

A Message from the Renewable Energy Policy Project

Renewable energy advocates have long argued that, given a choice, Americans prefer renewables to conventional alternatives such as nuclear and fossil fuels. The following REPP Issue Brief, *Energy and the Environment: The Public View*, by Dr. Barbara Farhar of the National Renewable Energy Laboratory (NREL), reviews twenty-three years of polling data justifying this widely-shared belief. Dr. Farhar's analysis reveals broad favor for renewable energy across society, and demonstrates that support has remained high even as energy prices have dropped and memories of the 1970s energy crisis fade.

REPP finds Dr. Farhar's work encouraging and timely for several reasons. First, it brings to an important election year a message of lasting concern over environmental issues. This non-partisan concern is often backed by a willingness to vote pro-renewables and pro-environment. Dr. Farhar argues that Americans are beginning to recognize the link between energy use and environmental degradation. Yet, many lawmakers fail to appreciate that most voters perceive attacks on renewable energy as anti-environment. Dr. Farhar's paper should alert policymakers to links among environment, energy and voter preference.

Second, Dr. Farhar's analysis sounds a wake-up call to the renewable energy community. Renewable energy advocates have devoted considerable energy to constructing political coalitions and crafting policies. These activities will remain important. However, as the American energy sector progressively deregulates, the renewable energy community will need to devote increasing effort to building markets.

The restructuring of the electric system will allow the renewable energy industry to tap directly the public support Dr. Farhar documents. But, to secure market share, renewable energy entrepreneurs must quickly develop the sophisticated and aggressive marketing tools common to competitive markets. This will require more detailed knowledge about how consumers think about energy and about less palatable topics, such as the environmental impact of renewables themselves. Dr. Farhar's paper constitutes an important early step in this market maturation process.

Finally, Dr. Farhar's review provides insight into the sources, strengths and limitations of polling data, and the institution of polling itself. In coming years, numerous interests armed with apparently convincing data will claim to represent public sentiment concerning energy. Awareness of the context and methods of data collection will aid the renewable energy community in understanding and, when necessary, rebuffing such claims.

REPP is pleased to bring this work to the attention of the policy and renewable energy communities. We thank Dr. Farhar for her extensive work in preparing this paper and Susan Conbere, REPP's Managing Editor, for her editorial comments.

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Energy and the Environment: The Public View

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Introduction

Several analysts of U.S. environmental values have concluded that the environment is a consensual populist issue. Support for the environment unites blocs of voters—liberals and conservatives, Democrats and Republicans.² Growing percentages of the population believe that environmental problems are "serious, worsening, and increasingly threatening to human well-being."³ Public support for government intervention to protect the environment has increased for several years and remains high. Typically among environmental policy options, only restrictions on the use of automobiles fail to receive majority support in public opinion polls.⁴

Environmental well-being is profoundly affected by energy production and consumption. In answers to survey questions over the past eighteen years,⁵ increasing majorities of the public have chosen renewable energy and energy efficiency over other energy alternatives.⁶ This Issue Brief presents evidence that these two trends—increasing environmental concern and majority preference for renewable energy and energy efficiency—are linked. Poll data show that the public is not simply paying lip service to environmental protection. The polls suggest that the public wants a broad national agenda of sustainable development, and it wants energy efficiency and renewable energy institutionalized as a greater part of the nation's energy mix.

The information in this Brief may help guide local, state and federal legislators; utility companies and regulators; environmental organizations; and renewables and energy efficiency industries in responding to public preferences on energy and the environment.

Methods

This paper synthesizes data from more than 700 polls between 1973 and 1996 that indicate

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²Cambridge Energy Research Associates/Opinion Dynamics. June 1992. *Fueling the Race for the Presidency*. Cambridge, MA; Dunlap, R.E. 1991a. "Public Opinion in the 1980s: Clear Consensus, Ambiguous Commitment." *Environment* 33: 12; Dunlap 1991b. "Trends in Public Opinion toward Environmental Issues." *Soc. Nat. Res.* 4: 285-312; Dunlap, R.E., and R. Scarce. 1991. "Trends: Environmental Problems and Protection." *Public Opinion Quarterly* 55:651-672.

³Dunlap and Scarce 1991, p. 655.

⁴Dunlap 1991a, p. 34; Farhar, B.C. 1993. *Trends in Public Perceptions and Preferences on Energy and Environmental Policy*. NREL/TP-461-4857, Golden, CO: National Renewable Energy Laboratory, 376 pp. See especially chapters 9 and 10.

⁵1979-1996, when questions comparing preferences among energy alternatives were asked.

⁶Because environmental concern and preferences for efficiency and renewables are so widespread and empirical findings on demographics are mixed, no clear empirical patterns associate preferences for these energy alternatives with demographic variables such as age, income, education, or political orientation.

longstanding trends and patterns in public perceptions about energy and the environment.⁷ Trends shown are based on questions repeated verbatim at various intervals, using identically drawn probability samples of U.S. adults, voters, or electricity customers. Patterns are identified by grouping together questions on the same or similar topics with different wording. In a probability sample, each member of the population has an equal chance of being selected. Between 1980 and 1987, major polling organizations asked many fewer questions than they had previously about energy efficiency,⁸ renewable energy, and environmental concerns. This apparent lack of pollster interest may have reflected the priorities of the Reagan administration, low gasoline prices, and stable utility bills. However, beginning in the late 1980s, national polls once again included questions about energy and the environment.

Why Perceptions Are Important

Perceptions are important because what people believe to be real is real in its consequences. **What people perceive to be real is real in its consequences.** Perceptions and preferences are themselves facts that describe the social world in which we operate. Perceptions and preferences about energy and the environment are influenced by objectively factual information—and sometimes by the lack of it—on matters such as the percentages of U.S. electricity generated by coal, nuclear energy, oil, hydropower, and natural gas; energy prices; oil company and utility profits; and energy-related events like the OPEC oil embargo, Three Mile Island, Chernobyl, Valdez, and the Gulf War.

Increased Environmental Concern

The available poll data cover an array of environmental topics, problems, and responses. These include the level of environmental concern, the nature of environmental problems that were defined as important, and the way people respond when asked to choose between the environment and other important values. Figure 1 shows data in response to the question: "How would you rate the overall quality of the environment compared to how it was 5 years ago?" In 1983, about 37% said it was better and 34% said it was worse; opinion was polarized. By 1988, opinion began to diverge. By 1990, a majority believed that the environment was getting worse. Although by 1994 the perception that environmental quality has improved increased slightly, a plurality of 40% still believed the quality of the environment was worse than it had been 5 years ago; 36% believed it was better, similar to the period before 1987. Almost one in five believed that environmental quality remained about the same.

The 1994 data show an ongoing preference for maintaining or increasing environmental regulation. More than 80% took this position when asked: "At the present time, do you think environmental protection law and regulations have gone too far, not far enough, or have struck the right balance?"

⁷Farhar, B.C., P. Weis, C.T. Unseld, and B. Burns. 1979. *Public Opinion About Energy: A Literature Review*. SERI/TR-53-155, Golden, CO: Solar Energy Research Institute, 450 pp.; Farhar, B.C., C.T. Unseld, R. Vories, and R. Crews. 1980. "Public Opinion about Energy." *Annual Review of Energy and the Environment* 5: 141-72.; Farhar 1993; Farhar, B.C. 1994a. "Trends: Public Opinion about Energy." *Public Opinion Quarterly*: 58, 603-632; Farhar, B.C. 1994b. "Trends in U.S. Public Perceptions and Preferences on Energy and Environmental Policy." *Annual Review of Energy and the Environment* 19: 211-239; Dunlap 1991a, b. See citations in these publications for many other sources.

⁸The term "energy efficiency" is used broadly to include getting more work from a given unit of energy or using less energy to provide energy services through both lifestyle changes and investments in technology improvements.

(Figure 2)⁹ In 1994, a plurality of 47% said that environmental regulation has not gone far enough, a slight decrease since 1990. About one-third said environmental regulation has struck about the right balance, up 8 points since 1990. The percentage saying that environmental regulation has gone too far—around 12%—was almost the same as in 1990.

Figure 3 shows a striking difference in opinion between 1973 and 1990. In the 1970s, opinion was polarized when a trade-off was posed between adequate energy and environmental protection. About 35% were on each side of the question in 1973, and opinion hovered around that point until 1981. Then, the lines began to diverge and majorities began to express concern for the environment. However, only about one in five expressed concern for adequate energy by 1990. Again, note the seven-year gap in data; this item had not been repeated as of mid-1995.

Concern for the environment remains strong. In July 1996, a majority of voters said that protecting the environment would be important in determining their votes in the 1996 presidential election.¹⁰

Preferred Energy Alternatives

Given majority concern for the environment, which energy alternatives does the public prefer? The most convincing responses to poll questions are on the entire range of energy options, including efficiency, renewables, fossil fuels, and nuclear power. Majorities prefer renewable energy and energy efficiency over other alternatives when cost or price data are not mentioned. This trend has been borne out in some eighteen years of poll data dating back to 1979. Several

questions asked whether energy policy should emphasize meeting energy needs by increasing supply or decreasing demand. Consistently, majorities chose demand reduction first.¹¹

But, when renewables were included as an energy option (Table 1), energy supply based on renewables is more popular than energy efficiency. One survey asked: "In order to help provide for the country's overall need for energy in the future, which do you think should be emphasized most?" A majority of 59% selected renewable energy; 25% energy efficiency; and 11% oil, gas, and coal.

Eleven times between 1979 and 1993, a Roper poll asked: "Which of these energy sources do you think are realistically possible to use for

Between 1989 and 1993, the Gulf War occurred, publicity about global warming increased, a growing number of scientists agreed that burning of fossil fuels was contributing to the greenhouse effect, and public controversy over the siting radioactive waste continued. During these years, percentages selecting renewable energy sources increased and percentages selecting nuclear energy, coal, offshore oil, and oil shale decreased.

⁹Notice the pairs of vertical lines toward the right of the figure. These show a 7-year gap during which Roper did not include this question in its omnibus surveys. No record exists of opinion between 1987 and 1989. Instead, we suddenly see that opinion, which had been somewhat evenly divided, diverged dramatically in the direction of preference for increased environmental regulation. As noted, the 7-year period roughly coincided with the Reagan administration and a period of relatively stable energy prices.

¹⁰Peter D. Hart Research Associates and Research/Strategy/Management 1996.

¹¹Farhar 1993.

replacing foreign oil during the next five years?¹² Figure 4 shows the results for the latest two times the question was asked, in 1989 and 1993. During these four years, the Gulf War occurred, publicity about global warming increased, a growing number of scientists agreed that burning fossil fuels was contributing to the greenhouse effect, and public controversy continued over the siting of radioactive waste. These events could have affected changes in preferences for energy alternatives during these years. Most notably, percentages selecting renewable energy sources (solar, wind, hydro, and ocean tides) increased, and percentages selecting nuclear energy, coal, offshore oil, and oil shale decreased.

Because nuclear energy could be perceived as a non-greenhouse gas-producing energy source, this Issue Brief documents data on the nuclear alternative. Figure 5 illustrates the general pattern of responses to questions about building more nuclear power plants in the United States. After the Three Mile Island nuclear accident in April 1979, increasing percentages opposed building more nuclear power plants. However, when people were asked about continuing to use nuclear plants that were already constructed, majorities were favorable. Because it produces no greenhouse gases, nuclear's role in the nation's energy mix remains to be seen. Public opinion on nuclear energy also could change in the future.

Because the 104th Congress dramatically changed budget priorities on energy, many wondered whether majorities still preferred energy efficiency and renewable energy after the 1994 election. The data show a continued preference for efficiency and renewables. In December 1995, Republican pollster Vincent Breglio of Research/Strategy/Management asked which of DOE's R&D programs should receive the highest funding priority (Table 2). The data show that a plurality of 34% selected renewable energy, followed by 21% selecting energy efficiency. In contrast, 9% selected nuclear energy.

The Breglio survey also asked which programs should be subject to funding cuts first in federal deficit reduction planning. Table 2 shows that 30% said funding for nuclear power should be cut first; 14% said funding for renewables, and 4% said funding for energy efficiency. These results are consistent with long-standing preferences among energy alternatives. Respondents favoring efficiency and renewables were slightly more likely to say that their energy preferences would influence their congressional voting decisions than were those favoring nuclear energy or coal (Figure 6).

In summary, the pattern of preferences for using energy efficiency to decrease demand and renewables to supply energy has been consistent in the poll data for at least the past eighteen years. This is one of the strongest patterns identified in the entire data set on energy and the environment.

The Link Between Energy Preferences and Environmental Concern

¹²The question's premise is flawed. Solar, wind, hydro, and nuclear are sources of electricity, and only 4% of electricity comes from oil. To what extent can these energy sources actually replace foreign oil? The use of this question's wording, and the public response to it, demonstrate a lack of "systems thinking" about energy.

The poll data show increased concern for the environment and a consistent majority preference for renewables and efficiency. Are these two trends causally related? This paper argues that they are and presents supporting poll data that approach the question in different ways.

A 1990 survey asked people what they thought was the single most important environmental problem facing the country (Table 3). Respondents had to volunteer their own answers rather than select from a list, making the results even more persuasive. At least half of the top concerns respondents identified were energy related, such as air pollution, the greenhouse effect, oil spills, acid rain, and car pollution; whether respondents realized they were energy-related is another question. A 1993 survey asked whether respondents agreed with the statement that every time we use coal or oil or gas, we contribute to the greenhouse effect (Table 4). Nearly two-thirds said that was "probably" or "definitely true," showing awareness of a connection between energy cause and environmental effect.

In 1990, Cambridge Reports asked a national probability sample of electricity customers to rank "several energy sources that are used to generate electricity" from 1 to 7, in which 1 meant "no environmental threat" and 7 meant "a large environmental threat" (Figure 7). Solar was perceived as least risky, followed by hydropower and natural gas. Oil, solid waste incineration, coal, and nuclear power, respectively, were perceived as the most environmentally risky sources.

A 1993 survey asked respondents to select one energy source from a list that included solar, hydro, natural gas, oil and gasoline, nuclear, and coal (Table 5). Fifty-five percent responded that solar was "best for the environment." In fact, pluralities selected solar energy as "safest," "most abundant," "least expensive,"¹³ "best for the U.S. economy," and "most positive for you." Pluralities also responded that solar energy "makes the United States most self-reliant" and "will play an increasing role in the 21st century." These responses parallel the responses on preferred energy alternatives, suggesting that environmental concern is not the only reason people prefer energy efficiency and renewable energy. These and other data show directly or imply that the public is beginning to connect energy production and use with damage to the environment.

Willingness to Pay for Energy Efficiency and Renewable Energy

People say they care a great deal about the environment and they are beginning to see that energy choices are linked with environmental degradation, but are they willing to put their money where their mouths are? Poll responses on willingness to pay (WTP) indicate attitudes toward environmental protection. Many surveys attempted to go beyond "motherhood" responses to the idea of a clean environment by asking respondents to consider out-of-pocket dollar cost. To protect and improve the environment, majorities in most surveys indicated a willingness to pay more for taxes, gasoline, electricity, other fuels, and automobiles. One survey even found a majority (63%) "willing to accept a lower standard of living if it meant a cleaner environment."¹⁴ Most questions focused on institutional rather than behavioral responses to environmental

¹³The perception on the part of respondents who said that solar energy is least expensive (32%) may be based on the notion that the sun is a free source of energy.

¹⁴Farhar 1994b, p. 218ff.

protection: they addressed WTP for actions by government, the oil industry, utility companies, and automobile manufacturers.¹⁵

To summarize, approximately 56% to 80% of respondents to recent national surveys say they would pay a premium for environmental protection or renewable electricity. However, a clear distinction should be drawn between results from national opinion polls and local-area market research findings. The national poll data should be interpreted as a long-standing favorable predisposition toward renewables and an indication of potential markets. National evidence suggests that customers will notice and favor environmentally friendly electricity generation, whether they themselves participate in such programs. However, the specific percentages actually willing to participate in a given utility service territory should be defined by local-area market research and experience.

Taxes

Despite the various ways that questions were worded, majorities of 59% to 78% in recent surveys responded that they were willing to pay more taxes to protect the environment. Because use of the word "taxes" in a question almost always evokes a negative response, these positive responses toward the environment are even more remarkable. For example, a 1990 poll queried whether respondents would be willing to pay 15% more in taxes each year to significantly reduce air and water pollution. A majority, 61%, said they would be willing to pay that much, while 32% said they would not; 7% didn't know. A 1970 question repeated in 1990 asked: "Would you be willing to raise your taxes in order to control pollution/improve the environment?" In 1990, two-thirds of the sample said they were willing to pay more taxes, an increase of 15 points in 20 years. The percentage saying they were unwilling declined from 34% in 1970 to 29% in 1990. Those unsure decreased from 12% to 2% in the 20 years.¹⁶

In 1992, Cambridge Energy Research Associates asked respondents how willing they would be to pay an extra \$50 in taxes to solve listed environmental problems (Table 6). Relatively large percentages said they would pay more taxes: 47% said they would "definitely" pay more for developing solar and wind power; another 24% said they "might" be willing. Similar percentages said they would be willing to pay more for energy conservation measures. However, the question did not specify the type of tax or how often it would be collected.

Prices

In 1993 and 1994, the National Opinion Research Center asked respondents how willing they would be to pay "much higher prices in order to protect the environment" (Table 7). In 1993, a majority of 53% said they were willing; 22% said they were not. The majority of "willing"

¹⁵Two types of changes can help protect and improve the environment: (1) lifestyle (or behavioral) changes and (2) institutional changes. Individuals can change daily habits and invest in energy efficiency improvements in homes and transportation. These behavioral changes can extend to market and voting behavior when people understand what to do, have some action available within their normal choices, and are not blocked by institutional barriers (Kempton, Willett. 1993. "Will public environmental concern lead to action on global warming?" *Annual Review of Energy and the Environment* 18:217-45.) The newest policy and program initiatives stress institutional rather than lifestyle changes. These include, for example, energy efficiency financing by the mortgage industry and utility green-pricing programs.

¹⁶Farhar 1994a, p. 218.

respondents slipped by 7 points to a plurality of 46% in 1994, while those unwilling increased by 4 points to 26%.

Renewable Electricity

In 1990 and again in 1994, Cambridge Reports asked: "How much would you personally be willing to spend each month to have your electricity come from sources that are less harmful to the environment?" (Table 8) Because the first response code was zero to \$5, we cannot discern how many said "Nothing more." Nevertheless, 60% said in 1994 that they would be willing to pay more than \$6/month more than they currently were paying for environmentally benign electricity. However, this percentage was down 16 points from 1990.

Still, stated WTP for renewable electricity seems widespread. In his post-1994 election survey, Breglio asked respondents whether, if given a choice between a utility company using coal to generate electricity and one using "cleaner, but slightly more expensive renewables," they would pay more for electricity generated from renewables (Table 9). More than three-quarters said they would pay something more for renewable electricity; the amount selected most frequently was "up to 5% per month."

Local-area Surveys

Results from two local-area surveys are another indicator of the public's WTP for renewable energy. In 1995, the Sacramento Municipal Utility District (SMUD) asked its customer groups about their willingness to pay a percentage premium for SMUD to invest in renewable resources. Table 10 shows that 43% of residential customers and 38% of business customers said they would pay 5% more. In total, 93% of SMUD's residential customers and 71% of its business customers (but only 8% of industrial customers) said they would pay more for renewable electricity.

In early 1996, Central Power and Light Company of Corpus Christi, Texas, sponsored a "Deliberative Poll™" of a probability sample of 265 participants drawn from its 600,000 customers. The participants met for a weekend to determine how opinion on specific energy issues might change if people learned more about the issues,¹⁷ and discussed ways to meet the increasing demand for electricity in the future. Participants were polled before and after the meeting. Before the meeting, 67% of participants said they wanted to meet future electricity needs solely with renewable energy, assuming all choices cost the same. During the meeting, participants were told that renewables would cost more than other choices. After the meeting, preferences for using renewable energy as a first choice dropped from 67% to 16%; however, residential customers were willing to pay an additional \$5.60/month on average for renewable electricity. Customer preferences for energy efficiency programs and fossil fuel plant options increased significantly after deliberation. After participating in the Deliberative Poll™, customers wanted energy efficiency programs as a first course of action and renewable energy as a part of the energy resource mix. They also said they were willing to pay extra for renewable electricity.

¹⁷"CPL's Deliberative Poll Results Show Customer Preference for Mix of Options to Meet Future Energy Needs." Central Power and Light Company News Release, Corpus Christi, TX, June 6, 1996.

West Texas Utilities and Southwestern Electric Power Company conducted similar polls with probability samples of their electric customers in August and September 1996.¹⁸ Each poll showed that, prior to deliberation, customers preferred renewable energy first (by 67% and 75%, respectively). Post-deliberation support for renewables as first choice dropped to 28% in one poll and to 35% in the other. However, the average monthly premiums the participants said they were willing to pay for renewables was \$6.44 and \$7.83, respectively.

What People Say and What They Do: The Example of Green-Pricing Programs

Utilities, in an increasingly competitive environment, are becoming interested in exploring the potential for green-pricing programs to build customer satisfaction and loyalty, even among those not directly participating in these programs. Utilities offering green-pricing programs can claim a competitive advantage; improve their images with customers, regulators, and public interest groups; offer products and services that customers want; prevent environmental pollution; and use market, rather than government, solutions to achieve goals the public wants. Some 24 utility companies have attempted to assess the market for green-pricing programs.¹⁹

The green-pricing concept is based on the notion that premiums and contributions are needed for renewable electricity generation because, at least in the short run, the market cost of generating electricity from renewables is higher than the market cost of generating electricity from fuels such as coal and natural gas. Green-pricing programs give customers the option of purchasing renewable energy at a higher price. Customers pay a monthly premium for a specific product or contribute more on their utility bills so that their utility companies can purchase renewables for electricity generation in the future.

Green-pricing programs provide one of the few opportunities to analyze WTP for actual renewables products. Local-area utility market research has shown various percentages of customers, ranging from 10% to 90%, who say they are willing to pay a premium for renewable electricity. Although some differences between national and local samples should be expected, the local-area results contrast sharply with consistent results from national probability samples, in which majorities of 56% to 80% usually express WTP for renewable electricity. At first glance, utility market research results may be troubling to renewable energy advocates. However, a closer look at utility market research on WTP reveals some problems in assessing the results:

- (1) Because such data are considered proprietary, the questions used and the actual range of responses are rarely published. Instead, interpretations are published. The scientific quality of the research and the interpretations is impossible to assess because the publications describing the findings do not undergo rigorous peer review. In addition, the data are not accumulating into a shared body of knowledge.

¹⁸Rabago, Karl R. "Deliberative Poll Shows Ark-La-Tex Residents Want Clean Energy." Environmental Defense Fund, Austin, TX, September 3, 1996 ; and Rabago, Karl R.. "Deliberative Poll Shows West Texans Want Clean Energy Future." Environmental Defense Fund, Austin, TX, August 16, 1996.

¹⁹Farhar, B.C. and A.H. Houston. September 1996. *Willingness to Pay for Electricity from Renewable Energy*. NREL/TP-461-20813, Golden, CO: National Renewable Energy Laboratory, 23 pp.

- (2) Sometimes the interpretations published generalize inappropriately to populations of electricity customers. For example, market researchers occasionally have generalized from percentages of focus-group participants expressing an opinion to the service-area population.
- (3) Often, sampling procedures are not described; therefore, no information exists on sampling criteria and sampling frames used. The generalizability of the findings cannot be assessed. Some writers have reported that they included only "green customers" in the study, but they then generalized results to the population of electricity customers in the utility's service territory. Such generalizations are inappropriate. The entire range of customers should be included in utility market research, not simply members of environmental organizations.
- (4) Programs described to respondents in market research may be actual or hypothetical; because questions asked are not reported, responses cannot be gauged.
- (5) Programs described to customers may be designed more to meet the utility company's needs than those of customers. If a low proportion of customers participate in a program, it may not mean that customers are unwilling to pay for renewable electricity, but that the program offered is not designed to meet customers' needs.
- (6) Question phrasing is often a problem. For example, asking respondents, "Are you willing to pay more for electricity generated from renewable sources such as solar and wind power?" is different from asking them, "Will you pay \$5/month more on your utility bill each month for one year so that XYZ utility can generate electricity from a small wind farm located 5 miles east of [city name]?"
- (7) Utility market research may be missing key motivators for participation. For example, environmental concern is an important element of WTP, but other factors such as health and safety, technology interest, and status and prestige can also motivate participation.

Utility market surveys also find that at the inception of a green-pricing program, fewer than 10% (and often only 1% to 2%) initially sign up. Several reasons may explain the difference between expressed WTP in utility market research and actual participation at the initial offering of a green-pricing program. Some hypotheses are that utilities may not

- (1) define an environmental or regulatory reason for the program or product presented;
- (2) state how the product relates to a problem or need customers care about;
- (3) define specifically a financial amount requested and how it would be used;
- (4) define the length of the customer's commitment; or
- (5) offer incentives for participation (such as fixed electric rates).

Also, customers may not understand green-pricing programs and concepts; the technologies involved and their costs, performance, and impacts; or the difference between rate-based and voluntary programs and its implications for utility green-product pricing. Customers' level of trust in their utility might interfere with their WTP. Customers may respond better to programs offered by municipal utilities than by investor-owned utilities or even to non-utility suppliers with a reputation for environmental stewardship (e.g., Working Assets).

Program features as well influence customer response. Customers are more likely to participate the more they perceive green-pricing programs as being

- (1) effective in actually producing clean electricity;
- (2) advantageous through paying relatively small amounts for value-added, avoiding resource depletion, planning for the future, or receiving a return (as in net metering);
- (3) reducing individual risk by keeping utility rates stable for long periods and customer ability to cancel, renew, or transfer participation; and

(4) easy to understand.

Finally, innovative programs and products almost never achieve high participation rates at their initial entry into markets. It may take longer for green-pricing programs to mature and penetrate the market than originally expected, but such an outcome would be consistent with a massive body of research on the diffusion of innovations.

The problems in utility market research have limited its usefulness in green-pricing program design. Effective design depends on use of high-quality market assessments in local utility service areas, and sophisticated understanding and use of new product introduction processes.

Summary and Conclusions

The national poll data show a marked increase in **What Americans think about energy and the concern about the environment since 1981,** environment means opportunities for industry although people are beginning to see progress in **and government to develop products, services, environmental protection and improvement.** programs and policies that customers and Environmental concerns are beginning to affect **taxpayers want.** energy choices. Energy production and **consumption appear to drive air pollution, acid rain, and global warming.** Although energy is not a highly salient public issue today, it could quickly become more prominent if oil supply disruptions or multi-state electricity outages, such as recent blackouts in the West, recur.

Because the public has exhibited strong and consistent preferences for energy efficiency and renewable energy for the past eighteen years, these energy alternatives are becoming more important to the private sector and public policymakers. Efficiency and renewables are widely perceived as environmentally advantageous, particularly when compared with conventional energy sources such as coal and nuclear power. **What Americans think about energy and the environment means opportunities for industry and government to develop products, services, programs, and policies that customers and taxpayers want.**

The public wants renewables and efficiency to be institutionalized—that is, to be built into the energy mix. Since the OPEC oil embargo, people have often been admonished to change their lifestyles and invest substantially in efficiency and renewables, yet without adequate business services to help them do so. Customers cannot choose efficiency and renewables when these choices are unavailable to them; customers also they do not want to bear all the risks of change themselves. They need organizations to stand behind efficiency and renewables, providing credible products and creative financing. When renewables and efficiency become a routine part of everyday business practice—the way the use of coal and nuclear energy are today—people will find them a customary part of their everyday lives.