Marketing Clean and Efficient Vehicles: Workshop Proceedings

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Workshop Synopsis

Moving the marketplace to clean and efficient vehicles is proving a complex, difficult, and long-term project. The first step, the development and commercialization of several technologies including electric, hybrid-electric, and alternative fuel vehicles is well underway. Now we must take the next step—transforming marketplace values. The challenges are formidable. There is the legacy of recent market trends. In recent years the automobile industry has focused on selling the size, power, and rugged image of truck-like vehicles; this strategy has produced some of their most profitable vehicles. Now, many consumers associate heavy, roomy, powerful, inefficient vehicle designs with images of the good life of recreation and adventure, the capacity to pick-up major home appliances at suburban superstores, or the ability to transport their child’s soccer team. These same consumers are largely ignorant that light-duty trucks—vans, sport utility vehicles, and pickup trucks—are allowed by policy to be less efficient and more polluting per vehicle mile. Ironically, there is a probably a sizable contingent of self-described environmentally conscious buyers who drive large, four-wheel drive SUVs. In our own locale, it is common to see such vehicles proudly decorated with bumper stickers exhorting people to “Keep Tahoe Blue.” (The reference is to efforts to maintain the lake’s prized clarity, a problem that appears to be connected in part to pollution from the growing populations of the Sierra Nevada foothills and Central Valley.) In such a market, how do we begin facilitate the expression of the values of efficiency, environmental stewardship, public health, and community?

A Los Angeles Times’ article on 29 March 2000 purported that automobile buyers pay more attention to cup-holders than the environmental impacts of different vehicles. There is little to no evidence that a majority of consumers will pay more than a token premium for clean and efficient vehicles. And aside from the uncertainties of green marketing, automobile companies face the initial challenge to convince even the most ecologically conscious consumers of the durability and reliability of new technologies. Marketers must trade-off size, weight, and power. They have to understand response to changes in refueling practices as they attempt to integrate these technologies into currently profitable product lines. These particular marketing challenges are new; the auto companies have little experience or market information with these values.

Even when knowledge barriers are overcome, these marketing challenges may require a large shift in marketing resources. Conventional marketing of vehicles is a large industry—$14 billion per year in the United States alone. Within the automobile companies, those groups charged with making and promoting clean and efficient vehicles are new and relatively small. They must compete within their own companies for resources to develop, produce, and advertise their products. Public agencies and non-governmental organizations (NGOs) who wish to promote clean and efficient vehicles typically do not have the resources and expertise to mount the long-term marketing effort required to transform the market.

Overcoming these challenges will require long-term, coordinated efforts among public interest groups, public agencies, and automobile makers. Towards this end, the Institute of Transportation Studies held a workshop entitled “Marketing Clean and Efficient Vehicles” on March 22 and 23, 2001 at the University of California, Davis. The Steven and Michele Kirsch Foundation and the United States Department of Energy funded this workshop. The workshop brought together representatives from federal, state, and local government agencies (e.g., federal DOE, DOT and EPA, the CEC and CARB, regional AQMDs, local cities and counties), environmental groups, proponents of electric transportation, marketing and communications experts, and representatives of two automobile companies. They came together to discuss prospects for, and barriers to, a marketing effort for clean and efficient vehicles. This workshop had two primary goals. One, to develop an action agenda for attendees to move forward in promoting cleaner, more efficient products in the market for light-duty vehicles. Two, to develop a research agenda to support the
action agenda. An ancillary goal was to bring together representatives from a variety of institutions in an effort to identify common objectives and to explore potential mutual activities.

The workshop was organized in the following fashion:

Day One
- A keynote speaker from the social marketing profession to describe the challenges and basics of marketing clean and efficient vehicles.
- A panel of speakers who are marketing clean and efficient vehicles at the “community and customer” interface.
- A panel of speakers who are organizing national marketing efforts.

Day Two
- Presentations by the U.S. Department of Energy and the California Air Resources Board, who are supporting marketing programs for clean and efficient vehicles.
- A behavioral research expert to speak on research methods.
- Breakout sessions for attendees to develop action and research agendas.

Summary of key points made by speakers in the workshop
The whole social marketing effort is driven by research. Research must be conducted in three stages: listening to consumers, testing programs, and monitoring outcomes. Behavioral change will take many years and will involve a number of steps, each with its own research component. To stay on track during long period of change, we need to develop and employ “process measurement”—measure intermediate changes in behavior to measure progress—as well as tracking intended outcomes. (Christi Black, Ogilvy Public Relations Worldwide)

- A necessary first step is to provide basic education to consumers about the new options and role of transport in health and environment issues. Oak Ridge National Laboratory convened two focus groups in Knoxville, Tennessee on February 27, 2001. Car buyers in these focus groups were largely unaware of the relation between CO2, fuel efficiency, and global warming (Bo Saulsbury, ORNL).
- Initial steps to provide more information in more different media are being taken. For example, there are a number of new sources of information on the web: Ozone maps, to show where dirty air is located; EPA, ORNL, and ACEEE green car ratings systems; a new web site from CARB—ZEVinfo.com.

We need to break out of simplistic images of the market place. A more complex understanding is requisite to study and engage all actors and all motivations. (Bob Knight, BKI)

- We have learned in green marketing that you cannot preach to consumers, berating them for their current sins to get them to change their behavior. We must offer an exchange, give them something for their step forward, including incentives, privileges, and tangible results for their community-minded actions (Maggie Nilsson, Ecos Consulting; other marketing professionals echoed her point.)
- Research efforts need to listen carefully to the design choices consumers want—choices that plug into their environmental values. Small design choices—“think cup-holders”—can be a big win for both the environment and consumers. (John DeCicco)
- Currently, sales people at dealerships do not have incentives to encourage them to focus on selling clean and efficient vehicles. Often customers come into the dealership wanting to talk about the new vehicles, but not to buy. This means much more of a salesperson’s time goes into each sale of an EV or AFV, than goes into the sale of a conventional vehicle. (Mark Baines, San Francisco Honda)
• Even the comparatively successful new hybrid EVs (Prius, in this case) are currently selling to a small market of environmentally motivated buyers. Toyota is waiting to see Prius buyers who are not coming into dealerships just to buy a Prius, but are comparing the Prius to other important, conventional competitors—for example Toyota’s own Echo and Camry, and Honda’s Civic and Accord. Toyota believes this will be an important indicator of the market bridging from a small environmentally conscious or technologically-curious vanguard to a larger, more sustainable (in the marketing sense of that word) market. (Geri Yoza, Toyota Motor Sales, USA)

Much can be done at the community level to promote these clean and efficient vehicles. The City of Vacaville has raised funds from CMAQ and other sources to incentives the purchase of EVs (Ed Huestis, City of Vacaville). Regional AQMDs, as well as state and federal air quality and energy regulators can provide information about policy goals and the means to achieve them. (Kerry Shearer, Sacramento AQMD; Lisa Kasper, CARB) Vehicle rental agencies can provide experience with new vehicles (Terry O’Day, EV Rental Cars). A variety of organizations can stage locally based demonstrations ranging from single day events to long-term vehicle leases.

**Research Action Items**

The workshop resulted in a number of suggested research actions. We state these as the following research questions.

**Industry**

• What are the automobile industry’s options to reduce vehicle size without loss of profits?

**Consumers—Individuals**

• What is the value of non-monetary incentives?

• How do consumers perceive small design changes (differences) between vehicles?

• What kind of information would make consumers consider environmental aspects of vehicles, e.g., to consider the choice of two wheel-drive or four wheel-drive from an environmental perspective?

**Individual Ramifications of Social Contracts**

• What are the ramifications for consumers of social dimensions of vehicle choices, e.g., would you buy an EV because your neighbor wants clean air inside their car?

**Social Dimensions of Individual Choice**

• How does a community talk about new mobility choices before they try them? How does a community talk about new mobility choices after they’ve tried them? What are the mechanisms and content of such discourses?

• Are there “community profiles” analogous to market segments? Are these more or less useful than market segments based on types of individuals and households?

**Developing an Holistic View**

• What is the full range of influences and motivations acting on consumers? For example, how do we incorporate the role of educators and vehicle mechanics in this particular green market?

**Alternatives to Marketing Vehicles**

• What is the impact on clean air and global warming of mobility purchase behavior vs. vehicle purchase behavior?
Presentation Summaries

Why a Workshop on Social Marketing for Clean and Efficient Vehicles?

Tom Turrentine, Institute of Transportation Studies, University of California, Davis

Tom provided the basic motivation for this workshop—continuing environmental problems stemming from light-duty vehicle emissions. Despite technical improvements (e.g., reductions in emissions per vehicle mile), we continue to fail to meet ambient air quality standards and total energy consumption in transportation continues to increase. The marketplace continues to move towards larger, more polluting, and less efficient vehicles. Further, Americans are driving more miles each year. The continuation of these trends threatens to offset technological gains.

Tom also noted that until quite recently, technological improvements in emissions and efficiency were made through regulatory processes, not through the market place (with the exception of the move to more efficient vehicles in the 1970s). Most consumers are not aware of the differences between vehicles in terms of emissions, and do not know the relationship between fuel efficiency and global warming. Moreover, the price of gasoline has stayed so low for so long in the United States that the financial incentive to buy fuel-efficient vehicles has not been present for many years. Thus we are now faced with a market in which vehicle emissions have never been a part of vehicle choice (California’s ongoing experiment with ZEVs notwithstanding), and fuel efficiency has been absent for decades.

What is Social Marketing? Applying Social Marketing Principles to Selling “Green” Cars.

Christi Black, Ogilvy Public Relations Worldwide

Christi spoke on “Applying Social Marketing Principles to Selling ‘Green’ Cars.” Ms. Black outlined the differences between traditional marketing approaches built on the four Ps—Place, Product, Promotion and Price—and social marketing approaches. Social marketing adds several layers to the marketing process, summarized as Program, Partnerships, Public Participation, Policy, Politics, Public Relations, and Proof. Social marketing is about behavior modification, getting consumers to adopt a behavior that is in their best interest (even if that interest is mediated by the necessity of others having to make similar choices). Partnerships in a social marketing program make it possible to provide “exchanges” to consumers for this desired behavior, such as acceptance in a group, identification with role models, rewards from employers and manufacturers, incentives, penalty avoidance, and garnering personal benefits. Because social marketing requires behavior changes, achieving this primary goal can take many years. Therefore, success is measured in terms of both process goals and outcome goals.

The tools and tactics of the social marketing campaign are drawn from the larger field of marketing, e.g., advertising and market segmentation. But social marketing also includes lobbying and public relations, including media advocacy, community relations, outreach to all stakeholders, and policy development. Often this process begins with building public awareness of issues, then moves on to either change or reinforce attitudes, and finally to support the desired behavioral outcomes. A social marketing program seeks to allow citizens to understand the problem, to create wider public support, and to make the solutions personally important to each individual by relating change to each person’s contribution.

To then motivate change of behavior, the social marketer must understand the key motivators and key barriers, develop rewards for change, and provide incentives and penalties. The social marketer must research their audience to understand its cultural, geographic, demographic, linguistic, and even personal diversity (particularly as related to sensibilities about vehicle purchases). The
marketer must also understand the clutter of information and communication in which the buyer resides, and know the relative credibility to consumers and citizens of information sources and communications media.

The final "P"—proof—points to one use of research in social marketing, but the whole process is driven by research. Research must be used to design the program; both secondary, such as literature reviews and existing data on the marketplace, and primary data gathered through focus groups, telephone surveys, interviews and direct mail surveys.

**Panel One: Community-based Marketing**

**What is Community-based Marketing?**

"Community-based social marketers identify the benefits and barriers to behavior and then organize the public into groups, or 'segments,' which have common characteristics, in order that the delivery of programs can be most efficient."


According to McKenzie-Mohr and Smith, this definition is put into action by answering the following three questions:

- What behaviors should be promoted?
- Who should the program address or target?
- What conditions (barriers, incentives, competing behaviors, etc.) do members of those target groups face in adopting the new behavior?

This panel was organized as a case study of one "community" and efforts there to introduce ZEVs to household and fleet markets. Our original intention was that the panel would address the metropolitan area of Sacramento. For a variety of reasons—speaker availability, the number of excellent programs in other nearby cities—the panel also included a speaker from San Francisco, Los Angeles, and Vacaville.

**What behavior is being promoted?**

These panelists were asked to talk primarily about education, outreach, marketing programs for air quality and ZEVs; some were also asked to address HEVs.

**To Whom?**

Most panelists described efforts to address information to residents of the Sacramento metropolitan area, and to promote ZEVs to both household and fleet markets. The fleet market efforts tended to focus more on government fleets (especially the large number of State fleets in Sacramento, California’s capital). Mark Baines from San Francisco Honda spoke more generally about the role of the automobile dealership and salespeople in marketing EVs; Ed Huestis spoke about the programs in the City of Vacaville. Terry O’Day spoke about the use of rental car agencies as outlets for EVs and AFVs. Though based in Los Angeles, he has set up EV rentals in the Sacramento area too.

**What conditions do people face?**

The conditions can largely be described as barriers to ZEVs, including recharging infrastructure, information on vehicles and underlying reasons for ZEVs, and vehicle availability. The panelists, by and large, addressed the variety of conditions that consumers faced in learning about EVs, in acquiring EVs, and the efforts to overcome those barriers. These include providing information
about why people would consider EVs to improve air quality, product demonstrations, and incentives.

Kerry Shearer, Sacramento Metropolitan Air Quality Management District

Communicating Air Quality in the Sacramento Region
The Sacramento Metropolitan Air Quality Management District has implemented many ways of communicating air quality information to residents in the Sacramento region. Kerry outlined his presentation according to these types of information efforts:
- Air quality public education
- Episodic notification
- Non-traditional ways to communicate
- Public awareness

Public education programs include outreach through employers. Currently, brochures and fact sheets are distributed through 580 employers with a total employee population over 200,000 people. A more recent innovation is the use of real-time ozone map movies on its air quality web site—www.sparetheair.com. The maps are shown during Sacramento’s “ozone season”—May to October. They are also shown during the weather segments of local television newscasts.

The Air Alert program provides day-before notification of Spare-the-Air day (high ozone) advisories and real-time notification of unhealthy air in the region. The Air Alerts can be sent to e-mail addresses, text pagers, and digital cellular phones. Other outreach measures include both paid and donated radio and television spots aired the day before and the day of high ozone concentrations.

In addition to the ozone maps, the web site is a source of daily air quality forecasts, air quality news, tips on reducing emissions, health information. Users may also sign up for the Air Alert program using the web site.

Less traditional outreach efforts include development and distribution of “tabloid”-style informational brochures distributed through the waiting rooms of health care providers and direct contact with schools regarding air quality, and notification of high ozone days in particular. The tabloid contained real air quality information presented with bright color graphics and wild headlines, e.g., “Psychic predicts clean air in the future....”

Two interactive “edutainment” projects have been undertaken with the involvement of several other partners. Smog City allows users to simulate the effects of weather, population, and emissions on air quality. The other, Planet Polluto, is a game available on CD-ROM.

Tim Hastrup, EV Owner from the nearby city of Roseville

EV Driver Experience as Consumer and Ambassador
Tim Hastrup spoke as an enthusiastic EV owner. He and his wife lease two EVs: a General Motors EV1 and an electric Ford Ranger. He relayed his own experiences in leasing their vehicles—which were generally positive except for the long waits. He provided first hand accounts of the fascination with EVs expressed by the general public, and his role as an ambassador for EVs. He spoke wistfully of the disappearance of EVs from the market, commenting that while he was intrigued and excited by hybrid vehicles like Honda’s Insight and Toyota’s Prius, for him they were clearly a second best choice.
Daniel Gehringer, Sacramento Municipal Utility District

Driving EVs to Market: The Many Roles Played by Electric Utilities
As the primary "fuel" retailer for electric vehicles, electric utilities have obvious interests and roles in marketing ZEVs. SMUD undertook a multi-faceted effort to:

- Provide electric vehicle recharging infrastructure
- Spur technological development through research and development
- Support market development through implementation in its own fleet and demonstration to other potential users and education and outreach.

Daniel outlined SMUD’s activities in all these areas. The initial aims of SMUD’s activities—going back to July 1990—were to introduce EVs to SMUD’s own fleet, create an EV loan program, and market research. Recharging infrastructure to support EVs was also an early priority. SMUD began installing 110v charging infrastructure in 1991. They quickly moved to higher power installations, as it became apparent that EVs would be charged from 220-volt systems. Today, SMUD maintains its commitment as the exclusive distributor in California and Arizona for inductive chargers. The utility has installed over 200 recharging appliances in the Sacramento area and over 3,300 throughout California.

SMUD’s Electric Transportation Group defines “outreach” as the process of extending knowledge to the Sacramento Community with a emphasis on perception. Their approach is based on what Daniel described as a realistic approach, based on providing hands-on experience. One of their main goals has been to overcome negative EV perceptions. They have participated in EV loan programs in Sacramento and throughout the state. Other outreach efforts have included the following:

- Community Forums
- Education Seminars
- Environment Conferences
- ‘Get the Word Out’ Program including grassroots marketing, the SMUD website, SMUD’s customer connection, an EV Hotline, and direct mail

Lisa Kasper, California Air Resources Board

Expanding Outreach to Support Regulation
The California Air Resources Board is expanding its efforts to support its ZEV regulations and requirements with marketing tools. Past efforts had included ZEV demonstrations to fleets, particularly state government fleets in Sacramento (but also including efforts in Southern California in cooperation with the South Coast Air Quality Management District). In recognition of the need to create an expanding program of public education and outreach, ARB has recently expanded its own efforts. These include hosting a series of workshops on EV marketing and its participation in outreach activities with many partners. These activities include:

- Vehicle demonstrations and presentations at schools and conferences
- Creation of the website: ZEVinfo.com
- Co-host of the “ZEVent 2000”—a one day ZEV demonstration and media event
- Establishing both short-term and long-term EV loan programs
- Increasing efforts to encourage fleets to use EVs through the evSacramento program
- Establishing the “EVs for Education”—a program that seeks to include EVs in school curricula and make EVs available to educational institutions.
Mark Baines, San Francisco Honda

Can you Sell EVs for a Living?
Mark Baines is the alternative fuel, electric, and hybrid-electric vehicle sales manager for the San Francisco Honda dealership. He provided insight into the position of these products and their “mainstream” competitors on the sales floor of a dealership. The existing training programs and incentive structures in an automobile dealership do not reward salespeople for the additional time and energy it takes to sell an AFV, EV, or HEV. Most salespeople work on commission and believe they earn more selling a larger number of conventional vehicles in a given amount of time. The group of EV sales managers at Honda dealerships is a small one, and Mark believes those people undertook to promote them out of a personal interest in the product—because of their interest in the technology and in clean air.

Terry O’Day, Budget Rental Car

Marketing Environmental Vehicles
The subtitle of Terry’s talk was “You gotta get ‘em into the car.” To create opportunities to put drivers into EVs, HEVs, and AFVs, Budget Rental Car includes several in their rental fleet. There are now at total of 250 EVs, HEVs, AFVs, and ultra-low emission gasoline vehicles for rent at nine of Budget’s U.S. locations. (Most of these are in California, including Sacramento. One is in Phoenix, AZ and another is in Pittsburgh, PA.)

At the time of his presentation, the EV fleet had accumulated over 2 million vehicle miles of travel. During the year 2000, the total number of EV transactions increased from less than 200 per month in January, to over 1400 per month during October, November, and December.

Terry said that the extensive international, national, and local print and television exposure of the EV rental program was important to attract customers and earn credibility.

He provided a “snapshot” of one month at the Los Angeles airport rental site. In that month, that site rented 20,000 vehicles. Of these, 750 chose an AFV. Each of these transactions involved the customer meeting with a specialist who provided an orientation to the vehicle. Customers then used the vehicles in everyday traffic to complete their rental car missions.

Renting EVs, HEVs, and AFVs has produced many lessons. His list of ‘what doesn’t work” included:
• General awareness is not linked to action
• Sole reliance on car dealerships to make vehicles available to potential customers
• Environmental or technology messages only
• Long waiting periods
• Inconsistent messages about availability (both the number of vehicles and where they may be obtained).

His list of “what does work” included:
• Customer testimonials
• Word of mouth
• Clear customer value proposition
• Direct incentives for rental agents
• Extended demonstrations in daily driving conditions
Ed Huestis, City of Vacaville

How to “Electrify” More of the Public To Lease Electric Vehicles
Ed Huestis has spearheaded efforts in the city of Vacaville to promote EVs. In addition to describing those activities, Ed described the innovative way he was able to fund these efforts in a small city. The city of Vacaville began hosting EV ride-and-drive events in 1998. The city leased a GM EV1 I that same year. Also in that year, the Solano Transportation Agency decided to make EVs a priority in the county.

In addition to a variety of EV demonstrations, Ed Huestis outlined the innovative manner in which the City of Vacaville was able to make these happen. The City applied for, and received, $300k in Congestion Mitigation and Air Quality (CMAQ) funds to pay for incentives (lease buydowns), EV leases for city vehicles, and installation of recharging infrastructure. They were able to facilitate the lease of eight GM EV1s and four Ford Ranger EVs by people in Vacaville. The City was able to place orders for four Toyota RAV4s and two Ford Ranger EVs. The program has garnered extensive local media coverage.

Their success led them to apply for twice as much funding in a second CMAQ application. They were again successful—allowing them to not only expand the program in Vacaville, but to implement a similar program in another city in their county. The city has set itself the goal to have the more electric vehicles per capita (residential) than any other city in California. Further, the city is committed to maintaining ten to twelve EVs in its own fleet, and to install EV charging at every interchange of Interstate 80 as it bisects the town. This is part of a commitment to expand the current network of 14 recharging appliances by 20 to 25 more.

Panel Two: Marketing at the State and National Level

John DeCicco, author of the ACEEE Green Vehicle Rating Guide
John spoke on transforming the marketplace toward environmentally preferable vehicles. He noted that despite the excitement about the Toyota Prius and Toyota’s interest in green cars, the introduction of the Toyota Sequoia full-size SUV was a major shift upward in Toyota vehicle sizes. The Sequoia (at least in the short term) will have a larger impact on the market than the Prius. Thus, this one new truck model will more than undo the environmental benefits of the Prius.

John presented his pyramid of strategies for transforming the market. Regulatory programs for emissions and fuel economy standards form the base. On top of those are broad coverage incentives, such as fee-bates and tradable credits. The next strata are other incentives aimed at commercialization. The top of the pyramid is research and development.

John notes that we have just begun to learn about how to use marketing strategies to transform the marketplace. He discussed his own Green Guide, just reissued for model year 2001. The guide was developed as a stand alone consumer information tool that could also be used by media and educators, to stimulate government information, and to encourage other green scoring efforts. He pointed out that the Toyota Highlander, a “low emission vehicle,” earned a top score among medium-size SUVs and thus a slot in the “Greener Choices” list.

He points out that small design choices—“think cup-holders”—can make a difference for both consumers and the environment. The recycling movement was successful when it became convenient for consumers through curbside pick-up. Thus we must deliver green choices for consumers, instead of “alternative technologies” to move the market, allowing consumers to express their good intentions. This will empower the public.
There are many roles for government, industry, and other organizations in this new effort to transform the market. Government for its part must develop more public information and incentives programs, and lead in developing "green fleets." Industry must share appropriate market research information, and collaborate on public labeling and information programs. Other organizations can assist with education of the public, develop an appreciation of customer focused marketing, and encourage private fleet transformation.

One current effort is the Green Vehicle Marketing Alliance, which is an effort to build a multi-stakeholder effort made up of Government (at all levels), industry, non-profit organizations, consumer groups, and researchers. The scope of GVMA will be consumer education, public relations efforts, market research, vehicle labeling, awards, and other product recognition. GVMA will build the green concept, provide information to other organizations and to the public, and organize market research.

Geri Yoza, Toyota Motor Sales USA, Inc.
Geri Yoza is National Marketing Manager for the Toyota Prius Program. The Prius Program is in full swing. Toyota manufactures 36,000 Prius worldwide, of which 12,000 are destined for the US market.

The launch of the Prius presented an opportunity for innovative approaches within Toyota, including web marketing and vehicle distribution. Specifically, Toyota implemented a new internet dealer ordering and delivery process for Prius. Dealers carry no inventory, though each dealer has a few for rental or display purposes. Buyers order vehicles, which are then delivered to the dealer. Delivery of a Prius currently takes several months, and there is a national waiting list. The majority of buyers purchase rather than lease, and the strongest market so far has been in Northern California, especially the San Francisco Bay Area.

The Prius is a five-seat sedan and is not aimed at the same market segment as electric vehicles, such as the EV1 or the other current hybrid offering, the Honda Insight. Rather Prius draws from the same market segments as the Taurus or Accord.

Despite the high cost of this new technology, Toyota has set the price of a Prius competitively. Nevertheless, the current price of a Prius is a few thousand dollars above comparably equipped vehicles, like the Corolla. Toyota would like to see additional incentives from the public sector to bring the price down to the same level as a comparable vehicle so as to attract buyers from outside the environmentally-conscious market segments. As the market develops, Toyota is not likely to increase the manufacture of additional Prius's, rather it will put hybrid drivetrains into additional product lines.

Lisa Snapp, United States Environmental Protection Agency
Lisa spoke about the EPA’s Green Vehicle Marketing Program. The main goals of the program are to:

- Help people understand the links between cars and the environment, including emissions and fuel economy
- Have consumer know their greener vehicle choices
- Get consumer to screen their choices through environmental concerns

The key elements of the EPA program are 1) deploying "green" rating systems, 2) developing a trusted brand name, and 3) promoting public willingness to act. The rating systems must be responsive to public need and research findings. The green brand must offer instant signification of green choice. The public must believe that green vehicles are widely accepted, believe that their
choices make a difference, see that they don’t have to make big sacrifices, receive information that they need to make choices, and understand their obligation to act.

The EPA Green Vehicle Guide Website—www.epa.gov/greenvehicles—was launched in October 2000; the rating system based on a five-point scale of “green stars” launched in January 2001. The site has two rating systems. One is an overall rating of the vehicle emissions using a horizontal bar scale from one (highest, worst) to ten (lowest, best) emissions. A city and highway fuel economy rating accompanies the bar scale. Second is the newer five star rating. This system rates vehicles within vehicle size class. This system also incorporates emissions and efficiency. This within-class rating is intended to help consumers shopping within a size class—for example, mid-size SUVs—to pick the best vehicle in that class. The web site has been a “daily pick” on the Yahoo search engine site, gets good press, and is approaching 1 million hits per month.

The next steps are to refine the ratings approaches and web site with market research, develop an overall “green” transportation brand, and continue to coordinate with manufacturers and environmental organizations.

Charles Villanueva, Natural Resources Canada
Charles spoke on Canadian actions to develop a public education campaign around fuel efficiency as part of a Canada Action Plan on Climate Change. This program will be implemented in April 2001 with a federal contribution of Can$9.5 million over five years. This program will stress buying greener and more efficient vehicles and fuels, good driving habits, and regular vehicle maintenance.

The work plan includes market research to assess current levels of awareness of vehicle fuel efficiency, green aspects of fuels and vehicles, advanced vehicle technologies, maintenance issues, driving habits and fuel efficiency, and to identify barriers to behavior change. It also calls for development of a variety of marketing tools, including a green buyers guide, green labels, advertising campaigns, advanced vehicle testing and showcasing, internet activities, community based initiatives, and media outreach.

The plan emphasizes partnerships with automobile makers, fuel providers, parts and tire retailers, service centers, automotive media, other government agencies and communities. NRCan will provide leadership, and with the Transport and Energy Canada, will provide strategic direction, evaluation, and progress review.

Bo Saulsbury, Oak Ridge National Laboratories
Bo presented the results of two focus groups conducted during February 2001 in Knoxville, Tennessee. The groups were hosted by the National Transportation Research Center (NTRC). These focus groups explored car buyers’ knowledge and understanding of how cars and trucks affect the environment, the link between environment and car purchases, and tested participants’ response to several vehicle rating web sites. After a caveat that this is qualitative research, and thus not immediately generalizable to larger populations, he reported the following findings.

Participants for the most part believed that better vehicle fuel efficiency is better for the environment. This corresponded with the belief that larger vehicles are worse for the environment. However, they did not really know why bad fuel economy might be bad for the environment. The focus group moderator had to explain that poor fuel economy means greater CO\textsubscript{2} production per vehicle mile. Participants had a strongly held, but ill-defined, belief that cars and trucks are not good for the environment, especially old, large, or out-of-tune vehicles. They had general knowledge that tailpipe emissions are unhealthful and cause smog, acid rain, and ozone. They had little knowledge
of which gases are the “greenhouse gases.” Most participants assumed the government regulates emissions, that all vehicles meet standards, and implicitly that all vehicles meet the same standards.

These buyers did not know where to get information about environmental impacts of vehicles other than the window stickers on new cars and trucks. They did not know how to identify environmentally friendlier vehicles, and did not know if they were available. They also indicated that environmental concerns did not generally enter into their purchase decisions. For a few, fuel economy did affect their choices, but for cost reasons only. They would like to know more about the differences between vehicles, but only a few thought this might alter their purchase decisions.

The two groups were asked to evaluate four Internet sites that rate environmental effects of vehicles. These ratings systems included:
- The EPA’s two ratings systems described earlier by Lisa Snapp (the emissions/air pollution rating using a combination bar chart and 1-10 rating, and the EPA’s green car rating, which rates vehicles from one to five stars within size and body style “class”);
- The ACEEE Green Guide;
- California’s (class-specific) LEV system; and,
- NRTC’s own fuel economy site.

Participants understood best the EPA one-to-ten bar scale; it was simple. The EPA Green Star rating was not well liked because vehicles could have five stars from their class but not be as green as a vehicle with fewer stars from another class. Some regarded this as a trick. Response to ACEEE’s Green Guide was mixed. On the one hand, the ACEEE system was liked because the scale was simple to understand and comprehensive in the environmental impacts it summarizes. On the other hand, the system was so complex in its calculations, that some wondered if they could trust the ratings. Others commented “all vehicles fail, so why bother?” (Green Guide scores are scaled from zero to 100, but the current high scoring vehicle is rated at less than 50.) The NTRC fuel economy site had some features that were well received. These included the presentation of annual fuel cost and tons of CO₂ produced for a standard car. However, some participants were totally confused over these numbers and the comparisons.

There was confusion between the ratings systems. In some systems (e.g., ACEE Green Guide) a higher number is better. On other sites (e.g., NRTC’s use of tons of CO₂), lower numbers are better.

Both offered these conclusions. Two types of information were most relevant to consumers—fuel economy as it relates to global warming (without the intervening issue of what gases cause global warming) and some sort of overall green rating. Further, this information needs to be available in places where car shoppers normally look, such as Consumer Reports and automobile showrooms. Finally, many of the participants believed that even if they had access to this information, it would not determine the type of vehicle to be purchased but would affect only some final choice between the last couple vehicles being considered.

The Role of Federal and State Energy and Air Quality Agencies.

David Rodgers, Office of Transportation Technologies, US Department of Energy

David opened the second day of the workshop describing the role of the USDOE in marketing clean and efficient vehicles. David pointed out the projected growth of oil production to the year 2016 and its predicted decline thereafter. Further, domestic oil production is declining rapidly while
domestic use is growing rapidly. The increase is due in part to the increase in the number of less efficient light duty trucks.

The federal government has been involved in developing new vehicle technologies through research and development programs, demonstration and deployment projects, incentives, regulation, and setting priorities. These programs pursued a portfolio of technologies, partnerships with the automobile industry, developed strategic planning, and sought state and local input.

However, these programs had several pitfalls—one size fits all approach, too many program authors, unrealistic goals, single technology solutions, short-term thinking, and partial solutions. Better programs must allow more innovation and flexibility, be based on core principles, and have more realistic goals, a performance requirement, longer-term commitments, and a carrot and stick approach.

David described how the 1992 Energy Policy Act tried to help by setting a goal for the proportion of alternative fuel vehicles in federal fleets—10 percent by 2000 and 30 percent by 2010. These goals were to be achieved by using a combination of voluntary programs, public information, fleet mandates, and grants and incentives. The assumptions behind the 1992 EPACT included the following:

- The main barriers were informational.
- Mandates solve the chicken and egg problem.
- Fleets are uniform and easy to regulate.
- Small tax incentives and grants will motivate the market.
- The fuel providers will lead the way in vehicle use.
- Having a goal was sufficient.

David stated that we are headed in the right direction, but will not meet 2010 goals of 30 percent fleet penetration. There has been steady growth of alternative fuel use in fuel provider, state, and federal fleets. The Clean Cities Program has 80 participating programs and many thousand vehicles. Information about AFVs has become more widespread. The number of refueling stations has grown. Dozens of models of AFVs have been offered by OEMs. He noted that EPACT suffered most of the pitfalls described above.

What to do next? Recognize that there are serious energy supply and demand issues, that there is a role for federal government to do marketing, that marketing needs a more comprehensive approach to different segments with multiple technology options, and there needs to be great cooperation and partnerships with long term commitments.

**California Drives toward Zero Emissions**

**Alan Lloyd, Chairman, California Air Resources Board**

Alan started by noting California’s progress in achieving clean air, especially in the South Coast Air Basin, has been substantial. Peak ozone levels have steadily decreased over the last 20 years. However, rapid population growth and even more rapid growth in vehicle miles of travel will slow continued air quality improvements. Because of these trends, further progress toward achieving compliance with state and national health-based air quality standards requires that California’s vehicle population exhibit zero emissions or near-zero emissions.

<table>
<thead>
<tr>
<th></th>
<th>1999</th>
<th>Projected 2020</th>
<th>Growth 1999 to 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (in millions)</td>
<td>34.07</td>
<td>45.45</td>
<td>33 percent</td>
</tr>
<tr>
<td>VMT (in 10 million miles)</td>
<td>765</td>
<td>1,046</td>
<td>37 percent</td>
</tr>
</tbody>
</table>
Emissions from passenger cars and light-duty trucks have been drastically reduced primarily through Low-Emission Vehicle (LEV I and LEV II) regulations. The focus of the ZEV portion of these regulations has been on long-term benefits and a transformation of our vehicle pollution control strategy, towards vehicles with lifetime durability. This has implications not just for ozone but for air toxics, global warming, energy supply, water pollution, and other issues.

ZEVs are the "gold standard" of what can be achieved in motor vehicle emission control. ZEVs have no tailpipe, evaporative or fuel marketing emissions; they have reduced emissions of toxic and greenhouse gases; and they have no emission control equipment which can deteriorate or fail. The indirect emissions from power plants to recharge ZEVs are extremely low in California.

The CARB Board recognized the importance of the ZEV "gold standard" when staff presented a Biennial Review of the ZEV program on September 7 and 8, 2000. Subsequent to that review, the CARB Board directed staff to address ZEV cost, availability, and public education, and return to the Board in January 2001 with proposed improvements to the ZEV program to address these issues.

A set of such improvements were approved at the January 25, 2001, Board Meeting. The revised mandate now includes three primary categories of vehicles for compliance in 2003:

1) Two percent must be truly ZEVs (from the large manufacturers).
2) Two percent may be Advanced Technology Partial Zero-Emission Vehicles (PZEV), with very low tailpipe emissions.
3) Six percent may be non-AT PZEVs.

The adopted modifications provide manufacturers with additional flexibility to encourage early placement of ZEVs, include more stringent emission standards for heavier sport utilities and trucks, and achieve a 16 percent ZEV mandate by the year 2018. At this meeting staff also proposed to expand CARB's ZEV outreach and public education efforts.

Alan stated the ability to place the increased number of vehicles required over the next several years under the ZEV Program is one of the key issues facing us today. The ARB is charged with working with all the stakeholders to build a successful ZEV marketing plan. In order to take full advantage of the available market applications, EVs must be available at prices that are competitive on a lifecycle basis with those of similar conventional vehicles. In addition, there needs to be continuity—an orderly buildup from current levels to increased market penetration. Several vehicle platforms must be available, in order to meet customer preferences and satisfy different needs. Public education is important to inform consumers as to the vehicles that are available and what they can and can’t do. Finally, many customers continue to express a desire to buy rather than lease their vehicles.

CARB's long-term outreach goals are to build upon current and past stakeholder efforts to develop and implement an Outreach and Public Education Plan for ZEVs that:

- Educes consumers and fleet operators of their advanced technology clean-air transportation choices
- Provides accurate information to the public
- Dispels misperceptions of EVs
- Educates the public about how their transportation choices impact air quality and energy use
- Shows how the ZEV Program can benefit at-risk communities

Alan argued that future improvements in air quality depend on continuing to produce ZEVs:

"We need to stay the course for air quality and energy diversity goals. For all concerned, we need to remove the uncertainty. It is an impediment to progress. The need to drive
toward zero- and near-zero-emission technologies is even stronger today than it was in 1990 when we first adopted the ZEV program. A move to the electro-chemical engine is not going to happen overnight; it is a long-term program. It would cost more to abandon what we’ve started. Investment would stop without the mandate. In fact, we already have a blackout, during which few or no battery EVs are available to those who want them, at any cost. The auto manufacturers have done a tremendous job in designing and producing EVs. Now we need a cooperative program with the manufacturers to address per vehicle costs and mitigate the availability gap.”

**What will people do? A brief review of research tools for peering into the future of motoring**

Martin Lee Gosselin, Groupe de Recherche Interdisciplinaire Mobilité, Environnement, Sécurité (GRIMES), Université Laval

Martin has been developing research methods for several decades that prospect the future for potential changes in driver behavior, including purchase and use changes to promote safety and environment. His talked about the research tools that lie between sales statistics (hard data) and focus groups (soft data) to help in designing and guiding efforts to promote clean and efficient vehicles. Martin said that the first step is to identify those segments of the market where realistic gains can be made, and to stick to reliable data.

Martin presented a case of two seemingly distinct households. The first household lives in a large private residence on the fringe of a major urban area. They have no access to transit from their residence. The two heads of household both commute more than 20 miles to work. They own three vehicles—one four-wheel drive and two sports cars. The second household shares one fuel-efficient vehicle, carpooling to work most days. They built their own passive solar house, are self-sufficient, and live in a village of 1,000 persons. Martin then asked the audience which household they believed was most likely to buy a fuel-efficient vehicle. The answer is both equally, as he had described the same household—his own.

Martin used this example to illustrate that the answer you get depends on the questions you ask. All questions come with a context. Respondent and researcher must have a shared understanding of that context; hence both researcher and participant must jointly construct a future choice scenario. To probe the future, you must first have a solid understanding of your research subject. You must always distinguish between constraints on their behavior and the behavior itself. Then you can decide if you wish to either fix or elicit future behaviors and fix or elicit future constraints. Future constraints can be “external” to the respondent, such as the performance of the future vehicle being suggested, fuel prices, regulations, or other frameworks. Constraints may also include commitments to family or shared cultural norms. Internal constraints can be perceived risks, personal values, and physical fitness, among others.

Martin notes that you can classify questions about the future constraints and behaviors in terms of four types of questions. Martin summarized these four in the following table.

The first, stated preference, is a classic utility tradeoff. An example of this type of question would be to ask respondents to choose between, for example, an electric vehicle with 100 miles of range and a trunk large enough for two suitcases versus an electric vehicle with 150 miles of range and a smaller trunk. The second type (stated adaptation) is a “What if?” question. For example, you might ask consumers what they would do if gas costs $7 a gallon and your city had 48 dirty air days per year. The third type of question (stated tolerance) is a “What would it take?” question. For example, you might ask consumers what circumstances would it take for them to buy an HEV that cost 25 percent more than a conventional gasoline vehicle. Finally, the fourth type (stated prospects) of question is “How does change start up for you?” An example would be to ask
“under what sort of circumstances would you think about switching your personal vehicles and how would you go about doing it?” Below is a more detailed matrix of these four types.

<table>
<thead>
<tr>
<th>Behavioral Outcomes</th>
<th>Mostly given Constraints (expressed as attributes: personal/household/social/spatial/supply, etc.)</th>
<th>Mostly elicited Constraints (expressed as attributes: personal/household/social/spatial/supply, etc.)</th>
</tr>
</thead>
</table>
| Mostly given        | STATED PREFERENCE  
(focus = tradeoffs, utility)  
“Given the levels of attributes in these alternatives, which would you prefer: [A]...? [B]...? etc...” | STATED TOLERANCE  
(focus = limits of acceptability and thresholds for change)  
“Under what circumstances could you imagine yourself doing:  
[r1]...? [r2]...? etc...” |
| Mostly elicited     | STATED ADAPTATION  
(focus = reactive and trial behavior; problem-solving; rules)  
“What would you do differently if you were faced with the following specific constraints: [...detailed scenario...]?” | STATED PROSPECTS  
(focus = learning processes; information seeking; imagining, formation, and testing of choice-sets; metadecisions)  
“Under what circumstances would you be likely to change your travel behavior and how would you go about it [...broad context...]?” |

Each of these approaches has particular research value. The utility trade-off question allows quantitative measures of narrowly defined problems, such as tradeoffs between cupholders and CD players. The stated adaptation questions explore “coping behaviors” and thus help to design policies and public messages to support change. The stated tolerance questions explore the thresholds of “action” and pain to examine perceived relative advantages. Stated prospect questions allow for observation of how households solve problems under uncertainty. This offers much input to “policy” dilemmas and may prevent critical surprises. For example, instead of buying a fuel-efficient vehicle, households may think about getting rid of cars all together and moving their residence to an area well served by non-automotive options.

Martin closed by cautioning researchers to be humble when peering into the future. Among the larger trends shaping peoples’ lives are an emerging 24-hour, just-in-time lifestyle, as well as the increasingly global resource and economic context. When researching the futures of novel technologies, researchers must understand what stage has been reached in diffusion of public knowledge. Finally, we must never underestimate the creativity of the consumer.

**Setting the Stage for a Review of Current Knowledge**

Ken Kurani, Institute of Transportation Studies, University of California, Davis

(This talk was not given in whole at the workshop in an effort to get back on schedule for the breakout sessions described next. The overheads for the talk are included, and this summary is based on those overheads. One important purpose of this presentation was to prompt participants to
suggest materials to be included in a review of what we believe we already know about marketing clean and efficient vehicles. Such a review is one initial step to define research needs.)

We are concerned with the marketing of new vehicles that are cleaner and more efficient. This suggests that overall we are interested in both household and institutional (fleet) buyers of new cars and trucks. But these two market types ought to be considered separately, and for purposes of this workshop and review, we will focus on households. Further, as low emissions and high efficiency are linked to both private and social goals, we are interested in beliefs and behaviors that people hold and exhibit as consumers and as other types of social actors. These other roles include being members of families and organizations, residents of neighborhoods and communities, and citizens of cities, states, and nations.

In conducting any type of review of research, one of the primary activities is de-constructing lists. In the same way that the only way to understand the answers to questions is to understand the context in which the question was asked, it is important to know how a list has been constructed. In de-constructing, for example lists of attributes that “people” think are important about cars and trucks, we are trying to do two things—sift and sort. A list may be an overall average ranking supplied by a sample of people. We can sift through the individual rankings to find those who place low emissions and high efficiency higher than average. The more difficult task may be to re-sort the list for all (or at least, more) people.

In looking for relevant studies for an initial review, we are interested in all types of media and all types of methods: opinion polls, attitude research, revealed preference, stated preference, psychographic assessments, demographic analyses, lifestyle studies, results of product demonstrations and trials. In doing so, we must use care in including results from studies that may never have been intended to address our specific needs.

A few pertinent studies do reveal that people appear to want environmentally more benign vehicles. Support for this idea may vary depending on whether people respond as consumers or as citizens. Support may vary according to whether the question is phrased in terms of air quality or global warming. Responses to survey questions depend on the timing of the question relative to other events and news. We can compare the results of two surveys to highlight some of these. The Dohring Company reports from their 2000 National Automotive Consumer Study that 57 percent of respondents agree that “auto manufacturers should make eco-friendly cars.” In January 2001, American Demographics reported that a much higher proportion, 77 percent, of their respondents say it is extremely or very important that manufacturers make cars that produce less CO₂. The American Demographics and Dohring results are based on a similar style of question—what should automobile manufacturers be required to do. But American Demographics’ results are based on a more specific phrasing of the environmental effect (CO₂ emissions versus “eco-friendly”).

ZEV demonstrations provide other types of information. They are a rich source of first-hand accounts with new technology. Gould and Golob report that EV test drivers perception of the environmental efficacy of EVs was higher after a 2-week trial. Drivers support for policy intervention on behalf of EVs was high prior to trials and remained so afterwards. However, after the trials, EVs were evaluated on a broader attribute base—not just clean air. The authors of that work are careful to give the usual caveats about demonstrations and trials—small sample size, self-selected respondents.

No single research method is “best.” We learn different things from different types of investigations.

In addition to vehicle technologies and buyers, we need to understand the marketing mechanisms—how cars and trucks are sold, and increasingly, leased. The internet will continue to
change how vehicles are purchased or leased by providing new channels of information and acquisition, e.g., direct sales, larger regional or nationwide searches for vehicles.

Market Professionals Panel Discussion
A question and answer session was held with three market professionals. They were Carol Johnson (JHME Advertising), Kevin Collins (Advertising Rising), and Maggie Nilsson (Ecos Consulting). A topic that raised considerable interest was how to handle the competition between electric vehicles and hybrid vehicles. Concern was expressed that current advertising for hybrid EVs was emphasizing that buyers would not “have to” plug in a hybrid. This advertising message was seen as harmful to battery EV markets, especially since EV owners typically do not view plugging in as a hassle. Quite the opposite, plugging the EV in to recharge is seen a benefit, seeing as it is done at home. Kevin Collins commented that in the early market there should not be comparative advertising between clean products—no “hybrid vs. battery electric vehicles,” or even brand competition such as Ford Th!nk vs. Daimler Chrysler neighborhood EVs. Rather, initially there should be an effort to float all boats. Another topic raised was how to be efficient with advertising funds. Carol Johnson noted that the media world has gotten very messy in recent years, with many new information channels. Picking the right channels is part of the overall marketing strategy. For example, in a recent project, Carol found that the best place to reach heavy-duty truck drivers with an air quality message was on localized media at truck stops. She also warned that despite growth of the Internet, Internet users are still a minority of all people. We are not at a time when the Internet should be seen as a core advertising strategy. Finally, Maggie added that her biggest lesson in green marketing had been to emphasize the positive contributions of a product and not to use guilt to change consumer behavior.

Workshop Breakout Sessions
Workshop attendees participated in several breakout sessions to discuss strategies. The workshop employed a process known as “open space,” in which attendees designed and lead their own discussions. This process was explained to participants, and the topics for the breakout sessions were identified on the first day of the workshop. Individual breakout sessions were convened on some of these topics on the second day. The open space process, the topics suggested by the workshop participants, and summaries of the conversations that were convened are summarized here.

Introduction to Open Space
Open Space is about giving responsibility to the participants for constructing the important outcomes of the meeting. These outcomes include strategic decisions about education, outreach, and marketing; building alliances and commitments; determining action agendas, including research agendas to support decision making, or as part of marketing activities.

Responsibility is given to the participants to define topics for discussion in smaller groups. Any participant may suggest a topic; any participant may attend any breakout session. All topics are valid. But a conversation about a topic can only happen if someone takes responsibility to host the conversation and report it back to the larger group.

Principles of Open Space
- Whoever comes to a conversation are the right people to have that conversation.
- Whatever happens is all that could have happened.
- Whenever it starts is the right time.
- When it’s over, it’s over.
One Law in Open Space
Mobility: participants are free to move from conversation to conversation.

Suggested Topics
The topics for which a breakout session was convened are summarized below. Some other topics that were suggested are not described here, as they were not convened due to lack of time or the loss of their initiator.

1) Which green vehicles need incentives? (Dave Ashuckian, CEC)
2) What are the best ways to build demand for clean and efficient vehicles? (Kathy Daniel, Federal Highway Administration)

Topics combined together into a single session include:
3A) Are we marketing technology or social change? How do we use both to reach our goals? (Lisa Kasper, CARB)
3B) If clean and efficient vehicle characteristics (e.g., technology) change the rules, which are the rules that should be challenged? (Martin Lee-Gosselin, Université Laval)
4A) How do we market the clean, green alternatives without vilifying the base product? Does it have to be “good” vs. “evil”? (Jamie Knapp, J. Knapp Communications)
4B) How do we conduct effective marketing (for clean and efficient vehicles) given the $14 billion manufacturers’ (advertising) budget? Think creatively...
4C) Holistic green vehicle marketing strategy—alternatives to beating our heads against the wall (selling something people don’t want to buy). What is the role of individual citizen, government, and automakers? Are their solutions that work “naturally”? (Robert Knight, Bevilacqua-Knight)

Topic 1: Which Green Vehicles Need Incentives?

Reporter: Dave Ashuckian

Participants
Dave Ashuckian, CEC
Brian Abbanat, ITS-Davis
Susan Frank, Kirsch Foundation
Terry O’Day, EV Rentals
Lisa Snapp, US EPA
Tom Adams, City of San Francisco
Ed Huestis, City of Vacaville
Margo Melendez, US DOE
John DeCicco, Consultant
Willa Pettygrove, City of Davis
Carl Graham, Washtenaw County, MI

Detailed Description of Topic:
How do we create cost-effective incentives to achieve the goal of increased sales of energy and environmentally preferred vehicles? We need to identify ways to impact the mass market for vehicles within reasonable incentive budgets.
Research Needs

- What is the value of non-monetary incentives?
- How do consumers perceive small design changes (differences) between vehicles?
- What kind of information would make consumers consider environmental aspects of vehicles, e.g., to consider the choice between 2wd vs. 4wd from an environmental perspective?
- What are the automobile industry’s options to reduce vehicle size without loss of profits?

**Topic 2: What are the best ways to build demand for clean and efficient vehicles?**

**Reporter: Maggie Nilsson**

**Participants:**
Robert Knight, Bevilacqua-Knight  
Carol Johnson, JHME Advertising  
Tom Turrentine, UCD  
Therese Langer, ACEEE  
Willa Pettygrove, City of Davis  
Daniel Gehring, SMUD  
Cece Martin, CETC  
Jamie Knapp, J Knapp Communications

**Detailed Description of Topic:**

The discussion in this group center around Bob Knights idea that we need to broaden our understanding of the motivations of all stakeholders / actors in the market. Bob noted that efforts in to market alternative fueled vehicles has centered upon a simple idea of the market with a triangular relationship between manufacturers, government and consumers. This model is over simplified.

**Old Model**

![Diagram](image)

The market comprises many more actors than the previous model suggests, including sales agents, media, mechanics, and even schools, whose motivations, knowledge, and behavior need to be understood to develop an adequate marketing plan. Below is a sketch of a more complete model that was drawn during the breakout session.
Research Needs

This more complete model indicates a greater range of research activities. First, the model above is only a sketch, and needs a comprehensive approach to exploring the full range of actors in the market. Such an approach might demonstrate that it will be more strategic to focus marketing research efforts upon sales force and media, than upon consumers. Or, it might be important to market to politicians. Moreover, when doing research on consumers, look at full range of influences and motivations; for example examine the impact of mechanics and educators in this particular green market.

**Topic 3: Increased choices through clean mobility**

**Reporter:** Lisa Kasper

**Participants**
Lisa Kasper, CARB
Steve Hansen, Th!nk Mobility, LLC
Kevin Collins, Advertising Rising, Inc.
Martin Lee-Gosselin, GRIMES
Tim Hastrup, EV Driver
Michael Coates, Green Car Institute
Kevin Mills, Environmental Defense

**Discussion Topic**
We discussed creating an “umbrella concept,” under which all or most alternative fuel vehicles could fit. The idea would be to brand the concept of ZEVs and PZEVs in order to position these vehicles as an entirely new category of transportation. As an example, we noted how FedEx repositioned itself as the leader in the "overnight delivery" business, in essence, owning the new category. We also discussed how this theme and positioning would help automakers focus and leverage the message of alternative vehicles, leaving them more room for their own individual story.

I think in this context we endorsed the idea of developing a campaign similar to “Intel Inside.” Such campaigns develop and promote a service mark that could be used to easily identify the vehicles.

Once the message was created, we talked about drawing maximum public attention to the effort. Given what we expect to be very modest resources, we thought a model “Mobility Community” would be a good way to showcase the efforts of all the green mobility options. This community would showcase how individuals gain more choices through clean mobility. Some details that need to be worked out include: (1) working with municipal officials to turn the community into an EV friendly town; (2) working with manufacturers to bring product to the community on a priority basis; (3) working with citizens to buy, lease or rent the vehicles; and (4) involving the local university and civic groups.

Actual towns were proposed as prototypes, among them San Luis Obispo, Santa Cruz, and Vacaville, CA. Concerns were expressed that the town embrace the "Modern Mobility Village" concept, be a relatively small and self-contained, i.e., not in a major metropolitan market place where we can get this concept rolling and refined before trying to take it further (to make use of the “baby steps” concept).
As the effort developed, we would mount a social marketing campaign with two goals: a) appeal to local pride to encourage participation in the project, and b) change attitudes about tailpipe emissions in much the same way as the anti-tobacco campaign changed perceptions and behavior regarding second-hand smoke.

Finally, we discussed how such a concentrated effort would provide an unprecedented opportunity to research customer attitudes both pre- and post-vehicle experience, as well as a chance to observe customer behavior first hand. Conceivably, the results of such research could fast-forward the development of green vehicles by a considerable period of time.

**Research Needs:**

1) How does the community talk about new mobility choices before they try them?
2) How does the community talk about new mobility choices after they’ve tried them?
3) Are people doing new and different things, now that they are not looking for gas stations and parking spaces?
4) Would you buy an EV because your neighbor wants clean air inside their car?

**Topic 4: What are the Best Ways to Build Demand for Clean and Efficient Vehicles?**

**Reporter: Ken Kurani**

**Participants**
Kathy Daniels, FHWA
Michael Coates, Green Car Institute
Dimitri Stanich, CARB
Tom Turrentine, ITS-Davis
Daniel Gehringer, SMUD
Brian Abbanat, ITS-Davis
Martin Lee-Gosselin, GRIMES
Jamie Knapp, J Knapp Communications
Tim Hastrup, private citizen
Lisa Kasper, CARB
David Ashuckian, CEC
Margo Melendez, NREL
Robert Knight, BKI
Ed Huestis, City of Vacaville
Lisa Snapp, EPA

**Topics of Discussion**

1) Funding alliances.

2) Developing messages based on talking to target audiences—Clean Cities, It All Adds Up to Clean Air—neither contain messages based on such research, nor do they have evaluative research.

3) All messages are aimed at people acting as consumers, not as citizens or in other social roles. Is the community—neighborhood, city, region, etc.—another valid research unit, in addition to the household?

Developing a research kit for communities. The kit contains the tools to evaluate the community and design their own campaign—messages and media—to promote clean air and efficiency. Solutions need to be available. For example, transit cannot be touted as a solution in towns and cities not served by transit. This is part of the motivation for a kit that communities use themselves.
What are the “community profiles” analogous to market segments? Are these more or less useful than market segments based on individual and household definitions?

4) Mobility purchase behavior or Vehicle purchase behavior?

5) Suppose Congress said, “Okay, you federal agencies start a social marketing campaign for clean and efficient vehicles.” Are we ready to answer questions about what it is we would do, and how much it would cost?

It All Adds Up to Clean Air has $4.5 million for promotion, and must decide how to spend the money. Programs in each city were to conduct both pre- and post-promotion survey activities. Most of these programs (and maybe all) failed to conduct all the “required” research. What would motivate these cities to conduct such evaluative research?

Evaluations
After the workshop, we asked participants to tell us what they thought they learned and what they felt was missing from the workshop. We have summarized their answers below according to general categories. We offer these statements not as workshop conclusions, rather, as participants’ impressions. We start by offering our thanks and congratulations to Christi Black; many participants offered her presentation as a high point of the workshop.

Highlights of lessons learned
I learned...

Automotive Industry—Producers and Retailers
• …the difficulty within existing automobile dealership practices of motivating salespeople to deal with selling ZEVs, AFVs, and HEVs.
• …it isn't in the auto manufacturers’ interest to collaborate on an effort to market clean and efficient cars.
• …a lot about the automobile manufacturers’ approach to marketing HEVs, and what that said about their willingness to market clean and efficient vehicles.

Marketing and Social Marketing
• …the high importance of education and outreach in market transformation
• …the high importance of addressing messages to children.
• …the absolute need to test market programs before moving forward on a major rollout.
• …that we are talking about behavior modification/change as much or more than product marketing when it comes to clean/efficient vehicle marketing.
• …the limited effectiveness of providing direct cash incentives to individuals to do the right thing.
• …people still need education about the underlying issues before they can move to making vehicle purchase decisions.

Government Policy
• …the federal EPAct mandate has had limited effectiveness in producing a shift to AFVs.
• …the federal government and the State of California appear to be out of step with each other. The federal government appears to be shifting its attention away from criteria pollutants from
light-duty vehicles toward efficiency and greenhouse gases, while California continues to focus on criteria pollutants and air quality.

- …of the City of Vacaville’s successful application for CMAQ funds to help subsidize EV leases. [Eds.: This was of particular interest to participants from other local governments.]

The Role of Research

- ...(from Prof. Martin Lee Gosselin’s presentation on market research methods) of new research methods, ways to organize how to think about research, and the relationship between types of questions and types of research.

Things you would have liked to have seen (and may in a future workshop!)

I would have liked...

Cross-pollination

- …more time to explicitly address the question of how the private and public sectors can work together to market clean and efficient vehicles.
- …more time to draw lessons out of California’s experience with ZEVs, and used these to engage participants from throughout the country in a discussion of how to move ahead.
- …less time spent on ZEVs in California. [Eds.: Well, it was a mixed group of people.]

Marketing and Social Marketing

- …more presentations of specific examples of well executed social marketing campaigns.
- …a more general perspective on “mobility” rather than just new vehicle purchase behavior.
- …more focus on specific designs for marketing programs, driven by government, and/or private sector money that is available.
- …more discussion of how to use the experience of ZEV drivers to aid in marketing.
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Appendix B: Speakers' Slides and Overheads
Marketing Clean and Efficient Vehicles
March 22 and 23, 2001

Host: Institute of Transportation Studies, University of California, Davis
Funding: Steven and Michele Kirsch Foundation
Sponsor: U.S. Department of Energy, Office of Transportation Technology

Why are we here?

- Criteria pollutants
  - VOC, O3, SO2, NOx, PM 10 and 2.5
  - 47% from transportation sources in 1996
- Climate change- CO₂ and other GHGs
- Safety
- Noise
- Road system effects on ecology
Health Effects

- ALA: 117 million people at risk of health effects from ozone exposure according to Federal Standards.
- CDC: 75% asthma increase in since 1980
- Federal EPA: 55% of cancers attributable to air pollution the result of emissions from road vehicles (also diesel trucks/buses).

Criteria Pollutants: NOx, VOC

US, million short tons


NOx VOC
Motor Vehicle Travel and Energy

National CO₂, million metric tons
Sales of New Cars and Light Trucks

Differences in emissions

Emissions of light-trucks as a percentage of emissions of cars
Acceleration

0 to 60 mph times, seconds

Say it Ain't So

- "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
  (borrowed from Barbara Teasdale, Ford)
Applying Social Marketing Principles to Selling "Green" Cars

Presentation by Christi Black, APR
Ogilvy Public Relations Worldwide
March 22, 2001

What is "Social Marketing?"

A combination of traditional marketing strategies and social science-methodology designed to change individual behavior for the good of society.

Traditional Marketing

- Place
- Product
- Promotion
- Price
Social Marketing

- Program
- Partnerships
- Public Participation
- Policy
- Politics
- Public Relations
- Proof!

Social Marketing is about behavior modification

- You know what defines "desirable" behavior
  - the customer may not agree

Partnerships make it possible for you to provide "exchanges."

Customer exchanges a behavior for something else:
- Acceptance with a certain group or influencer
- Identification with a certain role model
- Rewards from employers or manufacturers
- Incentives from retailers
- Avoidance of penalties
- Personal benefit
A social marketing campaign is developed using desired outcomes as the programmatic goal

- Process Outcomes
- Measurable Results

Awareness/Attitude/Behavior

1) Build public awareness of issue
2) Changes or reinforces attitudes
   - Develop understanding of problem
   - Create public support
   - Make solution personal
     "How can I help?"
     "What difference could one person make?"
     "What's in it for me?"

3) Motivate personal behavior change
   - Understand key motivators
   - Identify key barriers
   - Develop attractive rewards
   - Build in incentives and penalties
Understanding the Marketplace

- Audience diversity
  - geographic, demographic
  - cultural
  - linguistic
  - personal and cultural feelings about cars
- Communication clutter
- Credibility of the information source

Tools and Tactics

- Advertising
- Lobbying
- Public Relations
  - public service
  - media advocacy
  - community relations
  - stakeholder outreach
  - public affairs/policy work
  - internet-based outreach

Using research to design the program

- Formative Research
  1) Secondary
     - lit reviews
     - data resources
  2) Primary
     - telephone calls
     - focus groups
     - interviews
     - direct mail
Evalative Research

1) Process results
2) Outcomes
   • Measure against baseline
   • Achieve end goal
   • Make marked success against desired outcomes
   • "Do no harm"
Panel 1: Community Based Marketing

Kerry Shearer, Tim Hastrup, Daniel Gehringer, Lisa Kasper, Mark Baines, Terry O'Day, Ed Huestis

Community-based social marketing

- "Community-based social marketers identify the benefits and barriers to behavior and then organize the public into groups, or 'segments,' which have common characteristics, in order that the delivery of programs can be most efficient."
  - Fostering Sustainable Behavior: An Introduction to Community-based Social Marketing.
    - Doug McKenzie-Mohr and William Smith
Community-based social marketing

- What behaviors should be promoted?
- Who should the program address or target?
- What conditions (barriers, incentives, competing behaviors, etc.) do members of those target groups face in adopting the new behavior?

Community-based social marketing

- What behavior is being promoted?
  - These panelists will be talking about education, outreach, marketing programs for air quality, ZEVs, and a little on HEVs.
- To Whom?
  - household and fleet markets
Community-based social marketing

- What conditions do people face?
  - barriers (e.g., recharging infrastructure).
  - what do people know about local air quality
  - what do people know about EVs
- How do we provide them with answers to their questions?
Public Awareness

To communicate Non-traditional ways

Episodic notification education

Air quality public

About Today

What we will talk
Ozone Movies on the Internet

Weathercasters
Used on-air by TV Availability at sparterrestrial.com
Locations
Shows real-time ozone levels
May-Oct 8 a.m. - 10 p.m.

Air quality message
Reaches 200,000+ employees with the Employer Network
580 employers throughout the region
Air Alert

Cell phones
text pages and digital
Air Alerts sent to e-mail addresses,
pre-selected by the user
unhealthy air in the region at cutoff points
Provides real-time notification of
Spare The Air Advisories
Provides day-before notification of
Available at:

- smogcity.com
- smogcityresearch.com

Based on real regional air quality data.

The Web pollution simulator for interactive air.

Smog City

- ALERT Sign-up Link
- Featured Forecast, ozone maps
- Heavily promoted in news and weather its web site Watch page on the "smog (NBC) to create partnership with KCRA-TV 3 AGMD partnered Summer 2000:

Partnership with KCRA-TV 3
Be Creative

Reaching the Healthcare Community

- This represents about 44,000 households in the region
- This is average "Spare The Air Day"
- Sacramento Region: 15% claimed
- Measurable impact on the public
- Fact: Poor air quality has a

Unhealthy Air Impacts the Community
Reaching the Healthcare Community

• Outreach ideas:
  • Countertop tip cards in medical waiting rooms
  • Make a presentation to doctors at medical society meetings
  • Purchase a database of asthma sufferers in your region & use direct mail

Reaching the Healthcare Community

• Outreach ideas:
  • Create a publication for medical office, pharmacy and hospital waiting rooms that’s guaranteed to be read
Reaching the Healthcare Community

- Air Quality Insider
  - 4-page, 4-color
  - 20,000 run
  - Distributed to waiting rooms
  - All gone!

Outreach to Schools

- Fax forecasts to coaches, nurses, administrators
- Make them aware of Web site
- Promote availability of ozone mapping and e-ALERT for real-time information
- Create or obtain and distribute air quality curricula
Save Planet Polluto

• Interactive CD-ROM air quality adventure

• Target: grades 4-8

• Focus on ozone & particulates

• Produced by Sacramento AQMD and funded in part by a grant from U.S. EPA Office of Transportation and Air Quality
Before you can teleport to the surface you must take a reading of the Air Quality and the Particulate Density.

Your console meters will indicate how serious the problem is at that location.
OVERVIEW

- SMUD and Electric Vehicles, the early years
- Outreach Fundamentals
- Current Outreach Efforts
- The Infrastructure Business
The Beginning

- The SMUD Electric Transportation Department was created July 19, 1990
  - Board Resolution 90-7-14

- Primary focus
  - Market Support
  - Installation of Public Charging Stations in Sacramento
  - R&D Program

Early Market Support

- Introduce Electric Vehicles to SMUD Fleet
- Create Electric Vehicle Loan Program
- Market Research
  - Establish Target Market
  - Demographics
  - Commute cycles

<Sacramento County Data Collection Only>
SMUD Supports EV Charging Infrastructure Across California

- 110 volt installations in 1991
- Introduction of Conductive, 1992
- Introduction of Inductive, 1995
- In 1999 SMUD became the exclusive distributor in California and Arizona for inductive chargers

SMUD Has Managed Over $33M in R&D Projects Since 1993

- Managing Partner of Sacramento Electric Transportation Consortia:
  - One of 7 regional groups participating in DOT/DARPA Advanced Vehicle Program (AVP), Electric Hybrid Vehicle Program
- Collaborative Program:
  - Public/Private R&D funds matched by Federal Investment
- Overall Goal is to Promote Technology and Industry Development
SMUD R&D Projects

- PEM Fuel Cells
- Composites Mfg. Processes
- Hybrid-Electric Systems Development
- Charging Infrastructure
- Electric/Hybrid Shuttle Bus Development
- Battery Systems Evaluation & Test
- Data Acquisition Systems

Target Vehicle Applications

- Light Duty Vehicles
- Medium Duty Trucks/Shuttles
- Heavy Duty Trucks/Buses

What is Outreach?

- Dictionary Version
  - A systematic attempt to provide services beyond conventional limits, as to particular segments of a community

- Outreach @ SMUD, Electric Transportation Group
  - The process of extending knowledge to the Sacramento Community with emphasis on perception
Current Outreach Approach

- Realistic Approach Based on Experience
- Hands-On Exposure
- Overcome/Attack negative EV perceptions
  - Unsafe
  - ‘Golf Car Like’
  - Can’t compete against its gasoline counterpart
    » Range
    » Performance
    » Accessories

Current Electric Transportation Efforts

- EV Loan Program
  - Government Agencies
    » Local, State and Federal
  - Transportation Fleets
    » Local
    » Support CARB throughout California
  - Public
    » Charity and Fundraisers
  - Internal
    » Carpool
    » New Employee Trial
SMUD's Family of EVs in Operation

Outreach Education

- Community Forums
  - Seasonal Celebrations
  - Local Non-Profit Organizations
  - High Exposure Sacramento Based events
- Education Seminars
  - SMUD Speakers Bureau
  - Science in the Summer
  - Clean Air Challenge week with local High Schools
Additional Outreach Avenues

- Environment Conferences

- 'Get the Word Out'
  - High Profile Grass-Roots Marketing
  - Website
  - Customer Connection
  - EV Hotline
  - Direct Mail

SMUD is an EV Charging Infrastructure Provider

- Sales

- Service

- Installation
  - Inductive & Conductive Equipment
SMUD EV Charging Infrastructure
Highlights

■ Well over 200 EV Chargers installed in Sacramento

■ EV Chargers installed by SMUD State Wide (Approx.)
  – 1500 Conductive Chargers installed
  – 1800 Inductive Chargers Installed
    <Exclusive Distributor of Magne Charge>

Summary

■ SMUD has a very active Electric Vehicle Program
  – Charging Infrastructure Installer
  – Research & Development
  – Outreach

■ SMUD outreach activities continue to support the community
  – EV Loan Program
  – Community Forum
  – Public Education
Marketing Clean and Efficient Vehicles Workshop

Air Resources Board
March 22, 2001

Presentation Overview

- Background
- ARB's Outreach and Public Education Efforts
- ARB's Future Outreach Goals
- Summary
Background - September 8, 2002

- Board reaffirmed the importance of the ZEV program to California’s long term air quality strategy
- Staff directed to develop and propose steps to address regulatory and non-regulatory challenges to result in sustainable market

Background - January 25, 2003

- Automakers required to offer ZEVs for sale beginning in 2003 or sooner
- Staff proposed to expand ZEV outreach and public education efforts
ARB Public Outreach and Education Activities

- Schools/Conferences
- ZEVinfo.com
- ZEvent
- Short- and Long-term ev Loan Program
- ev Sacramento
- EVs for Education

Schools, Conferences....

- Information booth & vehicles at over 100 outreach events
- Brochures, fact-sheets & other products (pins, bumper stickers, etc)
- ZEV program Information available on ARB's website, ZEVinfo.com & 1-800-END-SMOG
- ZEvent 2000: Public demonstration of technology
ZEVent 2000

- August 17, 2000
- Over 100 Vehicles in EV Road Rally

- Demonstration of the Latest EV Technologies
- Opportunity to Celebrate the Success of ev Sacramento

Short-Term ev Loan Program

- Provides no-cost short term loan of EVs to public agencies (1 - 2 months)
- Temporary charger installed, if needed
- Goal is to demonstrate technology & encourage leasing of EVs
- Over 50 agencies have participated to date with lease rate of 30%
- Administered by ARB, with support from DGS & South Coast AQMD
Long Term ev Loan Program

- Loan Vehicles to Public Agencies for One Year
- Includes High Profile Locations Such as Yosemite, Parks in Old Sacramento & San Diego
- All Districts Use EVs for Public Outreach Activities
- Permanent Charger Provided at no Cost to Loan Participants

ev Sacramento

- New incentive program for public agencies in Sacramento area
- One of the largest roll-outs of EVs in California: Over 100 EVs placed in 3 months
- Waiting list of agencies wishing to participate
- Expanded area's infrastructure by 25%
- Administered by ARB & DGS
EVs for Education

- Goal is to incorporate EVs into education programs at schools
- To date, 6 vehicles have been loaned to air districts and educational facilities for six months
- Air districts have developed interactive games, educational materials that will be shared with ARB

ZEV Outreach

- Build upon current and past stakeholder efforts to Develop and Implement an Outreach and Public Education Plan for ZEVs that:
  - Educates Consumers and Fleet Operators of their Advanced Technology Clean-Air Transportation Choices
  - Provides Accurate Information to the Public
  - Dispels Misperceptions of EVs
  - Educates the Public on How Their Transportation Choices Impact Air Quality and Energy Use
  - Shows How the ZEV Program Can Benefit At-Risk Communities
Summary

- ARB's ZEV Program is important for achieving California's long term air quality strategy.
- ARB will focus additional efforts on ZEV outreach and public education.
- To do this, ARB plans to build on work that has already been done.
- ARB will also continue our community based ZEV programs.
Marketing Environmental Vehicles

EV RENTAL CARS, LLC

"You gotta get 'em into the car"

UC Davis Institute for Transportation Studies Workshop
"Marketing Clean and Efficient Vehicles"
Davis, California
March 22, 2001

Overview

I. Snapshot of EV Rental Cars
II. Defining Outreach, Education and Marketing
III. Lessons Learned from Marketing AFVs
IV. Applying Social Marketing Concepts
Snapshot of EV Rental Cars

Vehicles
- Honda Civic GX
- Honda Insight
- Ford Crown Victoria NGV
- Toyota Prius
- Nissan Sentra CA
- Honda EV Plus
- Toyota RAV4 EV
- Nissan Altra
- GM EV1

Primary Budget Rent a Car Locations
- Los Angeles
- Ontario
- Burbank
- Palm Springs
- San Diego
- San Francisco
- Sacramento
- Phoenix, AZ
- Pittsburgh, PA

Budget EV Rental Cars
- Over 2 million miles accumulated on the fleet of EVs
- More than 10 tons of air pollution prevented
- More than 60,000 gallons of gasoline left unused

Transactions Growth 2000

Experience the EVolution

758% Growth Rate
Media Results

Promotions
- December 1998 Company Launch
- March 1999 RAV4 EVs Intro
- April 1999 Civic GX Intro
- September 1999 Ford LA Streetrace
- January 2000 Nissan Altra Intro
- May 2000 San Diego Launch
- May 2000 National Clean Cities Conference San Diego
- July 2000 HOV Lane Access
- October 2000 One Million Miles Accumulated on the Fleet

Press Results
- ABC World News Tonight, CBS This Evening, CNN, local television news in more than 30 markets, all three Japanese network news stations

Awards
- Council on Economic Priorities, Automotive World, Clean Air Coalition, Calstart Blue Sky Award, US EPA Earth Day Award

---

Snapshot of EV Rental Cars

1 Month
October, 2000

1 Company
Budget Rent a Car

1 Location
Los Angeles Airport

20,000 Customers

- Chose a gasoline-powered vehicle
- Majority were pitched an AFV
- Total represents unique transactions, not passengers

750 EV Drivers

- Met with a specialist for an orientation to the vehicle
- Drove an AFV in daily driving conditions without supervision
- Carried out a task in the AFV

---

**EV Rental Cars meets TWO key marketing criteria:**

1. Sales Pitch
2. Extended Demonstration
Social Marketing Concepts

*Integrate Outreach, Education WITH Marketing*

**Define the Goal**
- Get consumers to buy/lease environmental vehicles in volume
- Convert miles traveled in conventional vehicles into miles traveled in clean fuel vehicles

**Align People and Interests**
- Create the structure for success - efficient, effective, personal

**Measure Results**
- The GOAL is to CHANGE BEHAVIOR, not just ATTITUDES
- Provide feedback to participants, continuous improvement

**ATTITUDE is not BEHAVIOR**

---

Lessons Learned from Marketing AFVs

<table>
<thead>
<tr>
<th>What Doesn’t Work</th>
<th>What Works</th>
</tr>
</thead>
<tbody>
<tr>
<td>General awareness not linked to action</td>
<td>Customer testimonials</td>
</tr>
<tr>
<td>Reliance on car dealerships</td>
<td>Word of mouth</td>
</tr>
<tr>
<td>Environmental or technology messages</td>
<td>Clear customer value proposition</td>
</tr>
<tr>
<td>Long waiting periods</td>
<td>Direct incentives for agents</td>
</tr>
<tr>
<td>Inconsistent messages about availability (volume &amp; location)</td>
<td>Extended demonstrations in daily driving conditions</td>
</tr>
</tbody>
</table>

**Key Factors**
- Efficiency requires reaching the most prospective customers in the fastest time for the lowest cost.
- Program structure will affect success. All participants must have a stake in the outcome.
Conclusion

Rental or Sale?
➤ Which is at the forefront, if every sale requires a rental?

How Can We Extend and Enhance Demonstrations?
➤ Exciting ride and drive events and comarketing

Aligning Interests...
➤ Automakers and dealers must be in support of any program

External Factors Remain
➤ Infrastructure remains an important consumer consideration
➤ How will biennial review of the mandate and other challenges to the industry affect public perception?
"How to 'Electrify' More of the Public To Lease Electric Vehicles"

City of Vacaville's EV Program

Background

- Ride & Drive Events
  - May 1998
  - August 1998
  - September 1998
  - April 1999

City of Vacaville's EV Program
Background (Cont.)

- 1997 EV1 Lease (AUG98)
- ACT Conference (SEP98)
- STA Makes EVs a Priority Project (OCT98)
- City Council Presentation (NOV98)
- Public Meeting (JUL99)
- 1999 EV1 Lease (24DEC99)

City of Vacaville's EV Program

CMAQ Application

- CMAQ Application ($300,000)
  - Application Submittal (JAN99)
  - Funding Approval (JUL99)
  - Caltrans Project Approval (DEC99)
- Breakdown of CMAQ Funding ($300,000)
  - Public Program ($210,000) (35 Incentives)
  - City Fleet Vehicles ($40,000)
  - Charging Infrastructure ($50,000)

City of Vacaville's EV Program
Electric Vehicle Deliveries

- Public Program
- General Motors EV1
  - December 1999 (5)
  - January 2000 (1)
  - February 2000 (1)
  - April 2000 (1)
- Ford Ranger EV
  - January 2000 (4)

City of Vacaville's EV Program

Electric Vehicle Deliveries

- City Fleet Vehicles
- Toyota RAV4 EV
  - Placed order for four RAV4 EVs (APR00)
- Ford Ranger EV
  - Placed order for two Ranger EVs (MAY00)

City of Vacaville's EV Program
Positive Press Coverage

- Vacaville Reporter (8)
- Fairfield Daily Republic (3)
- Vallejo Times-Herald (4)
- Benicia Herald (1)
- Dixon Independent Voice (1)
- Sacramento Bee (1)

City of Vacaville's EV Program

Positive Press Coverage (Cont.)

- Davis Enterprise (1)
- Fiesta Days Parade (May 27, 2000)
- Fleets & Fuels (May 29, 2000)
- Western City (July 2000)
- Vacaville Voices (August 2000)

City of Vacaville's EV Program
Electric Vehicle Program Expansion

- CMAQ Application ($600,000)
  - Application Submittal (January 2000)
  - STA Approval (February 2000)
  - MTC Approval (April 2000)
  - Caltrans Approval (July 2000)
  - FTA/FHWA Approval (July 2000)

City of Vacaville's EV Program

Electric Vehicle Program Expansion (Cont.)

- Breakdown of CMAQ Funding ($600,000)
  - Public Program ($300,000) (50 Incentives)
  - City Fleet Vehicles ($50,000)
  - Charging Infrastructure ($150,000)
  - City of Dixon ($100,000)
    - Public Program ($30,000) (5 Incentives)
    - City Fleet Vehicles ($20,000)
    - Charging Infrastructure ($50,000)

City of Vacaville's EV Program
Electric Vehicle Program Expansion (Cont.)

- Regional Clean Air Funding ($70,000)
  - Yolo-Solano Air Quality Management District (Y-SAQMD)
  - AB 2766 Vehicle License Renewal fees
  - Y-SAQMD Board Approval (June 2000)

Summary of Electric Vehicle Program

- City of Vacaville to be an EV Ready City - "Voltageville"
- Goal – To have the most electric vehicles per capita (residential) than any other city in California
- Potential Incentives = 90 (35 + 50 + 5)
Summary of Electric Vehicle Program (Cont.)

- Ten to twelve City fleet vehicles
- City Council passed Low Emission Vehicle resolution (May 9, 2000)
- Public Charging Infrastructure
  - Current (14)
  - Expansion installations (20 – 25)
  - Every exit in Vacaville to be covered
  - Provide critical link along I-80 corridor

City of Vacaville's EV Program

EV Program Logo Design

- "Zero – Emission Vehicles – The only way to fly"
- "Now Entering Voltageville"
- "Zero, Zip, Zilch, Nada ..." Emissions–Governor Gray Davis

City of Vacaville's EV Program
Toward National Collaboration on Building the Market for Clean and Efficient Vehicles

John M. DeCicco
Consultant – Arlington, VA

Ways to State the Problem

- How can we sell more [...]?
  [your favorite green car solution]

- How can we transform the market to environmentally preferable designs?
Toyota Prius Hybrid Electric Car

Toyota Sequoia full-size SUV for 2001

http://cars.com/.../autoshow2000
Public Information and Education, Marketing-Oriented Strategies

We Are Just Beginning to Learn How to Exploit Them for Transforming the Automobile Market
Toyota Highlander

Nationwide LEV, 2.4L, 2wd version has top score among medium SUVs, earns slot in ACEEE's Green Book 2001 “Greener Choices” list
Empowerment

- Think "cupholders"
  Small design choices can make a difference
  - for consumers
  - for the environment
- Recycling Analogy
  - Drop-off centers … EVs/HEVs/AFVs
  - Curbside … "Greener Choices"

Plug into the goodwill and good intentions that we know are there ... to help consumers make connections, so that they can make a difference.

Greening the Market Means Closing the Gaps

<table>
<thead>
<tr>
<th>DEMAND</th>
<th>SUPPLY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer Preferences</td>
<td>Product Plans</td>
</tr>
<tr>
<td>Environmental Values</td>
<td>Green Design</td>
</tr>
</tbody>
</table>

Future Car Market
Roles for Many Actors in Green Vehicle Marketing Collaboration

**Government** (all levels)
- Stronger public information, labeling & incentives programs
- Lead “Green Fleets” voluntary market development partnership

**Industry**
- Share appropriate market research, customer experience
- Collaborate with informational and labeling programs

**Other Organizations**
- Assist with information provision, education, promotion.
- Develop an appreciation of marketing (customer focused) paradigms.
- Private businesses and institutions can join in “Green Fleets.”

*Market research and marketing strategies expertise are needed to inform all of these efforts*

---

Green Vehicle Market Alliance

- Collaborative, multi-stakeholder effort
  *Government, automakers, non-profits, consumer groups, researchers*

- Mission:
  *To build the North American market for clean, efficient, and environmentally preferable vehicles.*
GVMA Scope: Marketing

- Consumer information and education
- Public relations, promotional activities
- Market research to inform variety of efforts
- Labeling, awards, other product recognition

Other policies (regulation, incentives) are clearly part of the larger strategy, but are not the focus of the GVMA forum.

GVMA Activities

- Sharing Information among Members
- Providing Information to the Public
- Providing Information to Other Forums
- Market Research
- Building the “Green” Concept
- In-Person Techniques
- Fleet Strategies
EPA Green Vehicle Program: Creating Demand

Marketing Clean and Efficient Vehicles
March 22-23, 2001
U-C Davis

Goal of EPA’s Green Vehicle Program

Market incentive program to create demand for green vehicles

- people understand the link between cars and the environment
  - emissions = air pollution: largely understood
  - fuel economy = global warming: the next frontier
- consumers know of their greener vehicle choices
- environmental concerns are used to screen vehicle choices
Key Elements to Achieve Goal

market incentive program to create demand for green vehicles

- dynamic green rating system
- recognized, trusted brand
- public willingness to act

Rating system is key

- need broad adoption of systems that are compatible
- green rating system needs to work for the public; market research is crucial
- EPA is receptive to revising our system based on research results
Green brand is also key

- needs to be highly recognized and trusted
- must instantly signify green choice
- EPA wants input from others as it embarks on development of such a brand

Public Must be Willing to Act

Consumers are more willing to buy a greener vehicle if they believe that:
- green vehicles are widely accepted
- their choice affects the environment
- they have an obligation to act
- they won't have to make significant tradeoffs
- they have the info they need to make the green choice
The Website Comes First: Consumer Info and Green Ratings

3/22/2001

Green Vehicle Guide Website
www.epa.gov/greenvehicles

• Overall Info
  - emission standards
  - fuel economy label values  City 23 mpg  Hwy 17 mpg

• Within Class Rating  🌟🌟🌟🌟 Among Compact Cars
  - worst case of fuel economy and emissions ratings
  - 1-5 stars within consumer-oriented classes
  - thresholds will rise over time
  - other variables can be added in the future

3/22/2001

EPA Office of Transportation and Air Quality (OTAQ)
Reactions to website

- yahoo daily pick
- press coverage in auto sections
- approaching 1 million hits per month
- enlightening emails from public
- focus groups on understanding of rating system; more planned
- improvements in the works

Status of EPA’s Green Vehicle Program

- rating system developed in 2000
- emissions website launched October 2000
- fuel economy and within-class green stars added January 2001
- green stars now available for use in advertising, consumer guides, vehicle info
- market research is beginning
- website is first step; many other endeavors on the drawing board
Many Endeavors

- website enhancements
- manufacturer promotion
- consumer guides, environmental reports
- press opportunities
- annual green vehicle trends reports
- auto shows
- school curriculum materials

Next Steps

- market research on website, rating system, brand
- make revisions based on research results
- develop green transportation brand
- work together to promote green vehicles
  - manufacturers: green labels, window stickers
  - consumer publications: use of rating system
  - enviro orgs: publicize green vehicles
  - federal agencies: coordinated information
DriveGreen

Public Education & Awareness Initiative for Canadians

Natural Resources Canada
March 2001

Part of Canada Action Plan 2000 on Climate Change

- New Motor Vehicle Fuel Efficiency Measure
  - improvement in energy efficiency of new vehicles
  - public education
An innovative campaign

- Implementation in April 2001 with a federal contribution of $9.5 million over 5 years
- Awareness of importance of reducing vehicle emissions, through:
  - purchase of greener/cleaner/more fuel efficient vehicles and fuels
  - good driving habits
  - regular maintenance

Two Aspects

- Distinct and direct delivery
  - through partnerships and alliances
  - aggressive campaigns with clear advice
- Clear, coherent, consistent message
  - careful research, development, design
  - a nationally consistent effort
Workplan

- Develop criteria for green-clean concept:
  - vehicle fuel efficiency and emissions
  - vehicle & parts recyclability
  - vehicle operations
  - fuel issues
- Explore comparable programs in Canada and U.S.
- Private and public participation

Workplan

- Market research, in collaboration with partners, to assess level of awareness of:
  - vehicle fuel efficiency
  - green and clean aspects of vehicle & fuels
  - advanced vehicle and fuel technologies
  - maintenance practices relating to fuel efficiency & emissions
  - driving habits impacting on fuel efficiency
  - barriers to change of behaviour
Workplan

- Joint development of tools, events & information for delivery through partners
  - green buyers guide
  - green label
  - advertising campaigns
  - advanced vehicle testing & showcasing
  - marketing, promotion
  - media relations
  - community based initiatives
  - web activities

Potential Partners

- Vehicle manufacturers and dealers
- Fuel retailers (CPPI)
- CAA
- Parts and tire retailers
- I&M centres, Service centres
- Environmental groups (Pollution Probe)
- Automotive media
- Governments
- Community groups
Management

- NRCan lead
- Steering committee with NRCan, TC & EC to provide strategic direction, evaluate and review progress
- Projects jointly managed through alliances with partners and a number of stakeholders
Rating Green Vehicles: Results from Two Focus Groups

David Greene
Bo Saulsbury
Oak Ridge National Laboratory

Green Vehicle Market Alliance Workshop
March 21, 2001
University of California at Davis

"Conclusions based on focus groups should be viewed with caution. Qualitative research is not designed to be statistically projectable over a large population."

- Two focus groups held in Knoxville, TN on February 27, 2001.
- Intended to discover:
  - what people know about how cars affect the environment,
  - what they make of a few key rating systems,
  - what preferences they may have for the presentation of such information and,
  - how they might use such information in making purchase decisions.
KEY FINDINGS:

- The participants generally do not and are not prepared to factor environmental concerns into their car-buying decisions.
- The participants generally did not know:
  - What information to look for
  - Where to find it
- They had no clue about where to get environmentally friendly vehicles, or what their availability was.

Focus groups were selected to be interested and favorably disposed.

- Participate in one or more environmentally friendly activities,
- be in the market for a new or used vehicle in the next 12 months,
- gather information via the internet and,
- be 18 to 64 years of age.
Interviews moved from general information about cars to specific measures of environmental impacts.

- Where do you get information about cars?
- How exactly do cars and trucks affect the environment?
- What do you understand from several rating systems?
- What kinds of information would you use and why?

Knowledge of how vehicles affect the environment was limited.

- Aware that what comes out of the tailpipe is not good for the environment, affecting smog, acid rain, ozone, etc.
- Generally do not distinguish among different gases emitted.
- Very little understanding of GHGs.
- Some had thought about this but hadn’t done anything or didn’t know what to do.
- Most would like some way to compare.
What’s fuel economy got to do with it?

- Consumers associate low fuel economy with high pollution.
- Consumers associate size with poor fuel economy and high pollution.
- For some, associating greenhouse gas emissions with fuel economy “made sense”.

Five ratings systems were presented using materials from three websites.

- EPA 0-10 criteria pollutant rating
- EPA green star rating (class-specific)
- LEV ratings (class-specific)
- ACEEE 0-100 green score
- Tons of GHGs
Even though detailed explanations were read, confusion remained.

- EPA's 0-10 most readily understood, green bars effective.
- 5-star Green Car Rating was confusing and counterintuitive.
- ACEEE more intuitive, some like single score, some questioned formula, "all fail so who cares?"
- LEV too vague, class specific systems not liked.

...confusion remained.

- The terms, "Climate Change" and "Greenhouse Gases" were not understood, but Global Warming was.
- Some liked the tons emitted measure, most were confused about what it meant.
- Some preferred a single overall rating, some preferred information on air pollution versus greenhouse gases.
Most agreed they would like to have environmental information and would use it.
- Environmental impacts would not be a primary decision criteria, however.
  - Tie-breaker
  - Screening criteria
- Would use information if readily available and presented understandably.
- Most still get information from sources other than Internet but would use Internet sources if they were aware of them.

"The majority...would prefer some kind of overall* score that they could have faith in, that would be applicable across the country and across all vehicles, that would be displayed on the new car sticker and be adopted by magazines like Consumer Reports. Nonetheless, there is a great deal of skepticism about the motives and actions of the government, the manufacturers and the dealers."
Limited as they are, these focus groups suggest an important role for the GVMA.

- Consumers are not prepared to factor environmental impacts into their car-buying decisions.
- Consumers do not know where to find trustworthy information nor how to use it.

Limited as they are, these focus groups suggest an important role for the GVMA.

- Prepare the public to factor environmental information into their car-buying choices.
  - Education about how vehicles affect the environment.
  - Education about where to find information and how to use it.
- Work towards selecting and publicizing measures that consumers can understand and use.
Thank you.
Role for Federal Government

Marketing Clean and Efficient Vehicles Workshop
March 23, 2001

David Rodgers
Office of Transportation Technologies
U.S. Department of Energy

Estimated World Oil Supply

U.S. Transportation Oil Demand

![Chart showing U.S. transportation oil demand with details on domestic production, heavy trucks, light trucks, and automobiles.]

Federal Roles for New Technologies

<table>
<thead>
<tr>
<th>Area</th>
<th>Transportation Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research &amp; Development</td>
<td>PNGV</td>
</tr>
<tr>
<td>Demonstration</td>
<td>U.S. Postal Service</td>
</tr>
<tr>
<td>Deployment</td>
<td>Clean Cities; ACAT</td>
</tr>
<tr>
<td>Incentives &amp; Funding</td>
<td>TEA-21</td>
</tr>
<tr>
<td>Regulation</td>
<td>CAFE; Clean Air Act</td>
</tr>
<tr>
<td>Priority Setting</td>
<td>EPACT</td>
</tr>
</tbody>
</table>
Common Themes

- Portfolio
- Partnership
- Strategic planning
- State and local input
- Cost-share

Common Pitfalls

<table>
<thead>
<tr>
<th>Pitfall</th>
<th>Better Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-size fits all</td>
<td>Innovation and flexibility</td>
</tr>
<tr>
<td>Many authors</td>
<td>Core principles</td>
</tr>
<tr>
<td>Over-agressive goals</td>
<td>Realistic goals</td>
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<tr>
<td>One technology solution</td>
<td>Performance requirement</td>
</tr>
<tr>
<td>Short-term thinking</td>
<td>Long-term commitment</td>
</tr>
<tr>
<td>Partial solution</td>
<td>Carrot and stick</td>
</tr>
</tbody>
</table>
### Selected Transportation Policies

<table>
<thead>
<tr>
<th>Policy</th>
<th>Year</th>
<th>Regulations &amp; Standards</th>
<th>Financial Incentives</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPCA (CAFE)</td>
<td>1975</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMFA</td>
<td>1988</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPACT</td>
<td>1992</td>
<td></td>
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<tr>
<td>ISTEA &amp; TEA-21</td>
<td>1991 &amp; 1996</td>
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</tbody>
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### The Energy Policy Act Tried to Help

- Set a goal – 10% by 2000 and 30% by 2010
- Voluntary programs
- Public Information
- Fleet mandates
- Grants and incentives
Assumptions in 1992 EPACT

- Barriers to alternative fuels are primarily informational
- The vehicle mandates solves the chicken/egg problem
- Fleets are uniform, centrally refueled, and easily regulated
- Small tax incentives and grants are sufficient to push the market
- Fuel providers will be the leaders in AFV use
- Saying we have a goal is all that's needed

Results Heading In Right Direction
Other Parts of EPACT Working Too

- Clean Cities has 80 participants - thousands of vehicles
- Public information on AFVs widely available
- Refueling stations have grown
- Dozens of AFVs offered by OEMs
- U.S. AFVS among the best in the world

But not good enough to meet the EPACT 30% goal for 2010

- 30% is about 30-40 Billion gallons
- Oxygenates in gasoline are predicted to continue
- Existing EPACT fleets and other AFVs contribute about 0.4%
- Including Private & Local Fleets in EPACT could add at most 0.7% by 2010
What Had to Have Happened to Meet EPACT Goals

- To meet the EPACT goals would have required:
  - about 6% of all LDVs in 2000 to be AFVs
  - about 35% of all new LDVs in 2000 and beyond to be AFVs

EPACT Report Card

<table>
<thead>
<tr>
<th>Pitfall</th>
<th>EPACT</th>
</tr>
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<tbody>
<tr>
<td>One-size fits all</td>
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<td>Partial solution</td>
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</tr>
</tbody>
</table>
So Now What?

Federal Promotion of Clean and Efficient Vehicles

- Recognition of important Federal role
  - energy supply and demand issues
  - marketing is okay
- Comprehensive program
  - multiple market segments
  - multiple technology options
- Coordination and partnership
- Long term commitment
California Drives Towards Zero Emissions

Dr. Alan Lloyd, Chairman
California Air Resources Board
March 23, 2001

California Environmental Protection Agency
Air Resources Board

Overview

- Goal is clean and healthful air
- Progress in reducing emissions
  - Zero Emission Vehicle or "ZEV" Regulations
- Vision of the future – "conventional technologies and fuels are not enough"
Improving Air Quality
Highest Ozone: Greater Los Angeles

Goal is "Zero" Emissions
Focus on Long-Term Benefits

- Continued emphasis on zero emissions
- Near-zero technologies also play major role

Pure ZEVs are the "Gold Standard"

- No tailpipe, evaporative or fuel marketing emissions
- Reduced toxic and greenhouse gas emissions
- No deterioration or catastrophic failure
- Indirect emissions extremely low in California
- Multimedia benefits
September 7 & 8, 2000
Biennial Review

■ Unanimous reaffirmation of ARB’s commitment to the ZEV program
■ Direction to staff to return with suggestions regarding
  - Cost
  - Market availability
  - Outreach and Public Education

January 25, 2001
Board Meeting

■ Adopted modifications to mandate
  - More manufacturer flexibility
  - Encourage early placement
  - Included heavier sport utilities and trucks
    - 16% ZEV mandate by 2018
■ Staff proposed to expand ZEV outreach and public education efforts
ZEV Mandate

- 10% ZEVs for large and intermediate manufacturers beginning in 2003

- Large manufacturers (2003)
  - 2% MUST be pure ZEVs – battery electric and fuel cell vehicles
  - 2% may be Advanced Technology (AT) Partial ZEVs (PZEVs)
  - 6% may be non–AT PZEVs

- Intermediate manufacturers

Pure ZEVs Required
ZEV Technologies

- Battery Electric vehicles
- City EVs
- Hybrids
- Fuel Cells
- Super Ultra Low Emission Vehicles (SULEVs)

Market Needs

- Competitive pricing
- Smooth, orderly buildup
- Several vehicle platforms
- Outreach and public education
- Retail sales
Long-Term Outreach Goals

- Build upon current and past efforts to develop and implement an outreach and public education plan for ZEVs that:
  - Educates People of Their Advanced Technology Clean-Air Transportation Choices
  - Provides Accurate Information to the Public
  - Dispels Misperceptions of EVs
  - Educates the Public on How Their Transportation Choices Impact Air Quality and Energy Use
  - Shows How the ZEV Program Can Benefit At-Risk Communities

Vision for the Future

- Need for nearly all zero and near-zero emission vehicles
- Improved efficiency for lower CO₂ emissions
- Clean and healthful air for everyone
What will they do?
A brief review of research tools for peering into the future of motoring

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Objectives for my brief review

• Help you think about research tools which respond to the frequent call yesterday to "mainstream" the Clean and Efficient Vehicle (CEV)

• In particular, open up the middle ground between sales statistics ("hard") and focus groups ("soft")

• Make sure cupholders are on the radar...
Learning from data

Tenets:

Figure out the segments of your market so that you focus your efforts where you can realistically gain ground

To characterise segments, stick to data you can reliably observe

Household case #1

- Both heads of household have >20 mile commutes, one-way
- 3 vehicles owned:
  - one 4WD
  - two sports cars
- Single family home, >4000 sq. feet, 1 acre lot
- Location: fringe of a major urban area, no transit
Household case #2

- Couple share one fuel-efficient vehicle (Toyota Corolla), including carpooling to work
- Regular informal car-sharing with 3 other local households
- Owner-built passive solar home, with total annual energy cost of 33 cents/square foot
- Village location (population 1000)
- High degree of self-sufficiency, including many automobile repairs

Which is more likely to buy a Clean and Efficient Vehicle?

- Household case #1?
- Household case #2?

*Answer: Both equally likely*

Why? How come?

*Because Cases #1 and #2 are describing the same household*

Mine!
Inescapable principles

1. The answer you get depends on the set of questions you ask

2. The questions you ask have a context

3. The (market) researcher and the respondent must have a shared understanding of that context

4. The context for future consumer behaviour (a scenario) must hence be jointly constructed

5. If elements of the future context have not yet been experienced, or are rapidly changing, you and your respondent have got a lot of work to do together

How do we deal with future contexts?

- Know who you are talking to – get a solid base about what they do know when they buy a car and use it

- Distinguish future constraints from future behaviour

- When talking to the consumer, decide whether you are interested in fixing or eliciting the behavioural outcomes (which kind of vehicle, lease or buy, etc…) and in fixing or eliciting the future constraints.
Future constraints

- Can be made up of many attributes
- Mostly *external*, such as household income, the performance of the vehicle on offer, fuelling infrastructure, price, regulations, incentives, etc.
- External includes personal stuff: commitments to family, social norms, etc.
- But also *internal* attributes, such as state of physical fitness, values, risk perception, etc.

4 different types of question

1. Which would you choose between a BEV with 100 miles and a one-suitcase trunk and a BEV with 150 miles and a two-suitcase trunk? => “UTILITY TRADEOFF”

2. What kind of vehicle would you buy if gas cost $7 a gallon and your city had 48 “Save the air” days a year? => “WHAT IF?”

3. Under what circumstances would you buy a HEV which cost 25% more than the equivalent gasoline vehicle? => “HOW MUCH WOULD IT TAKE?”

4. Under what circumstances would you think about switching your personal vehicles, and how would you go about selecting the replacement? => “HOW DOES CHANGE START UP FOR YOU?”
### Constraints vs. Outcomes

<table>
<thead>
<tr>
<th>Constraints</th>
<th>Mostly given</th>
<th>Mostly elicited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcomes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mostly given</td>
<td>UTILITY</td>
<td>HOW MUCH WOULD IT TAKE?</td>
</tr>
<tr>
<td></td>
<td>TRADEOFF</td>
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<td>Mostly elicited</td>
<td>WHAT IF?</td>
<td>HOW WOULD CHANGE START UP?</td>
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### Constraints

(Expressed as attributes: personal/household/social/spatial/supply, etc)

<table>
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<th>Mostly elicited</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stated Preference</td>
<td>(focus = tradeoffs, utility)</td>
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<tr>
<td>&quot;Given the levels of attributes in these alternatives, which would you prefer: [A].....? [B].....? etc.....&quot;</td>
<td>&quot;Under what circumstances could you imagine yourself doing: [r1].....? [r2].....? etc.....&quot;</td>
</tr>
<tr>
<td>Stated Adaptation</td>
<td>(focus = reactive and trial behaviour, problem-solving, rules)</td>
</tr>
<tr>
<td>&quot;What would you do differently if you were faced with the following specific constraints: [....detailed scenario]&quot;</td>
<td>&quot;Under what circumstances would you be likely to change your travel behaviour and how would you go about it [broad context]&quot;</td>
</tr>
<tr>
<td>Stated Prospect</td>
<td>(focus = learning processes; information seeking; the imaging, formation and testing of choice-sets, metadatacisions)</td>
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</table>
THE UTILITY TRADEOFF GAME
(Stated Preference) - example

• Multiple tradeoffs of combinations of attributes, e.g.

  \begin{itemize}
  \item \textit{(Choice 1 of 32)}
  \textit{A vehicle with no cupholders and a CD player}
  \textit{vs.}
  \textit{A vehicle with state-of-the art cupholders and a cassette player}
  \end{itemize}

• OBSERVED: forced choices – indeed, can be devised as quite sophisticated choice experiments

• RESULTS: quantitative utility measures (and so choice probabilities) – but for a narrowly defined problem

WHAT IF? (Stated Adaptation) – example

• BEVs in California and France (PIREG)
• A week of driving for a whole household, then try an EV on for size
• OBSERVED: coping behaviours
• RESULTS: found out ways consumers might use the BEV, as well as a lot about barriers, and so fed into design of supportive policies and core messages
HOW MUCH WOULD IT TAKE? (Stated Tolerance) – example

- Discounting a BEV for to "compensate" the buyer for limited range

- OBSERVED: threshold of pain/action

- RESULTS: with MANY cautions, some indication of perceived relative advantage, but need to explore the "why" too... especially if we want to agree on "core" messages.

HOW WOULD CHANGE START UP? (Stated Prospect) – example

- Consumer response to hypothetical fuel supply shortages in Canada (CUPIG)

- Based on recent activity and travel patterns

- OBSERVED: search for, and trial of, solutions under conditions of uncertainty

- RESULTS: Much input to a policy dilemma, and some critical surprises
...but be humble when peering into the future

- Pay attention to the edge city, the 24-hour E-economy and the “just-in-time” (post-modern) lifestyle (NB: the post-modern consumer has countervailing desires: predictability and spontaneity?
- Don’t overlook the global resource and economic context

...more being humble when peering into the future

- With novel technologies and products, know which stage has been reached of both diffusion and public understanding
- But never underestimate the creativity of the consumer – is your research as creative?
Automobile Consumers, Auto-mobile Citizens: Preliminaries to a Review

Ken Kurani & Tom Turrentine
Institute of Transportation Studies
University of California, Davis

23 March 2001

Who are We Addressing?

- Consumers
  - Households: New or Used Car Buyers
  - Fleet
- Citizens
  - national, state, region, local
- Social Roles
  - family, work, club, team,...
What Materials to Review?

- Media
  - books, reports, articles, web sites...
- Sources
  - Academe, agencies, industry-auto and marketing, consultants’ reports...

Deconstructing lists

- Most important thing about a list is how it was made.
- Sifting
  - Sift lists of buyers’ desires to find those who place cleanliness and efficiency near the top.
- Re-sorting
  - Use of marketing tools to re-sort the list, raising the importance of environmental performance
Studying Consumers/Citizens

- Opinion Polls
- Attitude Research
- Revealed Preferences--direct and proxy
- Stated Preferences--cf. Martin Lee-Gosselin
- Psychographics
- Lifestyle
- Product demonstrations and trials

Studying Consumers/Citizens

- Often difficult matching materials to our needs
  - Studies of knowledge and actions regarding efficiency may not be linked to global warming
  - Polls of support for global warming policy may not be linked to transportation and vehicles.
  - Studies of knowledge and actions regarding air quality not linked to vehicle purchase behavior
- Pointing to research needs
Vehicle Choices and Clean Air

• What do people know about clean air?
  – air quality in their town
  – connections between air quality and health
  – sources of emissions
  – awareness, knowledge, and consideration of vehicle options
  – awareness, knowledge, and support of policy

Vehicle Choices and Global Warming

• What do people know about global warming?
  – how will global climate change affect their town
  – connections between efficiency, climate change, air quality, and health
  – sources of emissions
  – awareness, knowledge, and consideration of vehicle options
  – awareness, knowledge, and support of policy
Consumer awareness, knowledge, consideration

- Auto manufacturers should make eco-friendly cars.
  - 1999 51% Agree
  - 2000 57%
    - Dohring Company’s 2000 National Automotive Consumer Study

Consumer awareness, knowledge, consideration

- Demand for EVs and HEVs?
  - 68% interested in buying an electric or hybrid electric car within the next 3 to 5 years.
- Vehicle purchase and global warming
  - 83% of motorists “concerned” about global warming
  - 77% say it is extremely or very important that manufacturers make cars that produce less CO₂.
    - American Demographics, January 2001
Citizen Beliefs about the Environment

'standards cannot be too high'

State Citizen Opinion/Attitude of Air Quality and Vehicles

- Improving air quality in my state
  - 77.4% important or very important to them personally that air quality in their state be improved.
  - >70% interested or very interested in reducing pollution created by motor vehicles
  - 61.8% stated their state government should issue regulations requiring ZEV sales
Citizen Opinion of Government

Baseline Vehicle Sales Trends and Facts

- Light-trucks
  - Sport Utility Vehicles
  - Pick-up Trucks
  - Vans and Minivans
- Safety
- Efficiency
- Emissions
Sales of New Cars and Light Trucks

More info about environmental impacts
Buying Clean Air

- Opinion Research
- Attitude Research
- Revealed Preference
- Stated Preference
- Psychographic
- Lifestyle
- Product demonstrations and trials

Buying Clean...: demos and trials

  - perceived environmental efficacy of EVs increased after a 2-week trial
  - among trial participants, support for policy intervention on behalf of EVs was high prior to trials, and remained so afterwards
  - trials broadened the attribute base upon which EVs were evaluated » not just clean air.
Why might consumer/citizens fail to act?

Reducing pollution is a more effective way to prevent global climate change than energy conservation.

Why might consumer/citizens fail to act?

- Don’t choose efficiency because they apply a “pollution” model to greenhouse gas emissions.
  - Pollution consists of artificial chemicals
  - These are toxic to humans, and other life
  - Sources are largely industrial/automotive
  - Pollution is fixed by installing additional filtering equipment.
How Vehicles are Marketed

- Leasing
  - 13.6% of sample of new car buyers in California planned to lease their next new vehicle
  - 16.6% were currently leasing a vehicle.
    - GCI/Dohring, Summer 2000
- Rental

How Vehicles are Marketed

- Internet Sales and Information Sources
  - Percent of new cars and trucks sold via Internet
    - 1998 1.1%
    - 1999 2.7%
    - 2000 5% (forecast)
    - OTT
- Direct Sales
- Need longer timeline data for all these
Strategic Decisions

- Market Clean and Efficient Vehicles
- De-Market Less Clean and Efficient Vehicles
- Establish Trust
  - 49% believe ads saying a product is approved by an environmental group (Roper, 1993)
  - 30% believe ads saying one product is better for the environment (Simon & Woodell, 1997)
  - “Your Town” Environmental Coalition (Kathy Daniel, 22 March 2001)

Go to the Binders!

- Add your own Questions
- References to:
  - books
  - reports
  - articles
  - web sites, and anything else you have
- Program descriptions, process outcomes, end results, policy directives,…