

INTRODUCTION

Since the first three utility green pricing programs were initiated in late 1993, about 40 utilities have launched or have announced plans for programs that offer an alternative “green”—or environmentally friendly—power product choice to their franchise customers. About a dozen green power marketers also are operating in competitive markets, including several that offer multiple products. Regulated markets will continue indefinitely in some states, while others will experience a transition to competitive markets with retail customer choice of both product and provider. Regardless of which situation prevails in any given state, there will be an increasing array of opportunities for markets to support green power resources.¹

To tap the market for green power, market research has sought to help understand green consumers—who they are, what are their motivations, and what is their willingness to pay more for environmentally preferred products. In addition, experience with green power marketing and consumer response provides insights into the potential demand for green power.

This report summarizes what is currently known about green power consumers and explores how to turn the market opportunity into reality. Specifically, this report:

- Estimates the existing and potential market penetration of green power.
- Identifies the characteristics of green power consumers.
- Summarizes consumer perceptions of and preferences for different energy resources.
- Discusses ways in which green power marketing can be strengthened by market assurance mechanisms.
- Explores how marketers can reach green power consumers.

A companion report explores green power marketing from the supply aspect. It examines how wind marketers can add value to electricity products, thereby making them more appealing to consumers.²

CONSUMER INTEREST IN GREEN POWER

Insights into consumer attitudes and behavior toward green power are available from a wealth of market research, growing green power marketing experience, and an understanding of the product innovation and diffusion process.

Summary of Market Research

A review of market research and literature on environmental consumerism reveals that interest in green power is broad and that consumer support for environmental improvement cuts across demographic profiles. It is critical to remember, however, that most of this market research provides information about consumer *attitudes*, and says little about actual *behavior*. This distinction must be kept in mind when interpreting the results. Nevertheless, using a variety of methodologies, this research makes clear the existence of a potentially substantial market for green electricity. Only a few of the most prominent examples can be cited here.

- National probability samples show consistently strong support for energy choices and policies that improve environmental quality. The National Renewable Energy Laboratory, in a voluminous and exhaustive review of nearly 20 years of opinion polling (more than 600 surveys), concluded that 56 percent to 80 percent of American voters say they are willing to pay more for environmental protection or for renewable electricity.¹
- The Edison Electric Institute sponsored research in 1993, based on a national sample, which found that 60 percent of households say they would pay \$6 or more per month for electricity sources that are less harmful to the environment. Forty percent would pay more than \$11 per month, and 22 percent of respondents would pay \$21 more per month.²
- The Sustainable Energy Budget Coalition sponsored national research that found that 75 percent of voters would pay up to 2 percent more for electricity from renewable energy sources. Fifty-two percent said they would pay up to 5 percent more, and 26 percent said they would pay more than 5 percent. Most of the last group (19 percent) indicated they would pay up to a 10 percent premium.³
- Research by the Electric Power Research Institute in 1997 posed the willingness to pay question differently. This research assumed that, in near-term retail access markets, green power will be offered at today's prices, while non-green competitive products will be sold at a discount. Thus, the question is how much savings are consumers willing to *give up* for green power, instead of how much *more* are they willing to pay. The survey of 18,000 consumers found that 84 percent of all utility customers say they would choose green power and pay a 5

percent differential, while 76 percent would pay a 10 percent differential and 71 percent would pay a 15 percent differential.⁴

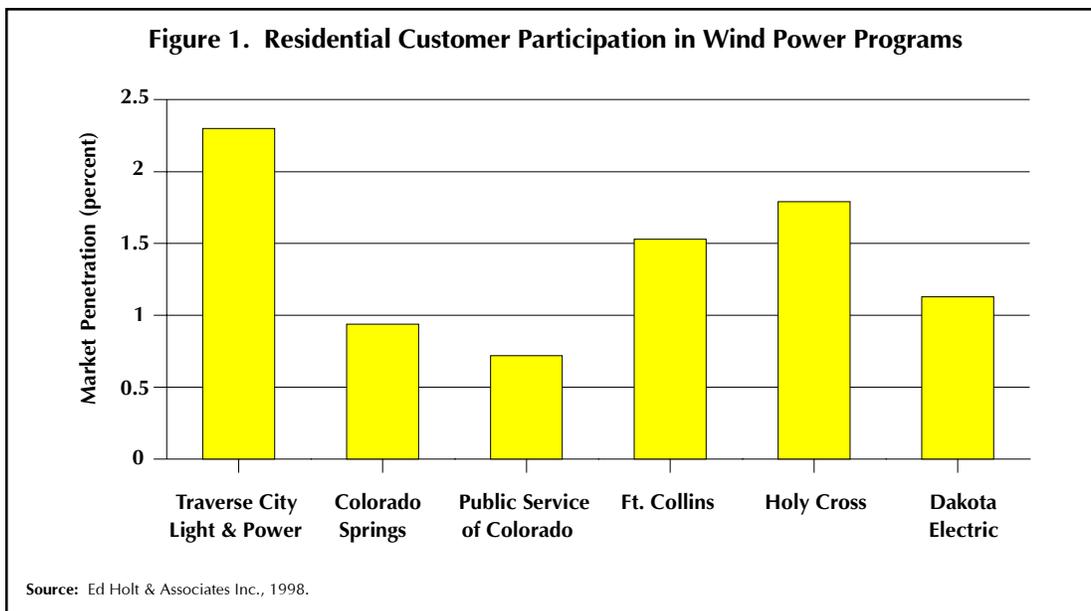
Most utility market research shows similar support for green power. But when consumers are asked to take action, as in market simulations or field tests, a few utilities have found lower levels of support. Public Service of Colorado, for example, asked customers who indicated a willingness to pay for a voluntary renewable program if they would like to receive a program registration card. About 75 percent requested the card but only 10 percent actually returned the signed form.⁵

Summary of Marketing Experience

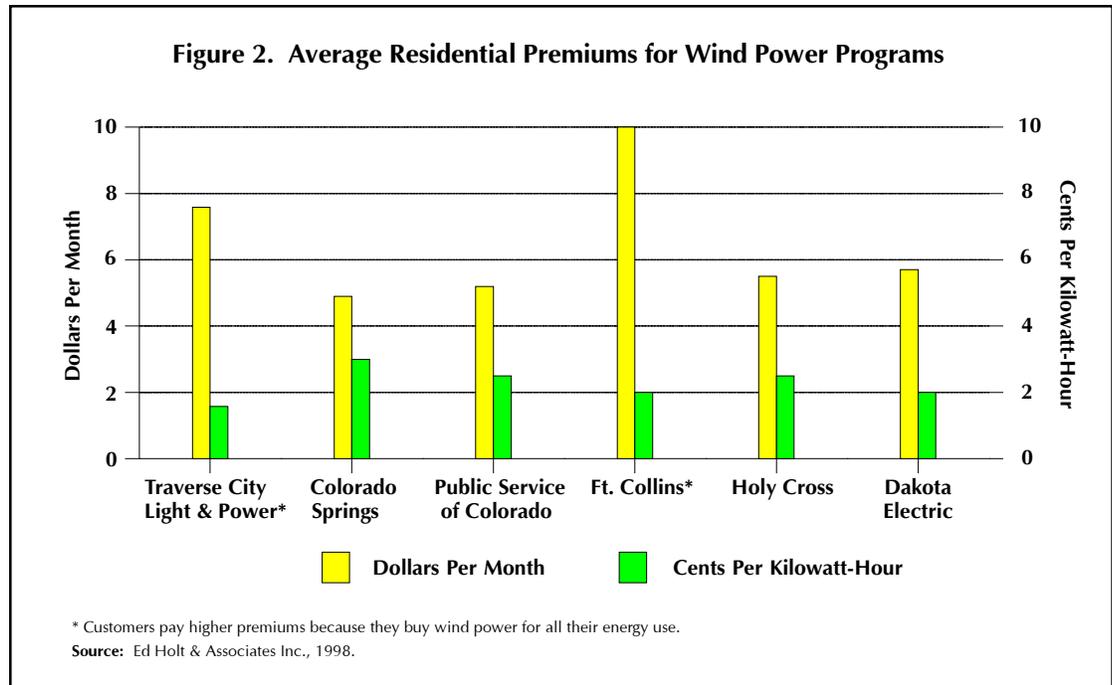
Although market research findings are consistently favorable to green power, marketing results generally have shown much lower levels of actual response to green power offerings. These results have varied somewhat according to differing market environments.

Utility Green Pricing

As of May 1998, roughly 45,000 residential customers are participating in utility green pricing programs across the country. Regulated utility programs have so far typically experienced participation of less than 1 percent to 2 percent of residential customers,⁶ levels that usually have been achieved in one to two years. Examples based on wind resources are shown in figure 1.



Residential participants in utility green pricing programs generally pay \$2.50 to \$10 per month extra, although the range is from \$.50 to \$50 depending on the program design. Not all programs charge a premium per kilowatt-hour (kWh) (for example, donation programs, capacity tariff programs and lease/finance programs for photovoltaic systems), but the energy tariff premiums range from less than 1 cent to 6 cents per kWh. Figure 2 shows the residential monthly premiums for the same wind programs, as well as the incremental cents per kWh charged for the wind energy.



The market for nonresidential customers is uncertain because there has been much less market research and because most green pricing programs have not yet targeted these customers. It is clear, however, that some nonresidential customers are interested in green power. About 1 percent of the approximately 7,000 customers buying wind power from Public Service Company of Colorado are commercial, industrial, institutional and government customers, but they represent 19 percent of the demand.⁷ Traverse City Light & Power enrolled about 25 small businesses, which represent 12 percent of the total participants and account for 38 percent of its 600 kilowatt (kW) wind turbine output.⁸ Even if the nonresidential market is small in terms of number of customers or market penetration, it can make important contributions to the development of green power.

Retail Access Pilot Programs

Results from some retail access pilot programs suggest higher levels of support for green power than in the utility green pricing experience, but still are not conclusive. In the New Hampshire and Massachusetts pilot programs, 20 percent to 30 percent of participants chose a green power option. These results must be viewed with caution, however, for several reasons.⁹

- Participants saved money regardless of which provider they chose because of the way the pilot programs were structured.
- The green power options were criticized for not being very “green,” because they consisted primarily of repackaged existing renewable energy sources and mostly image advertising.
- In Massachusetts, those who participated may have had a higher than average propensity to choose green power; that is, they chose to participate in the pilot program because they wanted the opportunity to buy green power.¹⁰ Nevertheless, participants in these two pilot programs did pay more—as much as 50 percent more—for the green power options than for the cheapest alternatives. Other pilot programs, such as in Pennsylvania, have seen no green power options at all. There are a variety of possible reasons for this, including few available renew-

able resources, lower expected levels of customer demand or greater opportunities in other states with full restructuring.

Full Retail Competition

California, Massachusetts and Rhode Island now are open for customer choice. California has attracted the most marketer interest, perhaps because it is the largest state market, because most essential market rules were known well before market opening, and because the market rules were acceptable to marketers. In California, 16 known electric service providers are planning to serve residential consumers, and the marketing activity is more significant than in other states. According to media interpretation, however, consumers have been slow to respond. Requests for direct access service by residential consumers totaled about 75,500 at the end of June 1998. After one year (April 1999), perhaps 1 percent to 3 percent of the 8.6 million households will have chosen a supplier, and a relatively high proportion (perhaps 30 to 50 percent) of the early residential switchers may choose a green power product.¹¹ The penetration of the eligible residential market after one year is likely to be similar to that of utility green pricing programs: 0.5 percent to 1 percent. About 25,000 currently have selected a green power provider.

Although this early experience in California is not predictive of the long term, it nevertheless provides a cursory look at one competitive market at an early stage. It appears that green power demand in California's market alone soon will overtake green pricing nationwide in the total number of customers served.

In contrast to California, very little residential marketing has occurred to date in Massachusetts and Rhode Island. According to several marketers, the competition market rules established by these states makes them less attractive prospects at this time. As of June 1998, only one marketer, AllEnergy, had launched a green power product in New England; no results can yet be reported.

Market Research vs. Actual Experience

Based on the above experience, far fewer customers actually are buying green power than say they will in surveys. There are many reasons for this, including the following.

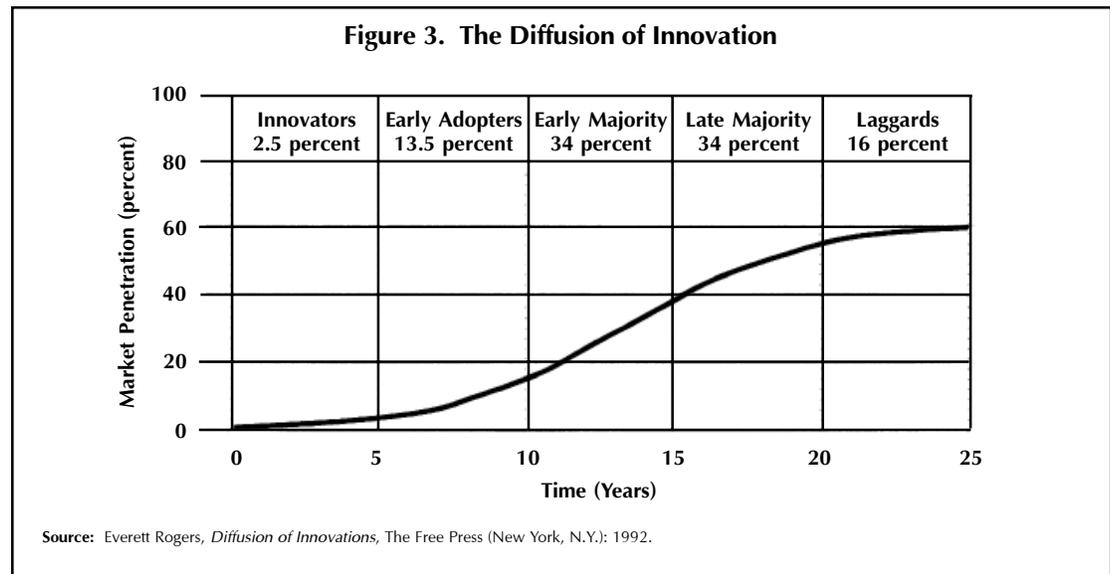
- Market research asks hypothetical, general questions about willingness to pay rather than offering a specific product, and does not require respondents to spend real money or to take action.
- Respondents may be inclined to give what they perceive to be socially responsible answers, also known as strategic bias.
- Some consumers may be disinclined to buy green power because they can share in the environmental benefits without paying the premium cost, also known as the free-rider effect.¹²
- Many utilities have not marketed their green pricing programs aggressively because they are not competing for customers. They also may need to minimize marketing costs either because these costs are large relative to green pricing revenue or because marketing costs are paid by nonparticipating ratepayers or shareholders.
- Many green pricing programs are experimental and customer participation has been limited by the size of the available resource, such as a photovoltaic system or one or two wind turbines.

- In competitive markets, consumers may hesitate to switch because of concerns about continued service reliability if they choose an intermittent resource or switch to a new provider.
- Default service that is offered at or below the market price of power also reinforces consumer inertia.
- Some green pricing programs or green power products may not be strong enough, or may lack sufficient credibility, to persuade consumers to participate.
- Consumers may consider the option for a long time before they decide to take action, and new product markets generally take time to develop.

The retail access pilot programs indicate mainstream interest in green power but may not be a reliable indicator of short term market response. The utility green pricing programs and the early returns from full retail access suggest niche markets for green power. Are these results indicative of the long term?

Understanding the Market Response

Forecasting future demand for green power based on early results from green pricing programs, retail access pilot programs, and states where there is full retail competition should be done with caution. Rogers characterizes product diffusion as a process in which a product passes from one stage to the next of its life cycle (product development, growth, maturity and decline) as the nature of the users of the product or service changes.¹³ The classic diffusion model suggests that product demand often follows the standard “S” curve, starting slowly, then proceeding through rapid growth before it tapers off (figure 3). The rate of product diffusion depends on many factors, but experience with other product markets suggests it often takes 10 years or more for new products to significantly penetrate a market.¹⁴



Green pricing programs that have been in place for a maximum of five years (with most programs operating for only two years or less) and results from retail competition that has only recently been introduced therefore provide only limited insight into the future of green power demand. It will

take some time for the green power market to develop. Thus, marketers, policymakers and advocates should not expect immediate, large-scale demand for green power, nor should they expect that the demand will remain static at the 1 percent to 2 percent of most utility green pricing programs. Unfortunately, there is no way to forecast demand with accuracy.

Green marketers themselves see a dynamic market. Both informal and formal surveys of green power marketers in the United States suggest that they expect to garner 0.5 percent to 2 percent of the residential market within one year after retail access is allowed, and 4 percent to 10 percent after five years.¹⁵

Estimates of market share for green power also are a function of the market rules and public policies established by each state.¹⁶ States that have with supportive renewable policies will make it possible to offer green power products that meet more consumer needs and interests, such as new renewables, a greater variety of resource development, and potentially lower prices. States that have no such support policies will be slower to develop a green power market.

Even more important are the basic rules that govern the functioning of the market. For example, default service that is offered at or below the market price of power (for consumers who do not choose to switch) will hamper competition and may be detrimental to the green power market. This could make it impossible for marketers to compete on price, and difficult for them to earn a profit, an explanation given by Enron Energy Services in its decision to stop marketing to residential consumers in California. It is also a factor cited by power marketers for the initial lack of competition in Massachusetts and Rhode Island. On the other hand, this may be why 11 of 16 marketers interested in California residential consumers are offering or soon plan to launch green power products. Green power may be one of the only products for which they can charge a premium and still win customers.

Necessary policy changes will take years, not months, to develop, and new product markets rarely open rapidly. Consequently, readers should be careful not to assume that experience from the early years will be indicative of long-term interest in green power. It will take patience, hard work and substantial resources to foster and expand the green power market.

PROFILING THE GREEN POWER CONSUMER

The size of the market is of perennial interest, but how to tap the market's potential is also of importance. This requires an understanding of green power consumers—who they are and how they can be reached.

Residential Consumers

In characterizing the residential green power market, the most important thing to remember is that it is not one market. It is diverse, with different consumer segments motivated by different attitudes and interests. At least three national studies have segmented the market with respect to the propensity to purchase green products. Although the first two are not specific to green power, they nevertheless offer important insights into the market.

- Roper Starch Worldwide conducts an annual Green Gauge, which is widely quoted. It characterizes U.S. households based on purchasing behavior across a variety of green products, and identifies five segments as of 1996: True Blue Greens (10 percent), Greenback Greens (5 percent), Sprouts (33 percent), Grouzers (15 percent) and Basic Browns (37 percent).¹
- The Hartman Report conducted a 1996 study that segmented the market for environmentally friendly foods produced by earth-friendly agriculture. It identified six segments consisting of True Naturals (7 percent), New Green Mainstream (23 percent), Young Recyclers (10 percent), Affluent Healers (12 percent), Unconcerned (18 percent) and Overwhelmed (30 percent).²
- In a study specific to green power, the Electric Power Research Institute identifies the following market segments: Radical Greens (4 percent), Alarmists (11 percent), Any Greens (11 percent), Parochials (10 percent), Bottom Liners (27 percent) and Don't Cares (37 percent).³ Table 1 summarizes the market segment labels and characteristics reported in this study.

Researchers can segment consumers in a variety of ways, depending on the number and type of questions asked, but these three studies are instructive because of similarities in the types of market segments found. In all three studies, the market is characterized by two or three core green segments: one hard core and small at around 5 percent to 10 percent, one relatively large (about 35 percent) latent green segment waiting to be tapped if presented with attractive choices, and perhaps another narrow market that could be interested if green products appealed to their special concerns—such as local community interests, supplier or product credibility, or near-term environmental issues such as health effects. These studies also suggest another two or three market segments: a large one (about 35 percent to 40 percent) that is plainly uninterested, and one or two

| Table 1. Market Segments and Characteristics Identified in EPRI Study | | | | | | |
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| | Radical Greens (4 percent) | Alarmists (11 percent) | Any Greens (11 percent) | Parochials (10 percent) | Bottom Liners (27 percent) | Don't Cares (37 percent) |
| Attitudes | <ul style="list-style-type: none"> • Passionate commitment to the environment • Technology important but must be controlled • Willing to defer gratification • Confidence in institutions • Sense of control over life • Independent | <ul style="list-style-type: none"> • Near-term fear about personal health and safety, not long-term fate of the earth • Anxious about dependence on dangerous substances • Skeptical about technology • Risk averse • Low sense of control over life | <ul style="list-style-type: none"> • Concerned but confused about environmental issues • High faith in technology • Will pay small premiums for green power if it is readily available and convenient | <ul style="list-style-type: none"> • Concerned about community effects—health, economy, traffic—rather than environmental issues per se | <ul style="list-style-type: none"> • Seek low cost, efficiency and productivity • Believe in technological solutions • Skeptical of institutions • Sense of control over life • Desire resource conservation, environmental safety and convenience | <ul style="list-style-type: none"> • Believe resource selection is someone else's problem • Don't oppose green power, but don't support it either • Wide variety of sources are acceptable • Will buy green power if it requires no effort or price premium |
| Green Power Interests | <ul style="list-style-type: none"> • Strict definition of green power—most renewables • Exclude nuclear, coal, waste-to-energy • Inconsistent on hydro and gas | <ul style="list-style-type: none"> • Resource exclusions (nuclear and fossil fuels) more important than inclusions (renewable energy) • Less tolerance for waste-to-energy and gas | <ul style="list-style-type: none"> • No strict definition of green power sources • Less positive re: renewables, less negative about other sources • Include hydro, waste-to-energy, gas | <ul style="list-style-type: none"> • Green energy accepted if no immediate negative effects on local community and provide for local economic development • Not in my backyard (NIMBY) may be a factor | <ul style="list-style-type: none"> • Skeptical of performance and adequacy of green power sources, which are also viewed as potentially expensive • Would buy green power at same or lower cost | <ul style="list-style-type: none"> • Don't care about energy sources unless there are gross impacts |
| Demographics | <p>More likely to be:</p> <ul style="list-style-type: none"> • Women • Homeowners • Older adults • Rural • Larger households | <p>More likely to be:</p> <ul style="list-style-type: none"> • Older, smaller homes • Renters • Larger households • Children present | <p>More likely to be:</p> <ul style="list-style-type: none"> • Higher incomes and education • Larger homes • Single male head of household • Urban • Professional or executive | <p>More likely to be:</p> <ul style="list-style-type: none"> • Lower incomes and education • Smaller homes and households • Renters • Older adults • Female head of household or full time homemaker | <p>More likely to be:</p> <ul style="list-style-type: none"> • Profile similar to households overall | <p>More likely to be:</p> <ul style="list-style-type: none"> • Younger adults (25 to 44) |
| <p>Note: All customers are different in some ways, and readers will not necessarily feel that they fit any one of the market segments described in the EPRI study. Some characteristics may overlap segments, and the demographic characteristics, in particular, describe tendencies rather than portraying rigid profiles. Source: <i>Green Power Guidelines, Volume 1: Assessing Residential Market Segments</i>, Electric Power Research Institute, December 1997.</p> | | | | | | |

small segments that might be willing to buy green power if it costs only a small amount more, or if it does not require much thought or effort.

Another important point to be learned from these studies is that, with the exception of the hard-core green segment, the environment is not the primary motivating factor in consumers' purchase criteria. Depending on the market segment and the product, other factors—health, economic development, cost, credibility, convenience—are the driving motivators. Green power may be viewed positively by many, but not only for environmental reasons. The key to unlocking this larger market will be in creating products with different features that respond to a diverse set of motivators, and that appeal to consumers with different marketing messages.

Finally, these three studies reveal that, just as there are different market segments with diverse motivations, so there are a variety of demographic characteristics rather than a single profile. Some

segments reflect the population at large, while others tend to be rural/urban, lower/upper incomes, larger/smaller households, older/younger, with/without children. The evidence may appear contradictory, but the answer depends on the market segment. It has been suggested that demographic variables are not as important as socio-psychological variables (such as a sense of control over one's life, or attitudes toward technology and institutions) in understanding the environmentally concerned consumer.⁴ As pointed out above, environmental concern is not the only motivating factor.

Non-Residential Consumers

The size of the business market for green power is uncertain. Based on a survey of retail green power marketers, they expect that in competitive conditions 10 percent to 50 percent (25 percent average) of their revenues will come from nonresidential consumers, and perhaps more in the early years of competition when nonresidential consumers will be more likely to switch from the default service.⁵ Further, although some may require considerable personal sales efforts, the per kWh acquisition cost of these customers is likely lower because they do not require mass marketing. This suggests that business consumers should not be ignored in green power marketing.

Not only can a few business customers equal the energy purchases of many small residential consumers, they also can create awareness, lend credibility and, therefore, attract residential customers to green power choices. Marketers will first try to sell green power to eco-image businesses and organizations. Some of this behavior already has been seen in California and Massachusetts. However, beyond the obvious businesses that market—or advocate—environmental behavior, there are opportunities among small businesses, large corporations, government and institutions.

- Twenty-five small businesses chose to pay a premium for wind power in Traverse City, Michigan. They represented a variety of business types from law and architectural offices, retail shops and restaurants to a dance studio, a funeral home and a credit union. These businesses represent 12 percent of the program participants, but account for 38 percent of turbine output.
- A number of Colorado utilities have enrolled about 150 nonresidential customers—including government, business and nonprofits—in several wind power green pricing programs. Public Service Company of Colorado (PSCO) and the Land and Water Fund of the Rockies have successfully signed up a number of large corporations for PSCO's Windsource program. These include Coors Brewing, IBM, Celestial Seasonings, Lockheed Martin, and US West.⁶ In fact, the PSCO nonresidential participants represent less than 1 percent of total Windsource participants, but nearly 20 percent of the wind generation.⁷
- Toyota Motor Sales USA initially announced that it will purchase more than 4 megawatts (MW) of renewable energy from Edison Source for several of its facilities in California. This purchase is equivalent to about 5,500 households buying all their electricity from renewable energy. The green power purchase soon will be increased to provide for its Long Beach port and a large auto parts supply center.
- Local governments have established energy policies that include purchase of renewable energy. Portland, Oregon, will buy about 5 percent of its electricity from renewable energy sources. The City of Palm Springs, California, in collaboration with Enron, has decided to offer its residential and nonresidential consumers a green power product through a voluntary aggregation program.

- The federal government is under executive order to install renewable energy systems where cost-effective. In New England, the U.S. General Services Administration (GSA) solicited power purchases with a minimum renewable energy content.⁸ GSA now has an option to purchase 5 percent green power in two to three years' time.

Nonresidential consumers offer good markets, but as with the residential market, reasons for purchasing green power vary widely.

- Business participants in the Traverse City program are small enough that the purchase decision was made by the business owner whose stated motivations generally were personal philosophy, community leadership and, in a few cases, an interest in recognition.⁹
- Recognition and corporate goodwill probably play a larger role in the decision of larger companies to purchase green power. Their participation will be encouraged by public support from governors, city councils, state energy offices and the like, especially if this support leads to a higher profile and positive image. As an example, Toyota will pay an extra \$1 million for its green power purchase, but, according to a company spokesman, the positive response from this decision has attracted enough media attention to justify the annual renewable price premium.
- Eco-businesses, or businesses that place a high value on social responsibility, are likely to want to reinforce their image consistent with market positioning and corporate policy. Patagonia, maker of outdoor gear, recently announced a contract with Enron to supply its 14 California facilities with 100 percent renewable energy. These facilities use about 1 million kilowatt-hours annually.
- Government institutions at several levels and environmental organizations may seek to implement local policy leadership and act upon their beliefs. For example, The City of Santa Monica, California, has directed the purchase of green power for its city hall and other city facilities, and in Colorado about 10 environmental organizations are purchasing green power from their utilities.

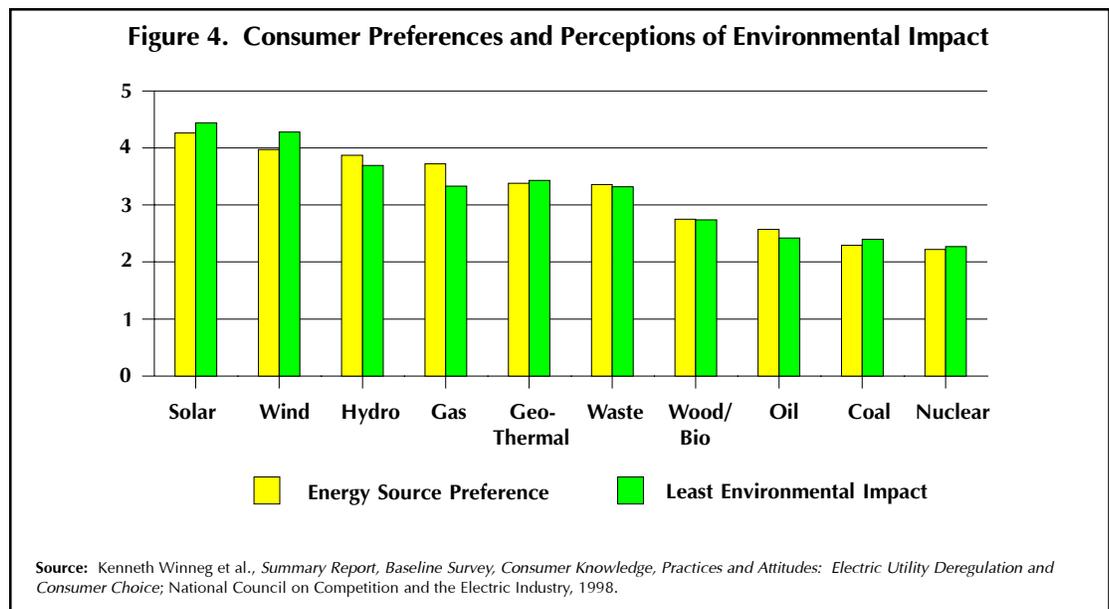
Given these different motivations, successful marketers will work directly with individual companies or organizations to understand how best to add value to green products.

CONSUMER PERCEPTIONS OF WIND

Given consumer interest in green power, what energy resources do they think are green, and how does wind rank as a source? As noted in Table 1, the answers vary with different market segments. The following answers are representative of the general population.

Some resources create differences of opinion, but solar and wind energy are routinely ranked greenest. As a recent EPRI study put it, “Solar, wind, and tidal are almost always seen as clean, readily available, free, natural, and renewable. These power sources epitomize ‘green,’ and serve as archetypes for the category.”¹ On a scale of 1 to 10, where 10 means extremely friendly to the environment, wind was rated 9.18 and solar was rated at 9.12.

Another recent study for The National Council on Competition and the Electric Industry found similar results.² As shown in figure 4, solar and wind were ranked 1 and 2, respectively, in terms of energy source preference and least harmful to the environment. On a scale of 1 to 5, where 5 is most preferred, solar scored 4.26 and wind scored 3.97 as the most preferred energy sources. In terms of harm to the environment, where 5 is “not at all harmful to the environment,” solar scored 4.44 and wind scored 4.28. Figure 4 shows the results across all energy sources tested, and reveals a clear link between energy source preference and perceived environmental impact.³



Wind energy is much cheaper than solar power, and this should give it an important marketing edge because price is almost always a motivator in the decision to purchase green power. However, siting is more of an issue for wind than it is for solar. Careful planning is necessary in order not to alienate those who like the idea of wind but have specific siting concerns.

THE ROLE OF EDUCATION AND INFORMATION

In order to realize the potential for green power and to narrow the gap between what people say and what they do, consumers need education and information. For the same reasons, marketers need credibility, especially for the intangible green attributes of power supply. Consumers generally have inaccurate ideas about the resources currently used to generate their electricity,¹ and they wonder if they will get what they pay for if they buy green power.² Many consumers who are newly exposed to competitive electricity markets find it overwhelming and easier to do nothing.³

As a result, early competitive markets will likely be marked by consumer confusion, skepticism and inertia. Consumers eligible for the New Hampshire pilot program, for example, complained about their inability to make “apples to apples” comparisons of competing offers. Focus groups across the country indicate that consumers expect exaggerated or misleading advertising claims that seek to put the company or the product in the best possible light. People are naturally slow to think about new choices that complicate their lives without adding convenience or other value. Even those who are motivated primarily by price may not find switching to be worth the effort for a savings of only \$5 or \$10 a month, and with green power they will not save money. In fact, most states where electric utility restructuring is occurring likely will guarantee consumers initial cost savings by doing nothing at all. Additionally, given the familiarity with incumbent electricity providers and fears about service reliability, consumers may be unlikely to engage in electricity choices.

Although confusion may be lower in regulated markets, inertia still may be high because consumers are less aware of the options available to them. Consumers in both markets may be skeptical about continued service reliability, the environmental reputation of the service provider and the environmental benefits of the green power product. Education, uniform information disclosure and green power certification have been suggested to combat consumer confusion, skepticism and inertia.

Education

In many states that are introducing retail choice of electricity provider, regulatory commissions are planning formal education programs to help consumers understand a variety of issues that concern utility restructuring. Education plans developed by states such as Pennsylvania, Vermont, Maine, Massachusetts and California include information about such things as competitive generation and choice, regulated distribution, service reliability, consumer aggregation, default generation service, unbundled billing, energy resources, and the environmental impacts of electricity generation and use. These education efforts are intended to increase consumer awareness, facilitate informed consumer decision making, and provide an objective and credible source of information for consumers.

A few states have targeted formal education activities specific to renewable energy. For example, California has set aside 1 percent of its \$540 million Renewable Resources Trust Fund for consumer education to further the development of a sustainable consumer-driven market for renewable energy. The Texas State Energy Conservation Office is using oil overcharge funds to support a significant public awareness and education campaign called “Renewable Energy: The Infinite Power of Texas.” Massachusetts and Connecticut also authorize expenditures for public education from special renewable energy funds created by their restructuring laws.

These state-sanctioned education efforts are important because consumers are not used to exercising choice in the realm of electricity supply, and the transaction costs for utilities or customer acquisition costs for competitive marketers can be very high. Green power marketers in California have suggested that the cost to acquire a new customer is well above \$100 per customer.⁴

Nongovernmental organizations also contribute in significant ways to public education. These include the Center for Energy Efficiency and Renewable Technologies; the Center for Resource Solutions with its Green-e logo; the Interstate Renewable Energy Council; the Renewable Energy Marketing Board; the National Wind Coordinating Committee; the Sustainable Resources Center; the Union of Concerned Scientists; and many others.

Utility and marketer partnerships with third parties can be very helpful in sharing transaction costs by educating consumers about renewable energy and in alleviating reliability and credibility concerns. Colorado offers several examples of public support from local governments, business organizations and environmental groups as part of a grassroots campaign.⁵

- Wind power supplies the governor’s mansion, and the governor has used press conferences to endorse renewable energy and acknowledge businesses and nonprofit organizations that have purchased wind.
- A half-dozen municipalities have purchased wind power, dedicated significant staff resources to educating citizens about renewable energy, and used bill stuffers and local cable TV to promote renewable energy.
- The Colorado Office of Energy Conservation has promoted renewable energy by funding community groups to educate citizens, publicizing success stories, and proactively working with the media.
- Chambers of commerce, environmental groups, universities and hospitals have purchased renewable energy and have helped to educate their members, employees and staff about the implications associated with their energy choices.

These examples illustrate the potential role of government, businesses and nonprofit groups as consumers and as public opinion leaders. Using publicity to promote renewable energy as an ethic or as the responsible choice could work in either regulated or competitive markets, just as governments and businesses have promoted recycling to the public and their employees.

Uniform Information Disclosure

Disclosure, also referred to as labeling, is a policy-based, required statement of facts about products being offered. Eleven states have either adopted legislation or are writing rules to require

disclosure, and an additional 16 states are in various stages of consideration.⁶ Several bills in Congress and the Clinton administration's restructuring proposal include a disclosure requirement and could eventually lead to standardized disclosure rules across states.

Implementation of disclosure began only in 1998 in California and Massachusetts and in pilot programs in Oregon and Washington. California has adopted a label that includes only the power sources, but uniform information disclosure generally is seen as facilitating comparisons across a number of product attributes, including average price per kWh, contract terms, resource mix and selected environmental impacts.⁷ By helping to eliminate some of the customer confusion, labels may make it easier for consumers to switch providers,⁸ which is a big hurdle facing any competitive marketer. Labels also may make it easier for consumers to select products that best meet their preferences.⁹

Green Power Rating, Certification and Endorsements

In contrast to disclosure, green power certification is a market-driven, voluntary product approval program based on standards that are set by the certifying organization. With the exception of customer-sited, distributed or community-based renewable energy projects, the ultimate electricity user does not experience directly the environmental or technology attributes of green power. Independent third-party certification offers reassurance that green power is not a green-washed product and that the company offering it is environmentally responsible. Certification may take the form of eco-logos, ratings or endorsements by environmental groups, or life cycle impact assessment of specific power plants.

The Green-e, in use in California and in development in Massachusetts and Pennsylvania, is an example of an eco-logo that has influenced the development of green power products in California.¹⁰ It includes aspects of both certification and labeling.

The Natural Resources Defense Council, at its website, has identified preferred green power products that it has screened for competitive markets. The largest environmental organizations and the Pace Energy Project are working together to develop a rating system or "Power Scorecard" that will help assess the environmental effects of alternative electricity products.

The assessment and certification of life cycle impacts from individual power plants is yet another approach that may play an educational role in regulated or competitive electricity markets. This approach is being promoted for use with the International Standards Organization's 14000 series of environmental management standards.

Certification is important to different market segments for diverse reasons. For mainstream green power consumers, less is more. They want reassurance without having to expend effort investigating.¹¹ Hard-core green consumers need to overcome their deep skepticism with independent verification, but also want to do their own research or use the information disclosure label. Some consumers dismiss certification as an advertising ploy that is available to anyone who is willing to pay the fee.¹² Its success will depend on public recognition and the credibility that the certification brand or endorsing organization carries.

MARKET STRATEGIES

So far this report has addressed market research, market results, market growth and market credibility, but not the programs and products that are being offered to consumers. What do these offers reveal about market strategies? Are utilities and marketers responding to the consumer interests, motivations and preferences described above? And how might the market evolve?

Resource Preferences

Utility green pricing programs generally have focused on wind (12 programs) and solar (19) resources, although a few programs market hydropower (1), biomass (1), landfill gas (1), geothermal (2), and combinations of these resources (5). Almost all green pricing programs so far emphasize one resource type, either wind or solar, rather than a blend of these or other renewables. In contrast, the competitive green power products combine a mix of resources, sometimes unspecified. Marketers appear to be aware of consumer preferences because they often picture solar and wind projects in their advertising. Although most marketers seem to rely more on blended renewables, a few marketers offer products that stress wind or solar. Green Mountain Energy Resource's Wind for the Future emphasizes wind power, and AllEnergy's ReGen promises to add new wind within the next year. Green Mountain also recently launched a rooftop photovoltaics product in California.

Another difference between utility programs and competitive products is that most utility programs emphasize new renewable facilities, while competitive products often rely, at least in the near term, on existing facilities with some new renewables mixed in. Six of 13 green power products in California include at least some new renewable resources. Existing renewable energy facilities that would have generated power, even absent consumer premium payments, do not displace generation from other existing plants that use polluting fuels, and thus yield no immediate environmental improvement. This distinction matters to some green power consumers, while others assume that their purchase decision could lead to new renewable investments in the longer term.

Why do utilities and marketers address customer preferences for wind and solar energy, and for new versus existing resources, differently? There are a variety of reasons.

- Utilities and marketers have different motivations:

Some utilities appear to be motivated by a desire to learn about technology performance and system integration, things in which marketers have far less interest.

Many utilities are experimenting with green pricing on a limited scale and are not necessarily trying to maximize response, as are marketers.

- Utilities and marketers play different roles in regulated versus competitive markets:

Because utilities are already the monopoly supplier, the product is incremental green power production for which a premium is being charged, while for competitive marketers, the product is the entire electricity supply package.

Utilities can afford the time to develop new wind and solar power because they can enroll customers and hold them before building the resource. As a result, most green pricing programs have yielded new resources. Competitive marketers need to acquire customers immediately and must have supply available to serve them on demand or risk loss of customers and credibility.

- Utilities and marketers face different price pressures:

Most of the utility solar programs are subsidized by the Utilities PhotoVoltaic Group's (UPVG) TEAM-UP Program, which competitively channels federal funds to utilities to help commercialize photovoltaic technology. This subsidy is not available to marketers unless they were to partner with a UPVG member utility, an unlikely prospect.

Competitive marketers face more price pressure than franchise utilities, so it is harder for them to offer a pure wind or solar product. They can achieve a more competitive price by blending with a variety of existing renewable resources that may be cheaper.

Both utilities and competitive marketers face a high cost of customer acquisition, but it is higher in competitive markets because of the need to differentiate the marketer and the product from the competition, and the high cost of creating brand awareness and image advertising.

Market Segmentation

Consumer profiles make it clear that there are different market segments with different attitudes and motivations. Most marketers seem to recognize this by offering multiple green products, while utilities for the most part limit choices to the cost and the amount of renewable energy included in the mix: the more renewable energy, the more the option costs. Although cost and the amount of renewable energy in the product are important factors in consumer choice, they are not the only ones. Others include convenience, marketer company reputation and name recognition, credibility of the product, community benefits, and health effects associated with electricity choices.

Although programs differ across utilities, individual utility green pricing programs generally offer just one option, albeit usually with different levels of participation. There are a few exceptions to this observation, including Sacramento Municipal Utility District, Wisconsin Public Service, Washington Water Power and Public Service Company of Colorado (PSCo). PSCo, for example, offers distinct options consisting of a bill round-up, customer-determined monthly contributions, blocks of wind energy, and a recently announced customer-sited rooftop photovoltaics program. Some consumers are happy to contribute small amounts to a fund and let someone else decide how best to use it. Others want to know more specific details about a particular resource or facility, expect

to pay for it only when it is operational, and want flexibility in how much they purchase. Still others want a closer connection to their actions, like working with new technology, and possibly derive satisfaction from the status that might bring.

In retail access, product differentiation is more advanced, and marketers are still experimenting with different approaches. Within a company, some products appear to be designed to reach different segments, and certainly there are different products across companies as they pursue different market strategies. For example, Green Mountain Energy Resources has four products. One of them contains a mix of 75 percent renewable resources, but emphasizes the development of new wind power, and carries a price premium of 2.1 cents. A second also contains 75 percent renewable resources, consisting of a mix of small hydroelectric, biomass and geothermal, and charges a 1.2 cent premium. The third product contains 100 percent large hydroelectric for a premium of just under 1 cent. The most recent product is rooftop photovoltaics, which is less an energy product than it is a technology product. These products may appeal to different segments with different priorities: one that cares about the specific resource or about new resources, one that is satisfied with most low impact renewables, one that cares about the environment but for whom price is still an important factor, and one that wants greater independence or power supply backup.

Because most green power marketers in California have so far sought Green-e certification for at least some of their products, the marketers have been challenged to further differentiate their products from competing green products. This has led to products with 75 percent and 100 percent renewable energy (more than the minimum 50 percent required for certification), to products that emphasize new renewables as distinguished from existing renewables, to products that are differentiated by in-state renewables as opposed to out-of-state renewables, and to products supplied by remote, moderate- to large-scale renewables as well as by distributed, rooftop generation.

Competitive marketers also are differentiating themselves by how they position their companies in the marketplace. Some portray themselves as a small, specialist energy boutique, focused on green power only, while others have the appearance of a major department store in which a green product line is simply a part of the range of options available to consumers.

In addition, some competitive marketers have formed alliances or enrolled high recognition non-residential consumers. For example, AllEnergy enlisted the Union of Concerned Scientists as a customer, and Green Mountain Energy Resources has developed a co-marketing strategy with Real Goods and Working Assets.

Taken together, the variety of utility programs and competitive products illustrate how they might appeal to different consumer market segments. As utilities and marketers seek to understand the response to their products, further differentiation may well occur. Company names, branding and marketing messages then may assume added importance.

Market Evolution

Given that the green power marketing experience is relatively recent, how might the market evolve? A pessimistic view is that consumer response could be too slow to sustain the costly investment required in competitive marketing. Also, uncertainty about restructuring in some states could paralyze the development and entry of new utility green pricing programs.

The diffusion of innovation curve suggests a more optimistic scenario. Initial marketing in restructured markets is targeted primarily, although not solely, to the most committed green power consumers, using mailing lists from environmental organizations or commercial mailing lists based on buying behavior. As time goes on, one-on-one marketing to nonresidential opinion leaders increases in importance. As the transition to fully competitive markets is completed, more consumers begin to switch providers. At the same time, some states keep traditional, regulated markets. More utilities in these states initiate green pricing programs as a way of testing customer interest and learning about unbundling services, adapting billing systems, and new product development and roll-out.

Consumer awareness about the environmental implications of electricity choice also grows with time, aided by advertising, education and, perhaps, uniform disclosure labels and environmental certification. Demand for green power begins to move up the steep diffusion curve and marketers increasingly differentiate their products to target the interests of more market segments. As demand grows, the cost of new renewables may decline, making it possible for marketers and utilities to create even more new green power products.

This scenario is plausible, but how fast could it happen? The pace depends on state and federal policies regarding renewable resources, the availability of a renewable energy supply, the effectiveness of public education campaigns to overcome confusion, skepticism and inertia, transmission access and retail market rules, and the degree to which markets are truly competitive so that new entrants can compete effectively with better known incumbents.

CONCLUSIONS

Experience shows that demand for green power exists in both franchise and competitive markets but, like most product innovations, it is still a niche market. Market research, however, suggests that green power could serve a mainstream market over the long term, and that wind energy could play an important role in that future.

It is important that green power stakeholders have realistic expectations about how consumers will respond. Today's market penetration of both utility green pricing programs and competitive green power products, at about 1 percent, shows that there is still a very long way to go. Short-term results should not be interpreted as predictive of the long-term, however, especially with market conditions changing rapidly in many states.

For the green power marketer, the challenge is to convert positive consumer attitudes toward renewable energy (wind and solar energy, in particular) into positive consumer behavior. For the policymaker and advocate, the challenge is to create consumer awareness and understanding through a variety of formal and grassroots education and information activities. In restructured markets, stakeholders also need to create market rules that support truly competitive markets and encourage consumer choice.

To succeed in this market transformation, utilities, marketers and advocates must realize that there are multiple green markets, each with their own motivations and interests. These multiple markets may be reached by offering an array of products that appeal to the various emotional and psychological needs of consumers, and to the various motivations of nonresidential consumers. Greenness may be the primary motivating factor for early market participants. To reach the mainstream, however, the environment may be subordinate to other factors such as cost, convenience, community interests, health concerns, or securing a sustainable future for children and grandchildren.

Fortunately, green power marketers are beginning to respond to these different motivations and interests with product variety and differentiation. Market segmentation combined with consumer awareness and education, supportive market rules and renewables policies will enable green power to move up the diffusion of innovation curve.

NOTES

Introduction

1. This report uses the term “green power” to describe energy resources that minimize the environmental impacts of electricity generation and use. Other terms frequently used to describe green power include “environmentally friendly,” “sustainable,” “renewable” and “low impact” energy. The report does not attempt to define green power because, like beauty, greenness is in the eye of the beholder. Marketers will try to determine what consumers think is green, and various interest groups will attempt to influence the outcome. Because of the uncertainty about what is green, marketers may find it more credible to promote green power products by their specific attributes, such as hydroelectric, wind, or carbon-free, rather than use the term green power.

2. The companion report, titled *New Markets for Wind Power: Creating Competitive Advantage*, was prepared for the NWCC by Jan Hamrin, Ryan Wisser, Katie McCormack, and Ed Holt (Denver, Colo.: National Conference of State Legislatures, December 1998).

Consumer Interest in Green Power

1. Barbara C. Farhar, *Trends in Public Perceptions and Preferences on Energy and Environmental Policy: Executive Summary* (Golden, Colo.: National Renewable Energy Laboratory, March 1993); Farhar, “Energy and the Environment: The Public View,” *REPP Issue Brief No. 3*. (College Park, Md.: Renewable Energy Policy Project. October 1996).

2. Ibid.

3. Sustainable Energy Budget Coalition (SEBC), press release, January 16, 1996.

4. Electric Power Research Institute (EPRI), *Green Power Guidelines. Volume 1: Assessing Residential Market Segments* (EPRI Report TR-109192-V1, prepared by Hagler Bailly, December 1997).

5. Keith Baugh, et al., “Green Pricing: Removing the Guesswork,” *Public Utilities Fortnightly* (August 1995).

6. The average market penetration for utility programs that have been marketing for more than a few months, and that are not significantly limited by the resource size or output, is 1.4 percent, based on a sample of eight wind and non-wind programs. Market penetration, as used in this report, refers to the cumulative percent of eligible customers that are participating in a pro-

gram. Sometimes the phrase "participation level" is used interchangeably with market penetration.

7. About 80 percent of the nonresidential participants in PSCo's program are concentrated in Boulder County, which has been the target of a grassroots marketing effort by the Land and Water Fund of the Rockies.

8. Edward A. Holt, "Green Power for Business: Good News from Traverse City," *REPP Research Report No. 1*: (College Park, Md.: Renewable Energy Policy Project, July 1997).

9. Steven M. Rothstein and Jeffrey M. Fang, *Green Marketing in the Massachusetts Electric Company Retail Competition Pilot Program*, NREL Topical Issues Brief (Golden, Colo.: National Renewable Energy Laboratory, October 1997); Edward A. Holt and Jeffrey M. Fang, *The New Hampshire Retail Competition Pilot Program and the Role of Green Marketing*, NREL Topical Issues Brief (Golden, Colo.: National Renewable Energy Laboratory, November 1997).

10. In New Hampshire, consumers had no inkling that green power would be offered, and were not expecting green power marketing when they volunteered to participate in the pilot program. In Massachusetts, consumers were presented with these options when they signed up to participate.

11. There are no public data on the market share of green products in California at this time. The assumption of 30 percent to 50 percent is based on an anticipation that some early participants are switching because they want the opportunity to buy green power, the fact that more than half the marketers selling to residential consumers are promoting green products, and calculations based on information released by various marketers.

12. Ryan H. Wiser and Steven J. Pickle, *Green Marketing, Renewables and Free Riders: Increasing Customer Demand for a Public Good* (Berkeley, Calif.: Lawrence Berkeley National Laboratory, 1997).

13. Everett Rogers, *Diffusion of Innovations* (New York, N.Y.: The Free Press, 1962).

14. Electric Power Research Institute (EPRI), *New Product Introductions: Case Histories from Other Industries* (EPRI Report TR-106901, prepared by Putnam Hayes & Bartlett Inc., 1996).

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Profiling the Green Power Consumer

1. Tibbett L. Speer, "Growing the Green Market," *American Demographics* (August 1997).

2. The Hartman Report (THR), *Food and the Environment: A Consumer's Perspective* (Bellevue, Wash.: THR, 1996).
3. EPRI, *Green Power Guidelines, Volume I*.
4. Charles H. Schwepker Jr. and T. Bettina Cornwell, "An Examination of Ecologically Concerned Consumers and Their Intention to Purchase Ecologically Packaged Products," *Journal of Public Policy & Marketing* 10, no. 2 (1991): 77-101.
5. Wiser and Pickle, 1998.
6. Jeff Ackermann, New Century Energies, personal communication, March 2, 1998.
7. Rudd Mayer, Land and Water Fund of the Rockies, personal communication, September 15, 1998.
8. *FEMP Focus*, (Washington, D.C.: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, March/April 1998).
9. Holt, "Green Power for Business..."

Consumer Perceptions of Wind

1. EPRI, *Green Power Guidelines, Volume I*.
2. The National Council on Competition and the Electric Industry is a joint project of the National Association of Regulatory Utility Commissioners and the National Conference of State Legislatures. Members include the U.S. Environmental Protection Agency and the U.S. Department of Energy. The council is a consortium dedicated to assisting state and federal decision makers to better understand the implications of the competitive changes and challenges facing the electric industry.
3. Kenneth Winneg, et al., *Summary Report, Baseline Survey, Consumer Knowledge, Practices, and Attitudes: Electric Utility Deregulation and Consumer Choice* (National Council on Competition and the Electric Industry, January 1998).

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1. Kenneth Winneg, et al., *Summary Report, Baseline Survey, Consumer Knowledge, Practices, and Attitudes: Electric Utility Deregulation and Consumer Choice* (National Council on Competition and the Electric Industry, January 1998).
2. Alan S. Levy et al., *Information Disclosure for Electricity Sales: Consumer Preferences from Focus Groups* (National Council on Competition and the Electric Industry, July 1997); Mario Teisl, Lynn Halverson and Edward Holt, *Information Disclosure for Electricity Sales: Consumer Preferences from Focus Groups—West Coast* (National Council on Competition and the Electric Industry, June 1997).

3. UNH Survey Center, *UNH Survey Center Retail Electric Competition Pilot Program Survey Report*, February 1, 1997. Obtained from New Hampshire PUC web site [<http://www.state.nh.us/puc/survey/surveya.html>].
4. Renewable Marketers, "Comments of the Renewable Marketers on Power Purchase Eligibility for the Customer Credit Subaccount" (before the State of California Energy Resources Conservation and Development Commission, Docket No. 96-REN-1890, 1998).
5. Rudd Mayer, Land and Water Fund of the Rockies, personal communication, June 2, 1998.
6. Center for Clean Air Policy (CCAP), *Policy Handbook: Disclosure in the Electricity Marketplace* (in draft, March 1998).
7. Tom Austin, David Moskovitz and Cheryl Harrington, *Uniform Consumer Disclosure Standards for New England: Report and Recommendations to the New England Utility Regulatory Commissions* (Gardiner, Maine: The Regulatory Assistance Project, October 6, 1997).
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