



ENVIRONMENTAL DEFENSE

finding the ways that work

**Final Report on the
Green Vehicle Market Alliance Project**

**Prepared for
Oak Ridge National Laboratory**

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DISCLAIMER

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Final Report on the Green Vehicle Market Alliance Project

EXECUTIVE SUMMARY

In May 2002, Oak Ridge National Laboratory (ORNL) contracted Environmental Defense to provide technical and administrative support for the Green Vehicle Market Alliance (GVMA). Key objectives of the project included (1) taking the GVMA from the level of an informal alliance that met periodically to the level of a viable membership organization of appropriate structure, including a strategic plan, funding plan, and functioning operational plan; and (2) developing a public education agenda for consideration by the GVMA as a way to guide its market research, information sharing, and promotional activities.

At the inception of the project, the GVMA was an informal alliance of stakeholders having a shared interest in helping build a market for green (clean, efficient, and environmentally preferable) light-duty vehicles in the United States. The hope was that such a multi-stakeholder group could identify and help advance social marketing strategies for overcoming the market acceptance barriers confronted by greener vehicle designs.

This initiative had emerged from an attempt to coordinate several convergent interests. The U.S. Department of Energy (DOE), assisted by ORNL and other national laboratories, wished to update and strengthen the federal fuel economy information program. The U.S. Environmental Protection Agency (EPA) wanted to find ways to recognize greener vehicles. Automakers were interested in finding ways to increase the customer demand for the greener, advanced-technology products they were developing. Environmentalists wanted to stimulate greater interest in fuel-efficient, low greenhouse gas emitting vehicles while seeing continued progress on air quality. Alternative fuels and vehicles proponents wanted to further promote the technology solutions which they were cultivating. State and local governments as well as several other organizations wished to advance solutions to air quality and energy problems that would better serve their jurisdictions.

Environmental Defense conducted research and outreach to yield insights into the challenges of educating and informing the public about green vehicles, particularly regarding greenhouse gas emissions and fuel economy. This report summarizes the lessons learned, provides a discussion and analysis of some key issues, and identifies considerations that need to be faced in ongoing efforts to promote greener cars and light trucks. The institutional and other circumstances detailed in this report created a context in which we were unable to create a viable organization from GVMA or to develop a specific public education agenda. However, the resulting lessons will be useful for informing efforts undertaken by the growing number of organizations interested in promoting greener personal vehicles.

Third parties with a social agenda, such as government agencies and environmental groups, face special challenges in attempting to influence the auto market, which is vast and

sophisticated and already has a thriving business of third-party intermediaries who explain cars to the public and help consumers with their decisions. Key conclusions reached regarding the green vehicle marketing problem include:

- Consumers poorly understand environmental factors in car choice and tend to assign responsibility on this issue to government or industry rather than themselves.
- There is a need to better address the view that public education and attempts to influence consumer behavior have poor leverage for solving major environmental problems.
- It is difficult to move proactively on a market issue such as auto efficiency and GHG emissions before political consensus is achieved on how to address the issue.
- For some automakers, maintaining the *status quo* is less risky than approving new programs that might change competitive positioning, even if only as a matter of image, and automakers do not need such interventions to help their own strategies on the environment.
- Environmentalists are wary of programs not strictly based on environmental performance and fear that such systems, often designed to reduce perceived risks to automakers, might do more harm than good.
- The question, "What cars are green?" appears to be a loaded question, and it is likely to be counterproductive to design public rating or labeling programs around answering it.
- Many consumers believe that alternative fuels and vehicles are the best way to address energy and environmental problems, so that choices among conventional vehicle options make little difference.
- Although greater consensus exists about promoting advanced technologies such as hybrids, it is doubtful that promoting technology, rather than environmental performance *per se*, will be effective if the main barrier to progress is insufficient customer valuation of environmental factors rather than limitations on technology adoption.

Finally, it is important to clarify the right role for government in fixing the market failure regarding information about cars and the environment. The complex and dynamic nature of the auto market suggests that the government role might best be restricted to objective information provision, leaving potentially contentious issues of recommending some cars over others to private market intermediaries.

INTRODUCTION

It is widely recognized that improved consumer information on automobile environmental performance is desirable. A key need is consumer education about fuel-efficient choices for reducing greenhouse gas (GHG) emissions. Information about fuel economy is also pertinent to consumers' costs (the original motivation for federal fuel economy information) as well as supporting the public interest in reducing oil dependence.

Historically, consumer information was not seen to play a significant role in air quality strategy because emissions standards were the same for broad categories of vehicles and offered little means of product differentiation. The advent of flexible regulations such as the Tier 2 system opens up the possibility of differentiating vehicles according to criteria pollution impacts. Arguably, however, the greater informational need pertains to GHG emissions (the main environmental aspect of fuel economy), where lack of consumer understanding and limited market interest are major obstacles to progress.

THE EVOLVING INTEREST IN PUBLIC PROMOTION OF GREENER VEHICLES

The importance of consumer information was appreciated when fuel economy became a public concern in the 1970s. A Federal Fuel Economy Information Program was established to complement fuel economy regulation in response to the oil shocks. Although environmental linkages to fuel economy were not articulated at that time, environmental factors entered public vehicle information strategies when alternative fuels policies developed as another response to transportation-energy concerns. Interest in public promotion of environmentally preferable ("greener") vehicles has subsequently grown, as described in the following overview.

Fuel Economy Information

In general, consumers have good awareness of the existing fuel economy label and have some understanding of fuel economy insofar as it pertains to fuel consumption and driving costs, but poorly link fuel economy to environmental impacts. Moreover, even when consumers consider vehicle environmental impacts, they tend to assign responsibility for addressing these issues to the government or automakers. In short, environmental factors are poorly understood and matter little to most consumers in the context of their automotive purchase decisions.

Awareness and sensitivity to fuel economy information was high during the oil crisis years, 1973 to the mid-1980s, but has steadily decreased since then. Nevertheless, market research has shown that auto consumers have maintained a level of interest in fuel economy information as such.¹ A recent survey, in fact, found that when consumers were asked what automakers' top priorities should be when designing a new vehicle, fuel efficiency (at 24%) was

¹ N.W. Hill and R.P. Larsen, Evaluation of the Federal Fuel Economy Information Program, Interim Report, Argonne, IL: Argonne National Laboratory, Center for Transportation Research. October 1990.

second only to better reliability (at 41%) in frequency of response.² Consumer decisions about vehicle attributes that determine fuel economy are made early in the car purchasing process, typically before a consumer visits dealerships. However, fuel economy is poorly linked to environmental concerns. Market researchers have suggested that efforts to educate consumers about the relationship of fuel economy to the environment might better tap consumers' environmental concerns and thereby enhance the effectiveness of fuel economy information beyond its waning salience as a pocketbook consideration.³

The existing Federal fuel economy information program largely dates from the 1970s, when it was established by the Energy Policy and Conservation Act (EPCA) as part of the nation's response to the energy crises of that time. The most prominent aspect of this program is the EPA/DOE fuel economy ratings, which are displayed on the mandatory new vehicle sales window stickers (Monroney label⁴), printed in an annual fuel economy guide that dealers are required to have available, and widely disseminated by automakers, automotive consumer publications, and other market intermediaries. The information is also provided on a Federal website, www.fueleconomy.gov.

Alternative Vehicles Promotion

Beginning in the 1980s and throughout much of the 1990s, the emphasis of federal and state transportation energy initiatives shifted to alternative fuels. The 1988 Alternative Motor Fuel Act (AMFA) authorized expanded alternative fuels R&D, analytic studies, and some incentives for alternatively fueled vehicles (AFVs) and their supporting infrastructure. Similar policies had also been developed in California with a stronger air quality rationale. California's 1980s emphasis on methanol that was superseded by a push for electric vehicles following the promulgation of the state's zero-emissions vehicle (ZEV) mandate in 1990.

Also in 1990, the Clean Air Act Amendments (CAAA) created new roles for alternative fuels. It required EPA to develop a clean fuels program, although its provisions permitted reformulated gasoline and diesel fuels. The conformity provisions for bringing states' transportation plans into line their air quality plans also provided motivations for AFVs, and a number of alternative fuel projects were funded by the Congestion Mitigation and Air Quality (CMAQ) program.

The AFV focus was further codified by the 1992 Energy Policy Act (EPACT). This law set national goals for petroleum displacement by alternative fuels; it authorized expanded incentives for new fuels and infrastructure; and it mandated AFV requirements for certain fleets. In addition, EPACT asked DOE to solicit voluntary AFV purchase commitments throughout the United States. The agency launched the Clean Cities program⁵ as a way to cultivate and develop

² Autobytel, "Consumer Voice survey takes pulse on upcoming auto show debuts and a host of year-end auto trends," press release, December 22, 2003.

³ Hill & Larsen, op. cit.

⁴ After the 1958 Monroney Act, which mandated vehicle labeling for uniform disclosure of price information and required use of what is known as the Manufacturer's Suggested Retail Price (MSRP).

⁵ See www.cities.doe.gov.

locally-based partnerships to support AFVs and related infrastructure. Although Clean Cities has restricted itself to AFV promotion to date, its leaders are now considering an expansion of its scope to cover hybrid vehicles and fuel economy.⁶

Thus, during the 1980s–1990s, federal and state agencies promoted various alternative fuels and vehicles using marketing-oriented strategies as well as limited regulations and incentives. Educational materials were developed and disseminated. Promotional activities including conferences, AFV demonstrations, and events with state and local public officials delivered the message that AFVs were an important means of improving energy security and protecting the environment. Most auto companies also undertook promotional and educational activities around AFVs. However, AFV purchases were generally restricted to fleets rather than the general market, recognizing the infrastructure and other barriers that would inhibit most general consumers from using alternative fuels. California's ZEV mandate stimulated the development of market research and promotions targeting general consumers, which were needed to build an electric vehicle (EV) market large enough to meet the mandates' original requirements. These efforts added to the research and experience base for promoting vehicles on the basis of environmental considerations, which had not hitherto been a significant factor in the general car consumer market.

Although these extensive AFV development and promotional efforts did not lead to any significant commercialization, this thrust succeeded in raising the profile of alternative vehicle and fuel technologies as a solution to environmental problems. For example, a late 1990s survey found that "consumer interest in alternative fuel vehicles is increasing."⁷ The programs served to educate the public and many political leaders that alternative fuels were a good thing to pursue and buttressed the intuitive notion that the best way to reduce oil dependence is by substituting other fuels. This conceptual frame spills over into the commonplace perception that equates efficient vehicle technologies (including hybrid gasoline-electric vehicles) with "alternative" technologies. Until recently, however, public programs and resources (other than the vestigial fuel economy information program) were almost exclusively focused on "true" alternatives, rather than more efficient use of petroleum fuels.

Broader Green Vehicle Marketing

In the late 1990s, DOE renewed its efforts to improve and strengthen the fuel economy information program. Other organizations also developed an interest in finding ways to promote vehicles that could help reduce GHG emissions. Such efforts were seen as a complement to the R&D efforts of the Partnership for a New Generation of Vehicles (PNGV).⁸ This program was not premised on alternative fuels, but rather had an explicit focus on higher fuel economy,

⁶ "Summary of Clean Cities Road Mapping Meeting on 11/18 and 11/19," Washington, DC: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, November 2003.

⁷ Emphasis as in original, "Alternative Delivery Systems: A New Generation of Vehicles," Update, Aguora Hills, CA: J.D. Power and Assoc., April 1999.

⁸ Partnership for a New Generation of Vehicles, Program Plan; Washington, DC: U.S. Department of Commerce, July 1994.

notably through the high-profile PNGV "Goal 3" of affordably tripling the fuel economy of a midsize car.

While R&D was advancing technologies that offered major progress in vehicle efficiency and emissions reduction, the fact that such attributes were not significantly valued by consumers raised a "market acceptance" problem. Although PNGV's goals included affordability and transparency in terms of vehicle performance and other market attributes, the resulting vehicles were cast as being revolutionary (a "new generation") rather than an evolution of conventional designs. Both government and industry policy makers fostered this sense of distinctiveness even though it raised customer valuation problems that the program's stated goals had sought to avoid. For example, a PNGV-sponsored study of consumer issues identified the dismal sales experience for electric cars and other alternatively fueled vehicles as motivating the need for investigation of market acceptance.⁹ Nevertheless, this situation helped federal agencies see a need to explore marketplace issues, a topic that officials who were traditionally regulators and technologists had not previously viewed as part of their work.

As an outgrowth of its efforts to promote efficient vehicles and acting on the findings that consumers poorly linked fuel economy to environmental performance, in 1995 ACEEE began researching strategies for public marketing of vehicles as "green." A product of this work was the *Green Guide to Cars and Trucks*, launched in March 1998.¹⁰ Rather than isolating fuel economy and its particular environmental impacts, a rating system was developed based on principles of lifecycle assessment in order to provide a comprehensive green indicator for light duty vehicle environmental performance.¹¹ The *Green Book's* ratings are largely determined by a vehicle's estimated in-use tailpipe emissions standard and fuel economy, but also indirectly incorporate production-phase environmental impacts linked to vehicle mass.

In May 1998, ACEEE held a workshop on fuel economy and green marketing issues at which representatives of federal and state agencies, national laboratories, and environmental groups discussed options and research needs for increasing activities on the topic. A consensus of that meeting was that collaborative initiatives on green vehicle marketing should be explored and involve other key stakeholders, particularly automakers, dealers, and auto market intermediaries.

In March 1999, DOE and ORNL held a workshop to obtain input from other agencies and environmental groups on improving the Fuel Economy Guide and website as well as more broadly enhancing the fuel economy information program.¹² Among the options identified were including environmental data (such as GHG emissions), providing motivational components (such as rankings, suggestions of particular car choices, or tips on efficient operation), attempting

⁹ B.C. Richardson, S.P. McAlinden, B.M. Belzowski, C. Booms, B.N. Ebarvia, K. Hill, Method for Estimating Market Acceptance of Technologies and Fuels of the Partnership for a New Generation of Vehicles, Report No. UMTRI-99-15; Ann Arbor, MI: University of Michigan Office for the Study of Automotive Transportation, May 1999.

¹⁰ This publication was retitled to *ACEEE's Green Book: The Environmental Guide to Cars and Trucks* starting with the model year 2000 edition; its website is www.greencars.com.

¹¹ J. DeCicco and M. Thomas, "A Method for Green Rating of Automobiles," *Journal of Industrial Ecology* 3(1): 55-75, 1999.

¹² Workshop on Improving Fuel Economy Information: Summary of Findings. Oak Ridge National Laboratory, March 1999.

to raise consumers' valuation of fuel costs, and reaching car buyers earlier in their decision process (before consumers get to the showroom). No firm conclusions were reached other than a consensus for strengthening the program. The ensuing effort, which included market research and information development work by ORNL, resulted in a series of improvements to both the fuel economy guide and the website. Enhancements included improved user-friendliness as well as the addition of information on greenhouse gas emission, air pollution, and safety, plus links to other web-based sources of related information.

During the same time period, DOT and EPA launched a voluntary initiative to bolster state and local efforts to meet air quality goals. A set of multi-stakeholder meetings led to the formation of the Alliance for Clean Air and Transportation (ACAT).¹³ Environmental Defense assisted in developing this initiative and the partnership also includes transportation user organizations and systems providers; road, transit, auto, energy, and related industries; public agencies, and other environmental groups. ACAT has developed, tested, and distributed materials for educating consumers about transportation and air quality as well as the actions they can take to reduce air pollution from transportation choices. Vehicle choice issues were not initially covered because the focus was on conventional air pollution rather than energy and climate. However, ACAT expressed an interest in green vehicle promotion as part of its second generation messaging.

The Green Vehicle Market Alliance

In August 1999, a special session at the Asilomar Transportation-Energy Conference discussed consumer education and marketing issues. Participants agreed to plan a separate meeting on the topic, leading to a June 2000 workshop hosted by the Center for Clean Products and Clean Technology at the University of Knoxville. It was attended by representatives from federal, state, and local government agencies, auto companies, universities, environmental and consumer groups, and national laboratories. (See Table 1 at the end of the report for a list of organizations participating in this and subsequent meetings.) Participants agreed on the desirability of developing a voluntary collaboration through which interested parties might share information and coordinate on green vehicle market development issues.

A somewhat expanded group met in Washington, DC, in December 2000 and agreed upon a mission statement for a coordinating entity to be termed the "Green Vehicle Market Alliance" (GVMA). The mission statement was, "to build the market for clean, efficient, and environmentally preferable vehicles." A planning committee was formed to develop a structure and procedures for the alliance and plan a workshop on market research issues.

A third meeting in this sequence was hosted by the Institute of Transportation Studies, University of California at Davis (ITS-Davis) in March 2001. It was held in conjunction with workshop on Marketing Clean and Efficient Vehicles also organized by ITS-Davis.¹⁴ In addition

¹³ See www.italladdsup.gov, the website of the "It All Adds Up to Cleaner Air" campaign that ACAT steers.

¹⁴ Turrentine, T., and K. Kurani (eds.), *Marketing Clean and Efficient Vehicles: Workshop Proceedings*, Report UCD-ITS-RR-01-06, Institute of Transportation Studies, University of California, Davis, March 2001.

to discussing organizational options for GVMA, this meeting focused on market research issues and also injected a social marketing perspective.

Several GVMA participants reported on market research they had conducted to support their green vehicle objectives. California state agencies had previously focused on electric vehicle marketing and were in the process of expanding their focus to include hybrid vehicles. ORNL had conducted focus groups on vehicle rating information, including the DOE/EPA Fuel Economy Guide, EPA's Green Vehicle Guide,¹⁵ and ACEEE's Green Book¹⁶ (the findings are discussed below). That work provided evaluations of these approaches that had been tried to date, but did not point to a clear sense of direction for how GVMA might contribute to further advancing the effectiveness and use of such tools. GVMA participants were not able to agree on the extent to which such an organization address the development of vehicle labeling programs, even though everyone recognized the importance of such programs.

Social marketing defines itself as the use of marketing and social-science strategies to change individual behavior for the good of society.¹⁷ Although social marketing draws on the same advertising and public relations strategies used for general product marketing, the premise is very different, in that the "customer" audience may not, at the outset, share the social objectives in terms of their own decision making priorities. Most products, in contrast, are developed in anticipation of meeting observable consumer needs. The Davis workshop pointed out the need to "reward" (in a broad sense of the word) consumers for the change in behavior that a green vehicle marketing seeks to achieve. It also highlighted the importance of evaluation work in planning and implementing any program. Evaluations should address both process results and measurable behavioral outcomes, and also ensure that a program "do no harm" as it attempts to achieve the social marketing objective.

During this time, EPA was undertaking an effort to develop a new vehicle information and labeling program, and the agency presented the plans for this initiative (the EPA "Green Vehicle Program") at the Davis workshop.¹⁸ The program involved the aforementioned Green Vehicle Guide as well as concepts for a voluntary label to recognize environmentally superior vehicles. The agency felt that both a rating system and a new green brand would be key elements for their program. EPA reported that the GVG website had proven very popular, approaching one million hits per month and getting good coverage by automotive press.

An EPA program had the potential to become the definitive national source of green vehicle information. The agency's main interest in a collaborative forum such as GVMA was as a venue for helping to obtain buy-in for its proposal. EPA's approach was not consensus-oriented, but rather premised on developing voluntary partnerships with one or a few automakers

¹⁵ www.epa.gov/autoemissions

¹⁶ At that time (March 2001), free access to *ACEEE's Green Book* was provided via Environmental Defense's ForMyWorld web portal, which was subsequently discontinued.

¹⁷ Black, C. (Ogilvy Public Relations Worldwide). "Applying Social Marketing Principles to Selling 'Green' Cars," presentation to the Workshop on Marketing Clean and Efficient Vehicles, University of California - Davis, March 22-23, 2001.

¹⁸ Snapp, L. "EPA Green Vehicle Program: Creating Demand," presentation to the Workshop on Marketing Clean and Efficient Vehicles, University of California - Davis, March 22-23, 2001.

that might then leverage acceptance by other automakers and stakeholders. GVMA participants appreciated the importance of an EPA resource for answering consumers' questions about vehicle environmental performance. Some saw value in having GVMA provide a forum for advising the development of EPA's efforts. However, other participants had concerns about both the substance of EPA's proposals as well as the agency's informal approach to obtaining public input for a federal program. This situation led to a lack of consensus about how to proceed. Some participants felt that GVMA could serve as a forum for developing generic informational strategies that might be pursued regardless of the source and nature of information about what vehicles were "green" or how vehicles were rated. However, such a role lacked specificity, leading others to question exactly what an entity like GVMA could contribute.

Environmental Defense organized a fourth -- and final in terms of GVMA as constituted over the prior two years -- meeting that was held in Ann Arbor, Michigan in December 2001. The meeting was hosted by the U.S. EPA and focused on information sharing, with participants reporting on activities that their organizations recently had been carrying out. Activities included: EPA's vehicle labeling brand concepts; California's efficient vehicle incentives program; DOE's fuel economy guide enhancements and "Technology Snapshots" of advanced technology vehicles; ACEEE's fleet buyers' information site based on the *Green Book*; and Environmental Defense's *Driving Forward* newsletter, among others.

An issue discussed at the this meeting was the "fulfillment problem." This refers to the fact that even if a consumer finds environmental ratings on the web, the ratings do not necessarily match up with the trimline designations by which vehicles are marketed. For example, even though vehicles are already labeled for fuel economy, it is not always straightforward to identify a particular model having a given fuel economy rating that a consumer might have found in a guidebook or on the web. Participants noted that it would be valuable to develop a plan for resolving this problem that would be applicable to any green vehicle rating system to be developed. Environmental Defense and NREL agreed to investigate this issue; it was noted that a starting point could be improving the vehicle descriptions in the Fuel Economy Guide so that they better match those used by car dealers.

Meanwhile, interest around the country in furthering the market for green vehicles had led to the development of other initiatives and a larger field of stakeholders for the set of issues being addressed by GVMA. An effort was launched to include some of these other players, leading to an expanded outreach effort (described below).

GVMA ORGANIZATION

A main objective of this Environmental Defense project with ORNL was to take the GVMA from the stage of an informal gathering of organizations having a common interest to that of a formal entity with a strategic plan and stable support. Both a vague sense of purpose and dim funding prospects contributed to the failure to achieve this objective; arguably, of course, the former implied the latter.

Although several potential activities had been identified for GVMA, none of the stakeholders found the need for them to be so compelling as to enable a shift of resources into pursuing them. For some organizations, the green vehicle marketing-related activities they wanted to pursue could be carried out without the overhead of a new coordinating entity. Although they saw some potential value in collaboration, automakers clearly did not need such a forum to carry out their own environmental product and brand strategies. On the other hand, because other players were also embarking on green vehicle promotional activities, a potential role was seen for coordination and information sharing among a broader group.

Stakeholder Outreach

As Environmental Defense embarked on the 2002-03 workplan, it renewed its contacts with previous GVMA participants and began an expanded outreach effort. The new outreach emphasized inclusion of state and local governments and non-governmental organizations who had been pursuing their own green-vehicle promotional efforts and had expressed an interest in networking with like-minded organizations. Environmental Defense also maintained outreach on the subject with automakers and others.

Environmental Defense held a series of phone and in-person meetings with the Natural Resources Council of Maine (NRC-Maine), which had spearheaded the "Cleaner Cars for Maine" voluntary labeling program developed by the Maine Department of Environmental Protection (Maine-DEP) with the Maine Automotive Dealers Association (Maine-ADA).¹⁹ This program was seen as significant for a number of reasons. For one, it was a pathbreaking voluntary effort involving promotion of vehicles having both higher than average fuel economy and lower than average criteria emissions (program thresholds were 30 MPG and LEV certification). The Maine program, launched in 1999, became a template for a similar program in New Hampshire, the "Granite State Clean Cars" voluntary labeling program launched in 2001.²⁰ Another significant aspect of the program was its involvement of auto dealers, a key stakeholder group that had not been among the early GVMA participants.

Environmental Defense learned some of the key steps leading to successful adoption of the Maine program. The initiative grew out of the state's decision to opt-in to the California Low-Emissions Vehicle Program, as permitted under the CAAA (1990). NRC-Maine's discussions with state officials identified concerns about how difficult it was for consumers to identify LEVs, given that the only requisite labeling was a highly technical under-the-hood label. There was also a mutual interest in developing consumer-oriented steps to address greenhouse gas emissions. A memorandum was developed discussing these issues and identifying needs and options for strengthening consumer recognition of cleaner cars. NRC-Maine presented this memo to Maine-DEP; once the state agency decided to explore options to remedy the situation, the agency itself engaged Maine-ADA in discussions about options. Although never specifically

¹⁹ "Gov. King Unveils First-in-Nation Consumer Labeling Program for Cleaner Cars," *Environews* brief. Augusta, Maine: Natural Resources Council of Maine, November 29, 1999.

²⁰ "Partnership for Granite State Clean Cars," Memo to NHADA Members. Concord, NH: New Hampshire Automobile Dealers Association, November 15, 2001.

proposed, the consideration of a mandatory labeling requirement was a motivating factor for the development of a voluntary initiative. Among the concerns that Maine-ADA identified were costs of implementation and appearance of the labels. The resulting constructive engagement of the dealers enabled Maine-DEP to resolve these issues. The multi-party process then led to a consensus proposal that was viable for presentation to the governor and the legislature.

Environmental Defense also advised the development of a multi-stakeholder roundtable on promotion of efficient vehicles that was convened by the Michigan Environmental Council (MEC) and met from late 2001 through 2002. Automaker representation at these meetings included DaimlerChrysler, Ford, Honda, and Toyota. Also represented were the United Auto Workers, Visteon, Ecostar Electric Drive Systems, the National Association of Fleet Administrators, the Michigan state fleet management department, plus several consultancies and environmental groups including Environmental Defense. Over the course of several meetings discussing various options for green vehicle promotion, this group achieved its best consensus around the option of educating consumers about the hybrid vehicle tax credits that were being developed at the federal level. It was felt that there would be a need to build public awareness of the credits and that such a program would be an opportunity to address some of the educational needs confronting the green vehicle marketing challenge.

Automaker Views

Environmental Defense contacted representatives of automakers who had been involved in the GVMA meetings as well as some companies that had not been involved. All maintained that value could be seen in additional, coordinated efforts to educate consumers and help build a market for environmentally improved products. The firms involved expressed concern about GVMA's inability to develop a sufficiently specific agenda, noting that it was difficult for their company to evaluate participation without a more concrete definition of the role for such collaboration, beyond information sharing.

As noted above, some auto industry representatives saw a role for GVMA in advising the development of EPA's labeling initiative. Several companies saw an EPA labeling program as something with which they ultimately would have to reckon and potentially participate in. Therefore, they had a strong stake in how it was defined. However, one company suggested that they did not see value in such a program at all. More than one suggested that they did not view EPA's approach to date as credible in terms of leading to a useful labeling program.

While there was fairly general comfort with program options that would recognize and help promote advanced technology vehicles, such as hybrids, not all firms seemed comfortable with programs based on environmental performance. Automakers understandably look at program options through the lens of their own product strategies. Firms who view themselves as well positioned on relative environmental performance (particularly fuel economy) seemed most comfortable with performance-based approaches. Others expressed reluctance with such approaches, discussing this concern in terms of how their customer base and product positioning would make it difficult for them to derive value from such a program. Given that a key environmental performance metric is a vehicle's greenhouse gas emissions, one representative

noted that it would be difficult for the company to support educational or labeling options using this metric because it is contrary to the company's policy stance on global warming. It was suggested that education around the importance of higher fuel economy for reasons of energy security might be more acceptable.

Dealer Views

Environmental Defense had discussions with representatives of the National Automobile Dealers Association (NADA) regarding their perspectives on information and promotional initiatives for greener cars. There was a general openness to the idea of developing such initiatives because dealers are beginning to recognize that information about their vehicles' environmental features is something that could be useful for customers.

During these discussions, we garnered insights about the types of considerations and concerns that auto dealers might have. These include:

- Giving labeling responsibility to dealers is inappropriate due to costs in staff time, creating an additional overhead, and is unlikely to be workable because it puts an unrealistic task on dealer staff to correctly identify which vehicles get labeled.
- The general proliferation of labels on vehicles results in an "information overload" that is viewed as unhelpful to dealers' customers as well as sales staff.
- Concerns about the appearance and placement of the label, including fears that visibility for test drives might be impaired if labels were added to windows.
- New labeling that comes with the vehicle (applied by the automaker) is more acceptable to dealers, but still creates additional sales staff educational and training needs.

Although a workable dealer-based program was developed in Maine, replicating it nationwide may not be very cost-effective because it duplicates implementation costs across all dealerships. A state-level dealer-based program might be workable by putting the implementation burden on automakers' regional distribution networks. Because such networks often serve multiple states, regional implementation may be more desirable. In general, educating dealers about a new label can be a challenge given the lack of public understanding of vehicle environmental performance and the educational background and temperament of dealer sales staff.

Environmental Defense also provided information to Ecos Consulting in its efforts to develop a concept for dealer-based sales-mix incentives.²¹ This approach would not entail new labeling, relying instead on existing information to compute the average fuel economy of a dealership's sales in a given year. The incentives could involve some combination of a financial incentive based on fuel savings of a given year's sales mix relative to the previous year's sales, state recognition, and possibly added financial rewards for best-performing dealerships. The program would also include dealer training, common promotional materials, and funds for dealer advertising that features efficient vehicles and messaging about fuel economy. Ecos Consulting

²¹ Calwell, C. 2001. Summary of Dealer Fuel Efficiency Incentive Program Proposal. Durango, CO: Ecos Consulting, October 9.

recently surveyed a set of dealers and analyzed sales and profitability data in order to test and refine the concept; a report on their findings is forthcoming as of this writing.

Prospects for Sustained Support

Based on the experiences recounted here, sustained support does not seem to be presently available for a new, multi-stakeholder green vehicle market-oriented initiative as had been envisioned in GVMA. The best hope for progress in this arena now appears to be through the Clean Cities program. This established DOE initiative originally had been focused only on promotion of alternative fuel vehicles but, as noted earlier, is now considering expansion of its agenda to include promotion of hybrid and high fuel economy vehicles.²²

Otherwise, federal government interests now seem to focus away from such consensus-building, near-term strategies. DOE is placing increased emphasis on long-term approaches, focusing on hydrogen fuel cell vehicles. EPA appears to be interested only in work that directly supports the agency's own concepts, which are premised on finding voluntary partnerships rather than multi-stakeholder acceptance.

While some limited public educational efforts are underway,²³ major environmental groups and the private funders who traditionally support clean car strategies tend to view consumer information initiatives as insufficiently results-oriented. They focus resources on advocating regulatory or financial incentive policies, with public education pursued mainly when it is issues-oriented and directly supports policy agendas. Thus, prospects for their increasing financial support for new consumer-oriented initiatives seem dim. The leadership of most green groups and funders may not appreciate the extent to which the general public fails to connect automobile fuel use to environmental problems; after all, their management, staff, membership, and key audiences tend to take such connections for granted.

DEVELOPMENT OF A PUBLIC EDUCATION AGENDA

Environmental Defense's work on green vehicle issues, including review of market research, outreach, and participation in relevant initiatives, has yielded a better appreciation of the challenges involved in educating automotive consumers about the relevance of environmental performance to their vehicle choices.

Car Consumers' Understanding of Environmental Factors

The research that has been done on consumer understanding, as well as the input from automakers during GVMA meetings, consistently points to lack of sufficient consumer understanding as a key barrier to effective green vehicle marketing.

²² Summary of Clean Cities Road Mapping Meeting, U.S. DOE, op. cit.

²³ For example: ACEEE publishes the Green Book, but its reach has been limited to date; Environmental Defense has developed web- and radio-based public service announcements on fuel efficiency as part of its collaboration with the Ad Council. Many green groups embrace and promote hybrid cars (among other "alternative" technologies), but it is unclear whether such efforts on balance help or harm the fundamental consumer education task needed regarding cars and the environment.

For example, a Canadian survey found that "not even one respondent out of 1,225 spontaneously linked fuel consumption to environmental matters."²⁴ Also, there is a widespread perception that environmental concerns are being adequately handled by government policy and the auto industry.²⁵ Automakers' market research has identified this perception as a belief that inhibits consumers from explicitly factoring environmental concerns into product decisions.²⁶ Note that this particular belief also helps explain why public support for fuel economy standards is strong while consumers rate fuel economy low compared to other purchase priorities.

Moreover, a recent Roper poll found finds that a majority (62%) of U.S. adults believe that auto fuel economy is still improving each year; another 12% believe that it is stable, and only 17% are aware of the fact that average gas mileage has declined.²⁷ The poll also found that, even though just over half (52%) of Americans realize that most U.S. oil is imported, two-thirds fail to recognize that the transportation comprises the largest use of petroleum. Therefore, the current situation finds U.S. car buyers quite misinformed in terms of their perceptions of automobiles and whatever concerns they may have about energy and environment issues.

On the other hand, once an environmental context is presented, consumers do understand the importance of a variety of vehicle characteristics. Fuel consumption ranks high on the list of what consumers state is important for improving the environmental friendliness of automobiles.²⁸ However, it is seen as one of a number of factors, including lower tailpipe emissions, recyclability, and use of an alternative fuel.

Thus, even though some key linkages are lacking, consumer knowledge regarding automobile choice and the environment is not a "blank slate." A certain level of understanding does exist on which to build. On the other hand, a number of perceptions and commonplaces may make it challenging to educate consumers about practical vehicle choices aligned with the major environmental protection needs in the auto market. An example is the relatively high importance consumers assign to recyclability. This perception may be based on the past education about household goods recycling and relatively widespread consumer experience with this tangible action that they can take themselves. Another example of prior knowledge is the perceived importance of alternative fuels as a "clean" solution, even though these choices are not relevant for the vast majority of consumers and may include options for which no real commercial market is likely to be viable for the foreseeable future. There appears to be a commonplace equation of "efficient" with "alternative fuel," something that this author has frequently encountered in public speaking and media contact.

²⁴ Turrentine, T., and M.E.H. Lee-Gosselin, "Vehicle Labeling for Improved Consumer Knowledge: Survey Methodological Considerations," Technical Memorandum prepared for Natural Resources Canada. Québec: Université Laval, Automobile Mobility Data Compendium, April 1996.

²⁵ Nye, D. 2001. Qualitative Research Report, ORNL/NTRC Focus Groups. Report prepared for the National Transportation Research Center (NRTC). Knoxville, TN: The Looking Glass Group, September 6.

²⁶ "Factors that Influence the Successful Introduction of New Technologies," J. Beseda (Corporate Manager, Strategic Planning, Toyota Motor Sales U.S.A.), Presentation to the Asilomar Conference on Transportation and Energy, August 1997.

²⁷ "Americans' Low 'Energy IQ': A Risk to Our Energy Future: Why America Needs a Refresher Course on Energy." The Tenth Annual National Report Card: Energy Knowledge, Attitudes, and Behavior. Washington, DC: National Environmental Education & Training Foundation and RoperASW. August.

²⁸ *American Demographics*, "Green Attitude," pp. 46-47, April 1999.

Another important market research finding is that consumers' "consideration sets" -- what a buyer weighs when evaluating vehicle purchase choices -- include only factors that affect the buyer personally.²⁹ This common-sense verdict underscores the necessity of developing consumer knowledge and perceptions of a car's environmental attributes that are personally meaningful, a situation that is now generally absent in the marketplace. Existing consideration sets include factors such as intended use, cost, comfort, reliability, styling, safety, performance, and so on. Fuel economy is considered by some buyers (varying greatly by market segment), but generally as an economic rather than an environmental concern.

The importance of pre-existing cognitive frameworks in shaping human perception and behavior is a well-known tenet of social science. This "status quo" knowledge situation in the automotive marketplace is a critical consideration for the design of any information program. Therefore, as further elaborated below, programs should not be premised on the existence of sufficient understanding, but rather must include education as a fundamental objective.

Status of Vehicle Rating and Labeling

Although understandable and meaningful information about vehicle environmental performance is prerequisite to harnessing car consumers' environmental sensibilities, an information gap now exists in this area. While a variety of relevant information is available, it is not all consistent and important aspects (particularly regarding GHG emissions) are poorly covered. The need for better car rating information or environmental performance labeling is generally appreciated. However, not all automakers appear comfortable with a change in the amount and nature of information available. Neither is there unanimity among public agencies and environmental groups about how to address the situation.

The federal fuel economy information program is rooted historically in the consumer economics, fuel-savings motivation, although the fueleconomy.gov website now includes GHG emissions based on a DOE-sponsored fuel cycle model (GREET)³⁰ and air pollution scores based on EPA's Green Vehicle Guide (GVG).³¹ These EPA air pollution scores, covering the entire market on a 0-10 scale, provide another piece of environmental rating information. Consumers are left to judge for themselves how to determine relative environmental friendliness based on the two disparate government ratings. Again, however, neither of these items is well understood and many consumers cannot differentiate them.

The California Air Resources Board also maintains a website (driveclean.ca.gov), but it does not provide general consumers ratings as much as it lists California regulatory certifications. Also, it emphasizes zero- and near-zero emissions vehicles, featuring environmental exotics such as fuel cell demonstration cars. DOE's Clean Cities program also provides an online Vehicle Buyer's Guide (www.ccities.doe.gov/vbg/) but it emphasizes alternatively fueled vehicles (including, however, gasoline-electric hybrids within that category).

²⁹ Nye 2001, op. cit.

³⁰ <http://greet.anl.gov/>

³¹ <http://www.epa.gov/greenvehicles>

A few private automotive environmental rating services have also been developed. As previously noted, *ACEEE's Green Book* (www.greencars.com) provides a "Green Score" based on lifecycle principles using a published methodology; however, its full ratings are available only through online subscription. Environmental Defense has a web tool, Tailpipe Tally, that enables consumers to look up and compare up to four vehicles according to a set of pollution measures. An organization named AMES Award LLC annually recognizes a set of nameplates for "Automotive Market Environmental Superiority" (AMES) using a proprietary methodology, also based on life-cycle principles (www.amesaward.com).

Several of the web-based consumer information approaches were evaluated for consumer understandability in focus group tests contracted by ORNL. This research concluded that while the various approaches had their pros and cons, most of the information provided was "difficult for consumers to understand and assimilate," because it tended to "assume a level of knowledge and interest that did not exist."³² Such results again underscore the high priority that needs to be given to consumer education if anything is to come of public information strategies to support green vehicle marketing.

GREEN VEHICLE INFORMATION ISSUES

In many ways, efforts to advance green vehicle marketing by third parties (e.g., government agencies and other information providers outside of the auto industry) may have "gotten ahead of themselves" in terms of what needs to be done. This situation could be a reason for the difficulties in launching collaborative efforts. Moreover, the challenges of achieving consensus on what information should be provided suggests a need to address some fundamental issues, both as a matter of information policy and in terms of the realities of the car market.

Stepping back from the situation, particularly as it pertains to filling the gap in public understanding that now inhibits marketing-oriented initiatives, three considerations come to mind that a government information provider should address:

1. What is the appropriate role for government?
2. What is the right question to answer for consumers?
3. What is the plausible impact of a program and how should it be evaluated?

The following discussion explores some of the implications of addressing these considerations one way or another.

The Government Role

Lack of adequate information about a product attribute of public concern is a form of market failure. Government has a role in filling this information gap. A key question is how this role

³² Nye 2001, *op. cit.*; the research compared focus group reactions to a CARB website (which has since been revamped), the EPA GVG website, the *Green Book* information (as was provided on a now defunct Environmental Defense web portal), and a DOE research site (which was used to test material subsequently adapted for revising www.fueleconomy.gov).

should be circumscribed, because it is important that the government not go too far in making the types of decisions best left to the marketplace.

For example, promoting particular makes and models with a government seal of approval is a very strong intervention and it is fair to ask whether such specific recommendations are better handled by private intermediaries. Government programs are "one size fits all" in nature, and while the recommendations might be useful for some consumers, they could be useless or even misleading for other consumers. All systems that we have reviewed for recognizing particular models as "green" (or superior in terms of energy efficiency) reveal shortcomings. As elaborated below under "The Right Question to Answer," a system has yet to be proposed that withstands close scrutiny regarding both meaningfulness and accuracy (i.e., not creating misleading comparisons). Moreover, the auto market is very dynamic, and so it is unlikely that an official government-developed system for recommending particular models as green could stand the test of time.

A minimalist approach regarding the fuel economy aspect of environmental performance would be for the government to maintain the existing, familiar fuel economy labeling, but substantially supplement the program with information about why fuel economy matters for the environment. A start in this regard has been made through the inclusion of greenhouse gas emissions estimates on fuelconomy.gov. A "fuel economy matters" educational strategy could also be reinforced using the non-environmental concerns associated with energy security.

A stronger approach would be either replacing or supplementing the fuel economy label with an label indicator of environmental impact (i.e., based on greenhouse gas emissions) or purely objective comprehensive environmental ratings. Such an information-only approach addresses a circumscribed aspect of market failure while leaving the next level of evaluation to consumers themselves and private intermediaries, avoiding the risk that a more ambitious attempt to recognize specific "green" vehicles might confuse or mislead consumers.

Comparison to Other Sectors

The question of the right role for government in vehicle labeling can also be elucidated by way of comparison to the Energy Star program that labels personal computers, small office equipment, household appliances, HVAC equipment, houses themselves, and other energy-using products.³³ Energy Star places an EPA-sanctioned seal of approval on products according to a set of quality and performance criteria in addition to energy-efficiency. Thus, this program is one in which the government effectively recommends certain products over others.

However, with the possible exception of homes themselves, Energy Star product markets are very different from the car market. For most Energy Star products, any given appliance or equipment market is much simpler in structure than the car market, which is far more complex, with a great diversity of products offering a very varied and ever-expanding set of features, any of which trade off against fuel economy either directly or indirectly. For homes, the Energy Star program develops whole-house energy consumption metrics based on either computer-simulated

³³ www.energystar.gov

performance of a collection of discrete building and equipment components or by a detailed measurement protocol relative to a otherwise identical but hypothetical house that meets only minimum building codes. Thus, the complications of cross-market comparisons are avoided, and the government seal of approval avoids arbitrary judgments about which products a consumer should compare to others.

Analysts seeking to formulate "Energy Star" systems for cars have struggled with this cross-market comparisons issue. An ORNL study attempted to address the problem of making fair and meaningful comparisons by using a variety of parameters (size, vehicle classes, or regressions involving weight and performance).³⁴ Although that report concluded that such a system is feasible on the basis of the narrowly defined technical grounds explored, it did not address considerations raised here, such as whether such a system is appropriate for government, whether it would answer the right question for consumers and help educate them, or be effective. The ability to sort lists of cars on the basis of technical parameters does not demonstrate value or effectiveness for meeting consumer educational and informational needs.

The ORNL "Energy Star" cars analysis did acknowledge that other product quality criteria would need to be explored. Nevertheless, inspection of the lists of vehicles selected according to the methods having the best balance of strengths and limitations (according to the authors' metrics) indicated that many vehicles were selected as a matter of happenstance.³⁵ Known efficiency leaders (hybrids, other vehicles deliberately positioned for high fuel economy) were typically among those selected, but so were many vehicles whose energy-related metrics appeared high simply because of where they fell, not because they had been designed with good energy-related performance in mind. While such outcomes may seem satisfactory viewed through a lens of abstract specifications, they are unlikely to appear credible to those knowledgeable of this complex market on its own terms, particularly automotive media. Thus, such "Energy Star" recommendations are unlikely to be credible to car consumers, whose knowledge of environmental (and energy) considerations may be weak but who have strong instincts regarding the trade-offs involved in making automobile purchase decisions.

Another point of sectoral difference is that Energy Star ratings are one-dimensional, addressing only energy-related impacts, while environmental considerations for cars have two major dimensions (greenhouse gas and criteria emissions impacts) that have independent variability. For cars, a rating system claiming an environmental mantle cannot restrict itself to only one of these two major impacts. Given that most consumers are not likely to clearly distinguish the two, they could be misled into thinking that a vehicle was environmentally preferred on the basis of its ranking along the single dimension. This potential "greenwash" concern arises for the case of a low-efficiency light truck that might carry a LEV rating as well as for the converse case of a high-efficiency diesel vehicle that might certify to a relatively weak tailpipe standard.

³⁴ D.L. Greene, R.C. Gibson, and K.G. Duleep, Energy Star Concepts for Highway Vehicles, Report ORNL/TM-2003/37, Oak Ridge National Laboratory, June 2003.

³⁵ Greene et al., *op. cit.*, Table 7 and appendices.

Relation to Automotive Media

A key issue that cannot be ignored is the fact that the car is a very emotional product. It is this richness that in fact sustains the substantial market for information about cars filled by media and others. Although consumer intermediaries cover appliances, lighting, office equipment, and so on, the extent and level of attention of market intermediaries is vastly greater for automobiles. The appliance and equipment markets are more isolated and receive less concerted attention by intermediaries than do automobiles, leaving a market mediation gap that government can fill without displacing the prerogatives of third-party mediators. By contrast, it may be very difficult, and arguably inappropriate given the levels of complication and individual trade-off involved, for the government to become an intermediary that recommends specific vehicles on the basis of environmental performance.

The concern about the appropriateness of government recommending particular vehicles as "green" (or "Energy Star") is accentuated if such recommendations are based mainly on abstract criteria divorced from marketing sensibilities, or if they entail potentially confusing or misleading judgments (which is a risk with categorical green labels, as discussed below). The ORNL-sponsored focus group study pointed out that "there was a great deal of skepticism among the respondents about the motives and actions of the government, the auto manufacturers, and auto dealers."³⁶ Government intervention in market matters is a balancing act. An ill-considered program could unhelpfully reinforce consumers' skeptical tendencies rather than helpfully use governments' position as an objective source of information to which consumers can turn to evaluate claims by automakers or dealers.

An analogy might also be made to the different roles and successes of government R&D programs for energy-using products. In the buildings and equipment sector, the relative fragmentation of the supplier industries has provided a rationale for a strong federal energy-efficiency R&D role. These R&D programs have successfully developed technologies that private industry had not been able to develop itself and which were subsequently commercialized. The automotive sector, on the other hand, is characterized by a concentrated yet competitive industry with a shared field of engineering. Although a government automotive technology R&D role has been rationalized for a variety of reasons, its record of success is much more ambiguous.³⁷

Similarly, the auto sector has a highly evolved private business of market intermediaries who provide information to the public. Government may be more successful in stimulating and facilitating green vehicle information provision through the sector's existing mechanisms than in attempting to step into the mediation role by making direct product recommendations through recognition- or award-based green labeling.

³⁶ Nye, D., D. Greene, J. Hopson, and B. Saulsbury, "Providing Consumers With Web-Based Information on the Environmental Effects of Automobiles -- A Qualitative Research Report Based On Focus Groups in Knoxville, Tennessee and Los Angeles, California," Report ORNL/TM-2003/166, Knoxville, TN: Oak Ridge National Laboratory, June 2003, p. 23.

³⁷ Although U.S. governmental automotive technology R&D has not had any significant commercialization success, the existence of these programs may have had a role in stimulating the proprietary work that yielded notable technology commercialization (such as the Japanese introductions of hybrid cars).

The Right Question to Answer

The form of information to be provided is determined by the question a program seeks to help consumers answer. Two distinct options for what a consumer might ask are:

- (a) What cars are green?
- (b) How do I compare cars by greenness?

The first question suggests a categorical approach, with some cars labeled green and others not so labeled. This approach has been the premise of EPA's labeling proposals to date as well as that of proposed "Energy Star" concepts for cars.³⁸ The second question suggests a "yardstick" approach that then leaves a consumer with further questions, such as "is this green enough for me?" or "does this car's greenness give it an edge in my mind?" In principle, a categorical approach should be based on a well-defined environmental yardstick that measures greenness along an objective scale.

Categorical labeling, the kind that would answer the "what cars are green?" question, is termed a "Type I" label by the International Standards Organization (ISO).³⁹ It is given to products that meet specific, documented performance criteria. A Type I label is also known as a "Seal of Approval" and so carries the weight of recognition by the certifying agency or institution. The Energy Star labels are examples of Type I labels, providing an EPA-sanctioned seal of approval regarding a product's energy efficiency. Star systems (such as 1-5 star crashworthiness ratings) are like Type I labels insofar as 4 or 5 star ratings represent a seal of approval by the agency. A yardstick approach is known as an ISO "Type III" label, which involves provision of reasonably complete objective information (which may be fairly technical) while leaving interpretation of the information up to the consumer. The existing fuel economy Monroney label is a Type III label. A Type II label makes a specific, narrow claim about an aspect of a product, and constitutes neither a "seal of approval" nor an attempt to fully evaluate all salient aspects of the product. For example, a claim such as "Recycled content -- at least 90% post-consumer waste" is a Type II label.

These two approaches can span a spectrum of options. A 1-5 star system is largely categorical in nature. The 7-tier (letters A-G) European label for fuel consumption⁴⁰ is another step toward being a yardstick, as are the 0-10 scales proposed by EPA. However, 5, 7, or even 10 categories provide only a coarse metric of limited use for comparing competing vehicles on the basis of fuel economy related environmental impacts. The fuel economy label is clearly a yardstick; it is open-ended and effectively provides 50 units of gradation in the current market, which has vehicles ranging roughly from 10 MPG to 60 MPG.

³⁸ Greene et al. 2003, op. cit.

³⁹ "Environmental Labels and Declarations – General Principles," Standard No. ISO 14020:2000, Geneva: International Standards Organization (www.iso.ch).

⁴⁰ "The Relative Fuel Economy Label," English version of pamphlet published by the Austrian Ministry of Science and Transport (undated, ca. 1999).

Some market research, such as the ORNL focus group studies,⁴¹ has found that categorical information as displayed on 0-10 bars was quite "telegraphic" in terms of conveying information to consumers. However, this is an assessment of effective presentation; it does not answer the question of whether or not categorical information is ultimately helpful in either accomplishing the educational task of a program or facilitating decision making about environmentally preferred vehicles choices. Therefore, mere ease of understandability should not be used as a *post hoc* justification for more fundamental policy decisions about the right information to provide. Rather, once the best policy is determined, market research can be used to guide effective means of communication to consumers. Moreover, caution is always needed in interpreting market research results. For example, an in-depth study of home energy labels found that, in comparison to seemingly more complex distributional graphs, bar charts were not the form of comparative energy use information most easily understood by consumers, contrary to expectations and the presumptions of many policy makers.⁴²

The problem of discrete labeling for a market that is a dynamic continuum

A deeper consideration of the realities of the car market suggests that it may not be possible to unambiguously answer the question, "What cars are green?" in a way that makes sense for the general market. Clearly, any *given* set of vehicles can be ranked using a green yardstick. The problem is whether or not it is possible to pre-determine sets of vehicles that make sense for "picking the winners" (those dubbed "green") in a manner that will be generally meaningful and not misleading.

Consider first the most simple such set, namely, that of all vehicles. The resulting ranking would then follow an absolute scale across the whole market. The outcome is, however, obvious and therefore trivial. As long as fuel economy has significant role in the underlying yardstick, the answer to "What cars are green?" largely reduces to, "small cars win, big ones lose." This answer affords little educational opportunity and the resulting message about green vehicle choices may be more disempowering than not. Moreover, if the ranking scale is coarse (as is a 0-10 scale), it has little value for helping consumers discern options among their personal choice sets, namely, the fluid and perhaps loosely definable collections of competing vehicles, often quite similar to one another, that a consumer considers for purchase.

Suppose the government tries to determine groupings (classes) of like vehicles that consumers might commonly use as personal choice sets. The question "What cars are green?" then becomes that of determining what cars are "best in class." Again, once a class is defined, green ranking is straightforward. The complication is twofold, however. One problem is whether or not the government, through an official classification system, can determine sets of vehicles that make sense for most consumers while avoiding class-boundary and cross-shopping problems that lead to potentially confusing results. The other problem is that putting a given green logo (an EPA seal of approval) on vehicles having widely different environmental

⁴¹ Nye 2001, op. cit.

⁴² C. Egan, Comparative Energy Information and Its Potential in Promoting Residential Energy Efficiency, Washington, DC: ACEEE, September 1999.

performance confounds the program's educational objectives and could undermine its credibility. Some consumers (and market intermediaries) might question why a 5-star light truck gets green recognition when an average subcompact with objectively better environmental performance does not.⁴³

The fact that all classifications proposed to date have had shortcomings should come as no surprise to anyone familiar with the auto market. EPA's classifications already raise questions regarding sensibility.⁴⁴ What might be a tolerable nuisance in a regulatory context is likely to be unacceptable for earning credibility in a consumer marketing context. In fact, automakers often position their vehicles to distinguish themselves "from the pack." Breaking boundaries is a natural part of marketing strategy and "segment busting" is emerging as a key strategy for reaching "Gen X" and "Gen Y" buyers. These demographics are also considered to be both more environmentally sensitive than previous generations and quite skeptical of marketing information; they will be the key group with which a new information program must pass muster.

The difficulties of pre-defining meaningful vehicle segments is not even restricted to the emerging "crossover" vehicle trend. According to a market research firm,

"People who bought the Mini may have looked at SUVs, some pickups, coupes, convertibles – anything out there that would be considered cool and fun could have been cross-shopped." Mini customers weren't, however, test-driving the similarly priced and sized Toyota Corolla.⁴⁵

The diversity and blending of body styles now seen in the market bespeaks the impossibility of having a government agency establish classifications that make sense for consumers. The fact that various classes have long existed for regulatory purposes is beside the point; the consumer information problem is a very different one than technical grouping of vehicles for regulations that apply to automakers. Even if a classification scheme minimized problems in the current market, it is highly unlikely that it would stand the test of time; government process is not agile enough to keep up with changing vehicle styles.

In short, just because a question can be asked does not mean that it can be answered, or can be answered sensibly. The question, "What cars are green?" is really a loaded question. It may well be imprudent for a federal agency to attempt to answer such a question rather than restrict its role to that of providing an objective informational yardstick.

A yardstick approach does limit the government from overtly promoting particular "green" cars. It leaves the task of highlighting specific makes and models to intermediaries such as automotive journalists and consumer-oriented guides and websites. However, these sources routinely help consumers sort among competing vehicles according to numerous evaluation

⁴³ This situation arose for all of the class-based labeling schemes previously floated by EPA, as pointed out in Environmental Defense's earliest comments on the issue; see, e.g., the list of concerns attached to the July 2, 2001 letter from Fred Krupp to Christie Todd Whitman. These issues are not revisited here, but this correspondence can be referenced for concrete examples of the problems that arise.

⁴⁴ H. Stoffer, "At EPA, birds of a feather do not flock together," *Automotive News*, November 11, 2002

⁴⁵ Wes Brown of Iceology, as quoted by K. Zachary, "What's Hot: Segment-Busters," *Ward's AutoWorld*, October 2003.

criteria. Coupled with educational efforts about why a car's fuel economy (or green yardstick rating) matters, such an approach could leverage meaningful and non-confusing consideration of environmental performance during the research phase of consumer decision making, which is likely to be when the most value is to be had.

A business context for green rating information

Another insight regarding what to answer for consumers comes from understanding the plausible role of environmental information. The view is widely shared that "green marketing" has shown little success in the past and holds little future hope of influencing purchasing decisions. This view is, in fact, an obstacle to investment in consumer-oriented programs by both government agencies and environmental groups. Even practitioners involved in green information provision express skepticism. For example, regarding to extent to which green concerns affect purchasing, one expert noted that, even though such hopes have been expressed for many years, "We're still waiting for this great wave of purchasing changes around values and desires to make the world a better place."⁴⁶

Nevertheless, businesses involved in marketing of products associated with environmental concerns take the issue of customer environmental values seriously. For example, a marketing manager involved with a hybrid car program noted that consumers broadly identified as concerned with healthy and sustainable lifestyle choices matched the profile of likely hybrid buyers.⁴⁷ The implication is that education and information about environmental performance should not be viewed as being directly persuasive in product choice, but rather as something to which automakers can tune their marketing strategies, potentially making green attributes something that they can "bring to the bank" as part of the multifaceted value considerations entailed in marketing any given product.

Likely Impacts and Evaluation

Strictly speaking, it will be difficult if not impossible to credit a car labeling program with net environmental benefits. Both fuel economy and emissions regulations are highly constraining of average market outcome⁴⁸ and it is average outcome that determines net environmental impacts. Under such constraints, for example, any increased sales of "greener" vehicles are likely to be offset by sales of less green vehicles, particularly for fuel economy. This fact does not imply that labeling is not worthwhile at all, but it does suggest that careful thought must be given to what a program can realistically accomplish. Developing appropriate ways to evaluate the impact of improved environmental information for automotive consumers is, in fact, a subject that warrants further investigation in its own right, given the complexities of the issue.

One rationale for a voluntary label is that automakers might find it valuable for promoting their products, resulting in a highly leveraged use of government resources. Models

⁴⁶ Joel Makower (author of *The Green Commuter* and principal of GreenBiz.com) as quoted in A. Cortese, "They Care About the World (and They Shop, Too)," *The New York Times*, July 20, 2003.

⁴⁷ Cortese, *supra*, discussing perspectives of a Ford Hybrid Escape marketing manager.

⁴⁸ With the advent of Tier 2, emissions regulations operate with fleet averaging (for NOx), as CAFE always has.

for such an outcome include EPA's Energy Star program and NHTSA's 5-star safety ratings, and as noted earlier, ORNL issued a report on Energy Star concepts for cars.⁴⁹ However, if industry decision making is the ultimate target of a program, then a key issue is the relationship of the labeling program to the regulatory standards already affecting industry.

Energy Star applies in markets regulated with non-"fleet"-averaged performance standards as well as in markets lacking energy consumption standards. Thus, each additional Energy Star product sold provides a net environmental benefit. The situation is similar for safety information in that NHTSA's 1-5 star crash ratings represent performance levels above the minimum standards that apply to all vehicles. Thus, that program has been effective in inducing automakers to voluntarily improve a number of aspects of safety performance to levels beyond the minimum required by law.

Given the existence of CAFE standards, such effects are not plausible, at least in terms of overall market outcome, for fuel economy. It could be argued that, even though fleet averaging might negate overall market benefits, a product recognition label will stimulate automakers to design "green leaders," even if mainly for corporate image reasons.⁵⁰ The result would then be greater adoption of improved technology or application of technology for higher fuel economy. Such an effect would be valuable to the extent that limitations on technology adoption are an important barrier to fuel economy improvement.

However, a close look at automotive market trends suggests that such an assumption may well be misdiagnosis of the problem. EPA has documented ongoing adoption of technologies capable of improving fuel economy even while new fleet average fuel economy has declined.⁵¹ The agency's analysis has shown that adoption of the same technology with different design priorities would have yielded higher fleet average fuel economy. Product design is, of course, tied to customer value. Therefore, if insufficient consumer appreciation is the main barrier, then greater attention should be given to eliciting consumer environmental values than to attempting to stimulate additional technology leaders.

⁴⁹ Greene et al. 2003, op. cit.

⁵⁰ Vehicles demonstrating technology-based fuel economy leadership have been available in the market in small numbers for many years. Hybrid cars are the current and more prominent examples, but earlier such products include Honda's Civic VX (1992-95) and HX (still in production).

⁵¹ Hellman, K.H., and Heavenrich, R.M. Light-Duty Automotive Technology and Fuel Economy Trends, 1975 through 2003. Report EPA 420R-03-006. Ann Arbor, MI: U.S. Environmental Protection Agency, Office of Transportation and Air Quality, Advanced Technology Division. April 2003.

CONCLUSIONS

The experience of attempting to forge a multi-stakeholder effort to advance social marketing for green vehicles revealed a number of challenges.

One is the traditional view that it is impossible to significantly impact environmental problems by modifying consumer behavior: in other words, even if such an effort reaches some consumers, its impacts on the market as a whole would be negligible. The implication is that public resources are better spent on technology R&D, financial incentives, or regulations, leaving consumer-oriented marketing to the industry itself, which is the only party having the skills and resources to accomplish it.

Another is the difficulty of moving proactively on an issue prior to the achievement of political consensus on how to address the issue. This hurdle may seem ironic in light of the prior challenge identified, but it has bearing because automakers themselves -- being acutely tuned to the nuances of a highly competitive market -- are wary of third-party actions that might influence how their products are perceived. Thus, given the lack of consensus for addressing greenhouse gas emissions and the prevalent industry view that raising fuel economy conflicts with more important customer needs that automakers must satisfy, maintaining the *status quo* is less risky for some of them than fostering programs that might change competitive positioning, even if only as a matter of corporate image.

A third problem is environmentalists' wariness of "halfway measures." For example, a program might not strictly reward environmental performance but nonetheless begin to build consumer awareness and yield more widespread use of environmental information in the car market. The fear is that such an imperfect system, designed in part to mitigate automakers' perceived risks, might actually do more harm than good and create a self-fulfilling prophecy about the ineffectiveness of consumer information strategies. Environmentalists may also evaluate a program according to whether they believe it will either enable or delay progress toward the traditional policy priority of regulation. This situation may result in interests that are difficult to reconcile with those of some automakers, who may support a consumer information or social marketing program only if it entails little or no regulatory jeopardy.

The experience also highlighted a number of issues that will need to be considered as any organization or institution attempts to pursue green vehicle marketing either individually or collectively. One is a well-known but easy to forget fundamental tenet of the current auto market: that consumers have a poor understanding of environmental factors in the context of their decision making. Moreover, to the extent they have concern, most consumers assign responsibility to government or industry rather than themselves. Another issue is the common perception that the best way to address automotive energy and environmental problems is with alternative fuels and technologies, resulting in a lesser appreciation for more accessible but incremental choices. Third, although some automakers see potential value in expanded public information and promotional programs, they do not need such programs to carry out their own product strategies. Moreover, not all firms are positioned the same way with respect to their customer base and environmental metrics; therefore, the risks of changing this aspect of how cars are evaluated may outweigh the small or nil benefit to their firm.

An area that has seemed to garner greater consensus is the desirability of educating the public about and creating greater recognition for advanced technologies such as hybrid-electric vehicles. Although there is disagreement on how to measure and recognize "greenness," there is more agreement that certain technologies should be promoted. This situation is consistent with the way that an updated and expanded federal tax credit program covering hybrid vehicles (among others) has come close to political approval. On the other hand, it is fair to raise doubt about the value of promoting technology *per se*, rather than actual environmental performance. Environmental outcomes depend on how technology is applied, but promotion of advanced technology vehicles rests on the premise that limitations of current technology are the main barrier that needs to be overcome. A closer look at the market indicates that this may be a serious misdiagnosis of the problem. Thus, focusing on supposed technology barriers will not be effective if the real barrier is lack of customer value in environmental performance.

This reflection on the GVMA and related undertakings also identified a major issue regarding the question that new or enhanced public programs should seek to answer for consumers. The question, "What cars are green?" turns out to be a loaded question, and it may not be productive (and could even be counterproductive) for a program to attempt to answer it. Market research has shown how consumers can understand simple information about what cars are green, such as star ratings and similar categorical indicators. However, if "What cars are green?" is the wrong question, a program will not be effective in its larger objectives just because its presentation is easily to comprehend. Thus, market research that demonstrates ease of understanding must not be used as a *post hoc* justification for more fundamental decisions about the approach to take. Rather, once the right approach is decided as a matter of information policy, market research can guide the design of ways to present the information so that it is easy for consumers to understand.

The richness, complexity, and ongoing flux of the car market, and the fact that the critical environmental factor of fuel economy trades off continuously and dynamically with so many functional attributes of vehicles, suggests that approaches to green vehicle information that may seem more minimal, in terms of degree of intervention, might in fact be more effective. An example would be an approach that restricts itself to providing education about why choices matter and offers an easy-to-use yardstick with which interested consumers can evaluate vehicles. This issue closely related to another one, namely, how to circumscribe the role of government. While a clear need exists to address the informational market failure around cars and the environment, the existence of a sophisticated automotive information business that mediates the market suggests that government agencies should avoid recommending specific products, leaving that role to private sector intermediaries who do it for a living.

Table 1. Green Vehicle Market Alliance Meetings Matrix

Organization	June 2000 Knoxville	Dec. 2000 Washington	March 2001 Davis, Calif.	Dec. 2001 Ann Arbor	Jan. 2003 Washington
ACEEE	x	x	x	x	x
California Air Resources Board	x	x	x		x
California Energy Commission	x	x	x	x	
City and County of Denver, CO		x			
Consumers Union	x	x			
County of Washtenaw, Michigan	x	x	x	x	
Electric Vehicle Assoc. of America		x			
Environmental Defense	x	x	x	x	x
Ford Motor Company	x	x	x	x	
Honda (American Honda Motor Co.)	x	x		x	
ICLEI			x		
National Automotive Dealers Association					x
National Renewable Energy Laboratory	x	x	x	x	
Natural Gas Vehicle Coalition		x			
Natural Resources Canada			x		
Natural Resources Council of Maine					x
Oak Ridge National Laboratory	x	x	x	x	x
State of Massachusetts	x	x	x		
Tellus Institute	x	x	x		
Toyota Motor Sales, U.S.A.	x	x			
U.S. Department of Energy	x	x	x	x	x
U.S. Department of Transportation		x	x	x	x
U.S. Environmental Protection Agency	x	x	x	x	x
University of California - Davis	x	x	x		
University of Tennessee	x	x	x		