct. Los Angeles continues to rank at or near the top of the list of cities with the highest number of days on which ozone standards are exceeded. However, New York City ranks only 17<sup>th</sup> according to the American Lung Association (2000, Table 4) analysis of EPA monitoring data. Houston, which was named “most polluted” by only four percent of respondents in the IRC poll, is the city that, in some years, displaces Los Angeles as the smog capital of America. During the time period of the IRC poll, the ALA reports Harris County, Texas (which contains Houston) had the second most days of ozone standard exceedances.

What will people do when they learn which cities are dirtiest, and which are becoming absolutely and relatively dirtier? Should efforts to promote cleaner vehicles be targeted in those cities, or nationally (to create the largest possible community and address the portability of automobiles and the mobility of people)?

## ***Hypotheses for Continued Marketing Clean and Efficient Vehicles***

We offer the following list of hypotheses that we believe require testing as part of the first phase of social marketing, as described by Andreasen, *listening*. This list is by no means complete. Additional hypotheses may be required both in the listening phase, and certainly in subsequent phases of testing, implementing, and monitoring social marketing campaigns to promote the purchase of cleaner and more efficient automobiles. We acknowledge that work has begun to address some of these hypotheses. The review of those specific works is beyond this review of the more general concepts of marketing, social marketing, and social science.

- Lay people's knowledge local air quality is low; even of their local air quality.
- Lay people's knowledge of the impacts of poor air on human health is low.
- Lay people's knowledge of how air quality policy is made, or even what are the current policies, are low.
- If local air is perceived to be polluted, then in the absence of a large local stationary source, people blame cars and trucks.
- Lay people are unaware of existing options to buy cleaner vehicles.
- Neither lay nor expert populations consider differences in air quality in their personal vehicle purchases
- Improved automotive fuel consumption instrumentation will be required to effectively market fuel efficiency.
- Households are more amenable to conserving energy in their home than their motor vehicles.
- Lay people do not consider fuel efficiency to be an environmental attribute
- Lay people are unaware of existing options to buy more efficient vehicles
- Neither lay nor (energy) expert populations consider fuel efficiency in their personal vehicle purchase decisions
- Neither lay nor (energy) expert carry forward dissatisfaction with current fuel economy into future vehicle purchase decisions.
- Empathy—the perception of the needs of others and the adoption of their perspective—is a strong motivator of pro-environmental behaviors, but may not prompt support for regulation (from, Lee and Holden, 1999).

- Assessment of subjective norms about clean air (fuel efficiency) may resolve the apparent lack of connection between attitudes toward clean air (fuel efficiency) and vehicle purchases (based on Fishbein and Ajzen, 1975).
- However, family life-stage, income, local and regional land use and transportation, the perceived existence of a standard set products throughout American society, and several other variables may explain as much or more than attitudes and subjective norms.

## X. References

- American Lung Association (2000) State of the Air 2000.
- Andreasen, A. R. (1995) *Marketing Social Change: Changing Behavior to Promote Health, Social Development, and the Environment*. Jossey-Bass: San Francisco.
- Archer, D., T. Pettigrew, M. Costanza, B. Iritani, I. Walker, and L. White (1987) "Energy conservation and public policy: The mediation of individual behavior." *Energy Efficiency: Perspectives on Individual Behavior*. pp. 69-92.
- Banister, D. (1998). "Introduction: Transport Policy and the Environment." In Banister, D. (ed.) *Transport Policy and the Environment*. E&FN Spon: London.
- Batson, C.D. (1987) "Prosocial motivation: Is it ever truly altruistic?" In Berkowitz, L. (ed.) *Advances in Experimental Social Psychology*. v. 20, pp. 65-122.
- Cramer, J. (1998) "Population Growth and Air Quality in California." *Demography*. 35:1, pp. 45-56.
- Daly, H. (1991) *Steady-state Economics*, 2<sup>nd</sup> Edition. Island Press: Washington, DC.
- Davis, S. (2001) *Transportation Energy Data Book, Edition 21*. Oak Ridge National Laboratory: Oak Ridge, TN.
- (2000) *Transportation Energy Data Book, Edition 20*. Oak Ridge National Laboratory: Oak Ridge, TN.
- Egan, C. and E. Brown (2001) An Analysis of Public Opinion and Communication Campaign Research on Energy Efficiency and Related Topics. Report A013. American Council for an Energy Efficient Economy: Washington, DC. March.
- Ehrlich, D., I. Guttman, P. Schönbach, and J. Mills (1957) "Post Decision Exposure to Relevant Information," *Journal of Abnormal and Social Psychology*. v. 54. pp. 98-102. January.
- Festinger, L. (1962) "Cognitive Dissonance," *Scientific American*, v. 207. p. 93. October.
- Fishbein, M. and I. Ajzen (1975) *Belief, Attitude, Intention, and Behavior: An introduction to theory and research*. Addison-Wesley: Reading, MA.
- Giddens, A. (1984) *The Constitution of Society*. University of California Press: Berkeley, CA.

- (1991) *Modernity and Self-Identity: Self and Society in the Late Modern Age*. Stanford University Press: Stanford, CA.
- Hardin, G. (1968) “The Tragedy of the Commons.” *Science* 162 pp. 1243-1248.
- Hini, D., P. Gendall, and Z. Kearns (1995) “The Link between Environmental Attitudes and Behavior.” *Marketing Bulletin* v. 6, pp. 22-31.
- ICR (1999) Survey of Air Pollution Perceptions, Final Report. Foundation for Clean Air Progress: Washington, D.C. September
- Kempton, W. and L. Montgomery (1982) “Folk Quantification of Energy.” *Energy* 10, pp. 817-27.
- Kempton, W., J.S. Boster, and J.A. Hartley (1995) *Environmental Values in American Culture*. MIT Press: Cambridge, MA
- Kurani, K.S and R. Kitamura. (1996) “Recent Developments in the Prospects for Modeling Household Activity Schedules.” UCD-ITS-RR-96-6. Institute of Transportation Studies, University of California: Davis, California.
- Kurani, K.S and T. Turrentine (2002) “Household Adaptations to New Personal Transport Options: Constraints and Opportunities in Household Activity Space.” In, H.S. Mahmassani (ed.) *In Perpetual Motion: Travel Behavior Research Opportunities and Application Challenges*. Pergamon: Oxford, UK.
- Kurani, K.S, T. Turrentine and D. Sperling (1994) “Demand for Electric Vehicles in Hybrid Households: An Exploratory Analysis.” *Transport Policy*. 1:4, 244-56. October.
- Lee, J.A. and S.J.S. Holden (1999) “Understanding the Determinants of Environmentally Conscious Behavior.” *Psychology and Marketing*. 16:5, 373-92.
- Marks, A.S. (1998) “Social Marketing Implications for Tobacco Control Policy.” *Proceedings of The IMM South African Marketing Educators’ Conference*. Graduate School of Business: University of Cape Town. 29-30 April.
- McKenzie-Mohr, D. (1994) Social Marketing for Sustainability: The case of residential energy conservation. *Futures*. 26:2 pp. 2224-33.
- McKenzie-Mohr, D. and W. Smith (1999) *Fostering Sustainable Behavior: An Introduction to Community-Based Social Marketing*. New Society Publishers: British Columbia, Canada.
- Mitchell, A. (1983) *The Nine America Lifestyle: Who We Are and Where We Are Going*, New York: Macmillan Publishing.
- OECD (1997) Sustainable Consumption and Individual Travel Behaviour. Report of the OECD Policy Meeting, OCDE/GD(97)144. OECD: Paris.
- Olshavsky, R.W. and D.H. Granbois (1979). “Consumer Decision Making—Fact or fiction?” *Journal of Consumer Research*. 6:2, pp. 93-100.
- Prochaska J. O. and C. C. DiClemente (1983) “Stages and Processes of Self-Change of Smoking: Toward an Integrative Model of Change.” *Journal of Consulting and Clinical Psychology*. 51. pp. 390-95.

- Richardson, B.C. (1998) "Toward a Policy on a Sustainable Transportation System." University of Michigan, Transportation Research Institute: Ann Arbor, MI.
- Rogers, E.M. (1983) *Diffusion of Innovations, 3<sup>rd</sup> edition*. The Free Press: New York
- Rothschild, Michael. (1999). "Carrots, Sticks, and Promises: A Conceptual Framework for the Behavior Management of Public Health and Social Behavior Issues." *Journal of Marketing* 63: 24-37
- Rosa, E.A., G.E. Machlis, and K.M. Keating (1988) Energy and Society. *Annual Review of Sociology*. 14 pp. 149-72.
- Schaper, V. and P. Patterson (1998) *Factors that Affect VMT Growth*. Office of Transportation Technology, United States Department of Energy: Washington, D.C.
- Sheller, M. and J. Urry (2000) "The City and the Car." *International Journal of Urban and Regional Research*. 24:4, pp. 737-57.
- Speer, T.L (1997) "Growing the Green Market." *American Demographics*. August.
- Stern, P.C. (1992) What Psychology Knows about Energy Conservation. *American Psychologist*. 47:10 pp. 1124-32
- Taschian, A., R.O. Taschian, and M.E. Slama (1983). "The Family Life Cycle and Preferred Policies for Gasoline Conservation: A Conjoint Analysis." *Journal of Marriage and Family*. 45:3, pp. 689-97.
- Tedeschi, R.G., A. Cann, and W.D. Siegfried (1982) "Participation in voluntary auto emissions inspection." *Journal of Social Psychology*. v. 117, pp. 309-310.
- Traeger, C. (2001) "Greenies, take heart; a useful family car doesn't have to be an environmental mess." On-line: <http://thecarconnection.com/?article=4213&pg=1>
- Turrentine, T., M. Lee-Gosselin, K. Kurani and D. Sperling (1992) "A Study of Adaptive and Optimizing Behavior for Electric Vehicles Based on Interactive Simulation Games and Revealed Behavior of Electric Vehicle Owners" *Proceedings, The World Conference on Transport Research*, Lyon, France, pp. 1-13.
- Turrentine, T.S. and K.S. Kurani (2001) Marketing Clean and Efficient Vehicles: Workshop Proceedings. UCD-ITS-RR-01-06 Institute of Transportation Studies, University of California: Davis, California. March 22-23.
- Turrentine, T. and K.S Kurani. "Adapting Interactive Stated Response Techniques to a Self-completion survey." *Transportation*. 25:2, pp.207-22. 1998.
- Weinreich, N. (1999) *Hands-on Social Marketing: A Step by Step Guide*. Sage Publications: Thousand Oaks.
- Wiebe, G.D. (1952) "Merchandising Commodities and Citizenship on Television." *Public Opinion Quarterly*. 15: 679-91.