

INTRODUCTION

As competitive retail markets for electricity begin to open around the country, there is a sense that the changes are more fundamental than a move toward simple price competition. A shift will take place in consumer thinking about electricity, from a view of electricity as an undifferentiated commodity to a product, the value of which is based in part on how (and by whom) it was produced, packaged and delivered. Specifically, market research indicates that a significant portion of residential consumers—and even some commercial and industrial consumers—say they may be willing to incorporate environmental values into their electricity supply choice.¹ As evidenced by utility green pricing programs and early retail access experience, at least a niche market clearly is willing to pay a premium for power it perceives to be environmentally preferable. Because the market is still immature, however, the long-term prospects for green power cannot be predicted with any certainty.

This report addresses the questions of how environmental values may be expressed and captured in emerging “green” markets,² and what role wind energy can play in retail product portfolios. The second part of a two-part research project, this report incorporates ideas from value chain analysis to help describe the features of emerging green markets. The value chain concept is used to explore the web of relationships linking the various stakeholders (wind project developers and operators, power exchanges, wholesalers, retailers, and resellers, as well as end-use electricity customers), and to identify opportunities for stakeholders to differentiate themselves and their products, depending on the particular structure of the power market (and specifically the green power market) in which they operate.

- The first section introduces the value chain concept and its application to the wind industry as different types of green power markets and stakeholders emerge in response to consumer interest and changing market structures.
- The second section highlights the challenges posed by evolving green power markets and explores various sources of differentiation that may be exploited to competitive advantage by different (including new) stakeholders in the context of retail competition.
- The third and final section examines the increased importance of information and the virtual value chain in green electricity markets.

The National Wind Coordinating Committee (NWCC) commissioned this report to educate its members and member constituencies about how emerging green power markets may affect wind development, and how wind industry stakeholders can contribute to building a successful green market. Background information for this report was developed through discussions among team

members and a review of value chain literature. Telephone interviews and face-to-face conversations were conducted in early May 1998 with utility representatives, retail and wholesale power marketers, aggregators, and developers from the United States and Canada (see appendix A). Interviewees represent a variety of backgrounds and geographic regions. Each interviewee was asked the same set of questions (see appendix B). The responses are aggregated, analyzed and integrated into this report. Although market perceptions and interview responses tended to be heavily influenced by early experiences in a few states, the observations of these early participants are valuable in anticipating and preparing for future wind markets as they emerge around the country.

INCORPORATING THE VALUE OF WIND POWER IN CHANGING ELECTRICITY MARKETS

The value chain concept was originally conceived as a tool for analyzing opportunities to improve a firm's competitive advantage.¹ The concept is built on the premise that each link in a firm's activities—whether from materials procurement to assembly, or from assembly to packaging—can contribute to improving its relative cost position and can create a basis for differentiation from its competitors. An individual firm differentiates itself by being able to create a more efficient link in the chain—or web—of activities connecting an industry's supply side with its demand side, or by providing something of unique value to its customers.

Virtually any business activity or product attribute is a potential source of added value. Differentiation may deliberately add to the cost of the product as long as the added value provides sufficient returns. For example, in the case of an apparently uniform commodity like electricity, many consumers say that they would be willing to pay more for power that they perceive as nonpolluting, more sustainable, domestically produced, or less subject to price volatility.² Despite debate as to its strict definition, the term “green” power has come into common usage to describe electricity produced all or in part from renewable energy generating facilities, such as wind power facilities. As electricity markets restructure to allow greater retail access, end-use electricity consumers become more influential in the value chain for electricity supply. This creates opportunities to translate stated customer preferences for green power into growth for the wind industry; it also creates challenges for wind energy development as risk profiles and relationships throughout the electric power industry change. Even in states where the traditional utility market structure remains in place, green pricing roles and relationships create new opportunities for differentiation.

The value chain perspective provides a systematic way to examine broadly the interactions among the various activities required to develop and market electricity. It also provides a basis for understanding wind industry stakeholder roles and relationships in emerging green power markets. An industry- or sector-wide value chain study, however, can obscure specific sources of competitive advantage available to an individual firm.³ For this reason, individual firms may want to use the value chain concept in a more detailed fashion—and the findings of this report as background—to assess opportunities to create competitive advantages for themselves.

Wind Power in the Traditional Regulated Utility Market

In traditional regulated utility markets there are five key stakeholders: the wind turbine manufac-

States. (Note that end-use consumers, although shown in figure 1, do not play an active role in the traditional regulated market because they have no choice about either the electricity product they purchase or who supplies it. Their interests and preferences are theoretically represented by regulators and by consumer advocates.) In this industry model, competition occurs among energy generation alternatives, including wind and other green energy options. This competition is directly influenced by the regulatory commissions, and a utility's product is largely determined through the regulatory process.

Green Pricing Programs

Green pricing programs are an extension of the regulated utility market where the green product is differentiated from the conventional electricity product offered by the monopoly utility to its regular customers. The customer is given a choice of perceived value added by the "greenness." The value chain stakeholders remain the same as for the traditional market structure, although the developer now may play a more restricted role and the utility more often may play the role of owner, as well as financier. In some cases—such as the Sacramento Municipal Utility District and Wisconsin Public Service Company—the utility may offer more than one green product.

Information becomes a prominent element in green pricing programs. Information concerning the added green value is critical for product differentiation and for eliciting consumer response. In some recent green pricing programs, this information has been reinforced by nongovernmental organizations. By bringing their independent credibility and knowledge of green consumers to the market, they can add value to the product and broaden their role in the industry value chain by endorsing the green product or by marketing it directly to end-use consumers. Examples include The Land and Water Fund of the Rockies working with Public Service Company of Colorado, and Renew Wisconsin working with Wisconsin Electric Power Company.

In a few states, regulators and legislators have played or may play a direct role in encouraging green pricing. For example, the Public Utility Commission of Texas (PUCT) recently adopted a green pricing rule. The rule does not mandate green pricing, but does encourage utilities to offer this option if they comply with the provisions of the rule. Related to this discussion, some green power marketers petitioned the PUCT that utilities be required to contract with green marketers to deliver the green pricing service, called a "buy-through" green pricing tariff. Consumers would be able to select renewable energy providers for all or part of their electric service. This would serve the marketers' interest by limiting the ability of utilities to establish themselves as green power providers prior to retail access, and would add a new stakeholder in a regulated market. The PUCT denied the petition on the basis that its (then) proposed rule addressed many of the issues raised in the petition, although the buy-through provision is not included in the final rule.⁴

As of June 1998, more than 40 green pricing programs are being marketed to utility customers around the country. Twelve of these feature wind and account for the development of about 36 megawatts (MW). Wind energy is the predominant renewable resource used for energy-based green pricing programs including, among others, the programs of Public Service Company of Colorado, Traverse City Light & Power, Fort Collins Light & Power, Colorado Springs Utilities, Holy Cross Electric Association, Cooperative Power and a number of its distribution cooperatives, and Madison Gas & Electric.

Other utilities are incorporating green pricing into a broader approach to customer choice, but

still within a regulated market. Sometimes called the portfolio or menu approach, this utility option allows customers to choose among the standard tariff and resource mix, green power, market index pricing, a fixed cost option, and other variations. For example, Indianapolis Power & Light (IPALCO) announced three options in addition to the existing rate.

- The sure bill option guarantees residential customers 1) the same bill each month for 12 months regardless of how much electricity is used, and 2) no settlement at the end of the period.
- The fixed rate option offers a fixed price for one-, two- or three-year periods, unaffected by adjustments in the regulated rate. Participants also receive a discount of 1 percent to 3 percent, depending on the length of the contract.
- The green power option offers renewable energy electricity that will be priced at the actual costs to obtain power. The resources have not yet been selected.

Washington Water Power in Washington and Idaho, Clark Public Utilities in Washington, and Pacific Power in Oregon now also are pursuing pilot programs that offer a portfolio of choices, each of which includes some wind. As with green pricing programs, competition is limited to the products offered by the utilities and does not include a choice of provider.

Although derided by one power marketer as “Soviet-style competition,” the portfolio choice approach (like green pricing) offers utilities an opportunity to prepare for competition among providers. IPALCO has stated, “Allowing IPALCO customers to purchase electricity in different ways and to learn more about how their electric bills are affected by changes in price and usage will help prepare not only our customers, but our company, for a future where even more choices are available. We are learning what tools are necessary to provide customers with options. We look forward to learning more about how our customers prefer to purchase and use electricity.”⁵

Green pricing programs offer utilities and developers an opportunity to gain experience in purchasing or developing modest amounts of renewable resources. It also allows the government and nongovernmental organization stakeholders⁶ to gain experience with technologies—such as wind—that are new to them. Traditional utilities are able to differentiate their products in anticipation of competition and gain experience with consumer preferences. One utility stated, “Forward-thinking utilities will start today to implement green pricing programs as a customer retention strategy.” New value added through these programs includes experience with consumer preferences and a direct communication link to customers that helps build loyalty.

The utility representatives interviewed generally feel that the trend toward green pricing will continue as an interim strategy between traditional markets and new competitive markets. Many marketers, however, reflecting their focus on competitive markets, believe the trend will last for only four or five more years⁷ as more states move to restructured markets. Such experience could lead to a smoother transition to competitive market structures where and when restructuring takes place. Green pricing also may continue as a method of offering some choice to customers in states that decide not to restructure.

Green pricing is an incremental variation on the traditional roles and relationships in the electric industry. In the industry model depicted in figure 2, competition occurs among electricity prod-

market may mean a failed company. Clearly, the risk is greater in competitive markets. Risk is being redefined in the context of these new markets, and the allocation of risk within the marketplace is slowly being sorted out.

How wind developers respond to competitive markets may be quite different from past experience. In traditional markets, projects were financed based upon 15- to 30-year utility power purchase agreements. A recent Lawrence Berkeley National Laboratory report⁸ indicates that most green marketers expect contracts for renewable energy in competitive markets to be for five years at most. The lack of a long-term power purchase agreement significantly changes project risk. Moreover, in competitive green markets, there are no captive customers or guaranteed recovery of costs. Any new investment by the stakeholders in a competitive market is at risk. Renewable technologies, as a group, have an elevated risk profile because the projects are capital-intensive, as opposed to natural gas plants, where risks occur in variable fuel costs.

In part to deal with these redefined risks and opportunities, a new set of stakeholders is introduced into the industry value chain with retail competition. Power quality, reliability and transmission services are provided by an Independent System Operator (ISO) or Independent Transmission Company (ITC), while the determination of the resource mix and price for the wholesale bulk power market is accomplished through the market, which may include a power exchange (PX), bilateral agreements and retail marketing. Wholesale marketers package the resource portfolio, shape and firm the power, and balance resource costs against resource attributes according to information received from the retail market. Retailers⁹ take the responsibility for marketing their product to end-use customers, providing them information that differentiates their product from others and justifies a value-based price. Aggregators may include local governments or retail merchant associations that may not even take title to the power. Regulators in this scenario focus on “getting the market rules right,” protection against abuse of market power, and protection of the relatively unsophisticated residential consumer from unfair business practices.¹⁰

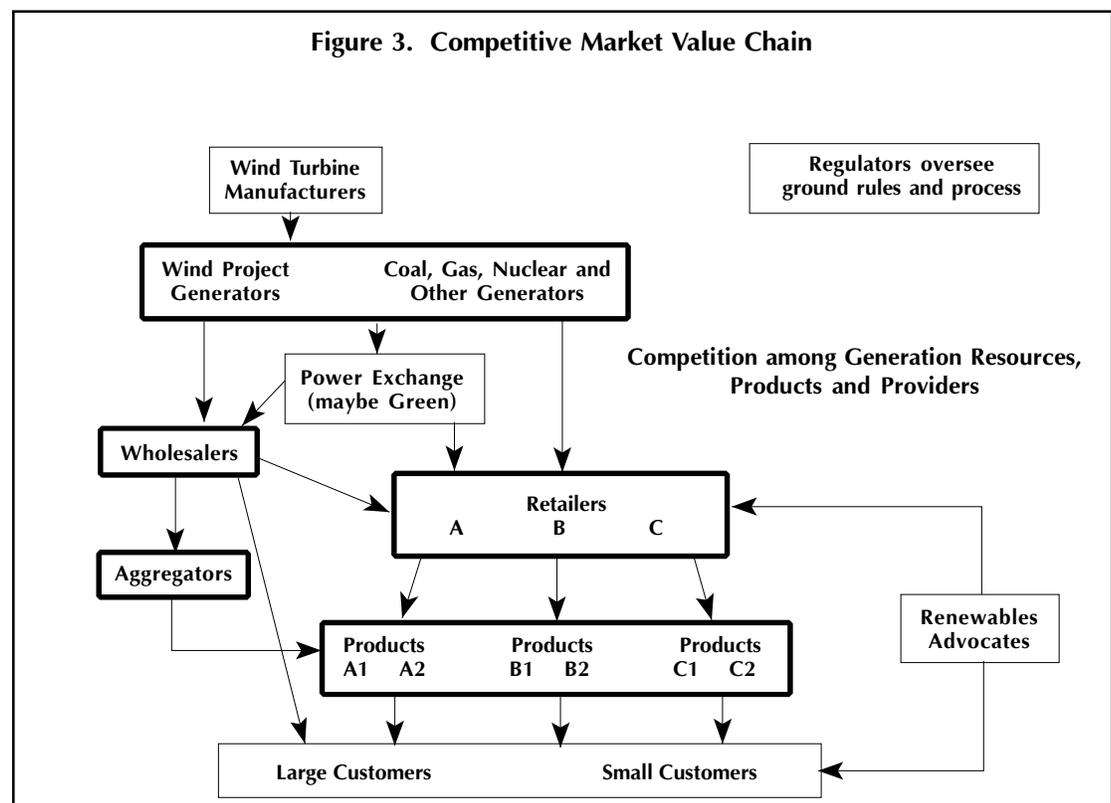


Figure 3 depicts some of the new stakeholders and their relationships in a competitive retail market. It illustrates the increased complexity of this value chain, which is more like a web than a chain. In this industry model, competition occurs among products and, for the first time, among providers, with energy generators making sales into the wholesale and retail markets, to traditional utilities and to new energy service providers. Consumers have new levels of choice.

In the traditional market structure, relationships between independent power producers and their customers (the utilities) were forged in the often adversarial environment of the regulatory arena. Over time, workable relationships were established, although participants in the relationships may have continued to think of each other as adversaries and competitors. According to the interviewees, these feelings have spilled over into the new competitive markets. As one marketer said, "Project operators and developers need to start thinking of retailers and wholesalers as their customers, their partners, not their competitors." If the relationships are as confused and in flux as interviewees suggest, assessment of a company's value chain and new market role becomes more difficult.

Most of the wind developers and wholesale marketers interviewed believe it is not practical to deal directly with the end-use customer because this requires specialized skills and significant investments in mass marketing. Product differentiation for electricity requires a significant element of information. Retail marketers, resellers/aggregators and nongovernmental organizations of various types are competing to be the point of contact to influence consumers concerning which electricity product they should buy. Environmental and consumer advocates fresh from adversarial arenas see new opportunities to influence consumers, marketers and suppliers to support their visions for the optimal renewable generating facility, the optimal green electricity product, and even the optimal approach to marketing green products.¹¹

In California, green power differentiation has arisen between existing and new generation, between in-state and out-of-state facilities, and between facilities owned by IOUs, municipal utilities and independent power producers. Differentiation also is developing around renewable resources such as large hydroelectric, wind and renewable blends. Companies are scrambling to understand the values held by retail consumers that influence their choice of electricity product and supplier.

Both consumers and green marketers consider wind to be a very attractive technology.¹² As one marketer said, "Economics play a role and wind power is not always the least expensive resource, though it is one of the lower cost renewable resources."¹³ Although experience still is limited, many green marketers include and even highlight wind energy in their product portfolios. Those interviewed identified other advantages for wind in competitive markets, including the fact that unlike some renewable technologies,¹⁴ there is support and even a push to build new facilities by NGOs as well as government. All things considered, many believe wind may have its greatest advantages in the competitive retail market.

FORGING NEW RELATIONSHIPS IN EMERGING GREEN POWER MARKETS

Green power may be differentiated from the standard commodity electricity by virtue of its being produced in a more sustainable manner, with lower environmental impacts. Yet for wind or other renewables to compete in a retail access market, the green power industry must look beyond the obvious environmental attributes of green power. Individual firms must examine all their business activities for additional ways to gain competitive advantage and differentiate their products. This section looks at the challenges and opportunities associated with the major functions linked by the wind power value chain, from project development to wholesale marketing, and from retail marketing to customer services.

Managing Project Development Risk for Competitive Advantage

Wind project development risk has increased because developers no longer have the security of long-term power purchase contracts. They might manage this risk in a variety of ways.

- Share development risk by sharing ownership of new projects.
- Spread development risk by vertically integrating project development and product sales.
- Secure multiple wholesale or retail customers for the output from a wind project.
- Expand existing facilities rather than pursue “greenfield” projects.
- Employ a different form of financing, such as shifting from project financing to corporate balance sheet financing.¹

Some interviewees believe that to be successful, financing and building new projects may require a different type of company or skill-set than in the past. There may be a need for specialized wholesalers, or a consolidation of several shareholders to obtain sufficient equity for new plants.

In general, those interviewed believe that companies in the future need to be fairly large for optimal and efficient risk allocation. Larger companies have more business opportunities and, therefore, more experiences from which to learn (information assets). A large company also may be able to obtain preapproved financing.

Marketers interviewed felt that developers will need to assume more risks than they have in the past, while developers and facility operators indicated a need for the marketers to assume more risk. Wholesalers, too, may be able to accept some of the risk. They have fewer customers than retailers, but their customer base may be more diversified. Retail marketers may be willing to share some of the risks by obtaining multi-year customer commitments to facilities. However, such commitments may include a fee for early termination, which can create a barrier for customers. Retailers also may be able to share risk by getting customers to sign up before building the project, as Green Mountain Energy Resources is doing in the California market. Finally, “Developers may need to help educate lenders to enable them to accept some of the market risk,” said one wholesaler.

Developers and their financial backers must have good risk assessment capabilities, good market knowledge and a fundamental belief in the market itself. Previous experience with green pricing and other types of renewable energy programs may help with this difficult transition.

The lack of long-term power purchase agreements may require the use of merchant financing² to develop wind and other renewable energy facilities. The primary condition necessary for building merchant plants is a liquid market for green power, including many buyers, a history of customer purchases and predictable prices available on a statistical basis. Forward markets, hedging and other financial strategies all flow from a liquid market. For example, the Automated Power Exchange has created a forward (week-ahead) market specifically for green power in California and has announced plans to do so in New York. Such specialized instruments are critical to the success of green marketing (and, hence, to new renewable resources development) in restructured markets.

Retail access pilot programs and slow transitions to restructured markets do not provide enough certainty to support merchant financing. Assured access to customers over the long term is required to justify construction of a merchant plant. As one developer noted, “There needs to be enough demand to allow a transaction of a practical size; a two-year pilot program doesn’t get you there.” Another developer emphasized that wind projects are more able to take risk than fuel-based technologies because the variable cost is predictable. Wind developers can give a firm price for 20 years out, which is an advantage in financing merchant plants.

Interviewees expressed mixed views about how project size can affect competitive advantage. Many respondents cited the theoretical advantage of wind’s modularity as a potential hedge against project development risks in competitive markets. True modularity can be a huge advantage. Being able to add small units rapidly and being able to buy gradually without overbuying could be very beneficial as price signals change. One utility noted that, where competitive electricity markets are being introduced, “The electricity market is moving from one extreme to another—from a market where capacity is added in huge chunks to one where capacity is added in modest amounts as price signals dictate.” In such a market, wind projects—if they are flexible and can be available fast enough—may be able to capture a higher market price.

The challenge, however, is how to make this theoretical advantage real, and some interviewees were concerned about the ability of developers to deliver modularity in real market settings. For example, to move rapidly in response to changing price signals could require wind developers to have a new site ready in advance: siting approved and the infrastructure and financing in place ready for construction. This can be costly if the site is not actually used. Alternatively, develop-

ers could be prepared to expand an existing facility in small increments. Projects that link customer demand to site expansion, as PacifiCorp is doing, have a distinct advantage.

Even while extolling the advantages of project modularity, some interviewees noted the scale economies associated with larger, multi-turbine projects. Wind project development incurs high transaction costs. (Legal costs alone often will be \$1 million or more, according to one developer.) These costs are relatively fixed, but may be ameliorated by recovering them over more kilowatt-hours generated by larger projects.

Larger projects also can benefit from economies of scale in required infrastructure investment, such as for increased substation capacity, access roads and interconnection. High infrastructure costs also affect project timing, because the wind project developer could incur significant costs in site preparation before securing a market for energy produced by the project. Finally, larger wind projects that are expanded incrementally, or projects in close physical proximity to each other, can realize operating, maintenance, and house load³ cost savings.

These scale advantages must be balanced against the size of market demand. “Large” and “small” are relative terms. A 10 MW wind project is small relative to other technologies, but 10 MW is large compared to market growth for green power. A project must be large enough to justify the transaction costs, but not so large that it is uneconomic for the expected demand growth.

The risk profile is changing not only for wind, but for all new generation developers. The higher capital costs for renewable technologies, however, mean that their risk profile is different from gas-fired power plants.⁴ Natural gas projects have less of their investment in the plant and more in variable costs such as fuel, operations and maintenance. Renewable resource plants have a higher percentage of fixed costs in each kilowatt-hour produced, so these generators must exercise greater caution in competitive markets.

As indicated above, all the stakeholders in the value chain are reconsidering how they manage risk to their competitive advantage. The next section examines other ways that companies may create competitive advantage: by differentiating themselves.

Sources of Differentiation for Competitive Advantage

Differentiation of products and services can take place at many different points in the value chain to create competitive advantage. Developers or wholesale marketers might differentiate themselves by adding value in a variety of ways, such as by:

- Siting a resource near or within a load pocket, enabling it to extract value for accessibility that otherwise would not exist because of transmission constraints.
- Specializing in marketing only (or primarily) green power—as does Foresight Energy—thereby increasing credibility.
- Adding storage capability and increasing the capacity factor for an intermittent resource in order to decrease transmission costs.
- Developing or using wind resource data analysis and forecasting techniques to increase resource predictability and scheduling.

- Packaging back-up resources with wind to reduce the need for retailers to perform this function.
- Meeting different retail needs with multiple products or packages, or with tailored products for special end-use customers.
- Offering complementary services such as suggested pricing, or helping retailers to develop websites.

Retail marketers might add value in several ways, such as by:

- Employing a particularly flexible billing system, such as one that aggregates for customers with multiple sites (in the case of large customers) or that provides information about environmental impacts avoided or about resource performance during the billing period.
- Bundling other services with green power. For example, green consumers might like an Internet news service that provides news about renewable energy projects or other green power activities.
- Offering bundled energy services that include not only renewable electricity but also natural gas, heating oil, or energy efficiency services.
- Increasing energy cost certainty by offering a fixed electricity price over some time period, or a fixed monthly bill for a year, as does one pilot program.
- Exploiting linkages with other sales channels through joint selling efforts; for example, the joint promotion of products by Green Mountain Energy Resources with Working Assets and Real Goods.
- Selling a “pure” product (for example, 100 percent wind) or a blend of renewable energy sources.
- Offering an array of products, from green electricity to customer-sited photovoltaics and wind, to green project investment opportunities.
- Positioning itself as a specialty shop (green power only) or as the energy department store (selling a full spectrum of electricity products). Similarly, a retailer could promote an image as a small or regional company or pursue a strategy to become a large national company.

Instead of considering wholesale or retail strategies separately, integration strategies might provide still other ways to add value and create competitive advantage.

Horizontal integration might allow individual firms in the wind industry to differentiate themselves by increasing the breadth of their renewable energy activities. For example, Enron Renewable Energy has developed broad renewable energy interests in solar and wind power.

Vertical integration is another way in which a wind power or renewable energy firm might differentiate itself. Value-creating activities might include site prospecting and banking, project development, and wholesale and retail marketing. Integration by itself does not make a firm unique;

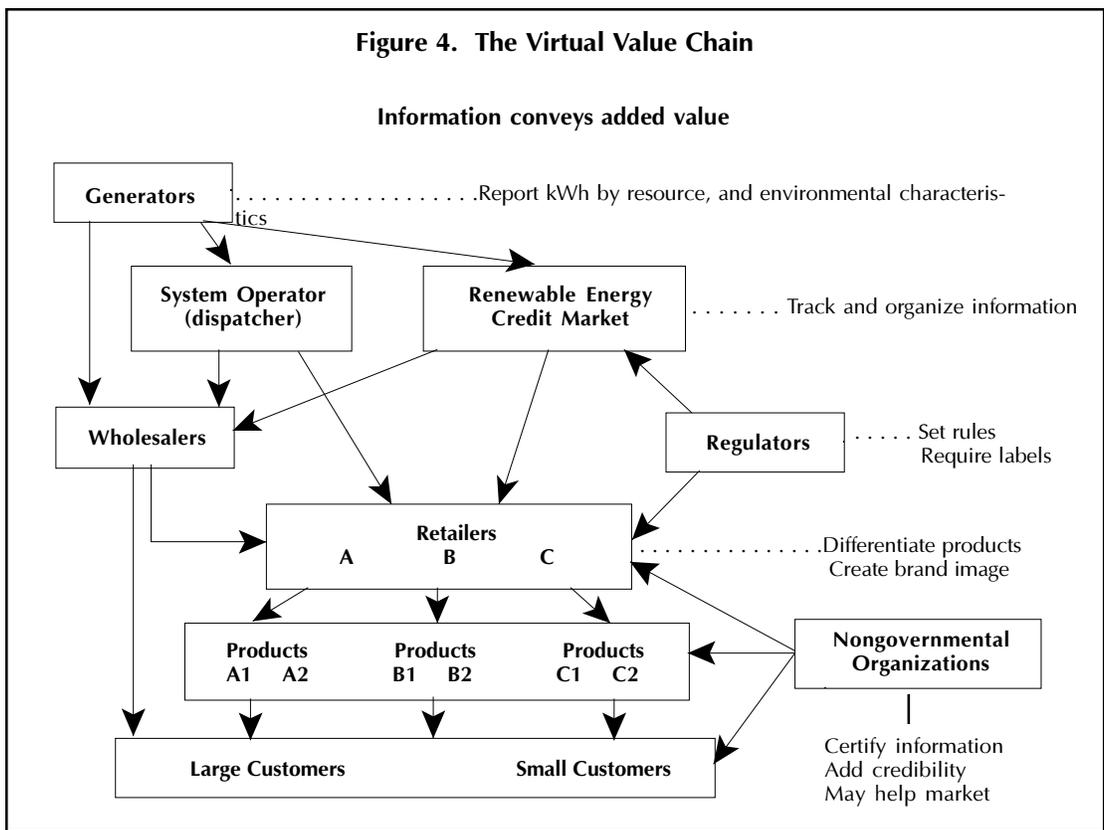
that differentiation depends on how the firm uses the capabilities at its disposal; for example, better controlling the performance of the activities, or better coordinating them with other activities.

Finally, there are the expected environmental benefits of green power. It may be possible to market these benefits separately from the electricity with which they are associated, either through a renewable energy credit trading program, or by selling specific environmental attributes such as carbon offsets. Such mechanisms add separate trading markets and stakeholders to the value chain.

Consumers will not pay for value that they do not perceive, however, no matter how real it may be. For a market in environmental credits to succeed, the public must understand what is happening and have confidence that the credits actually are being purchased and feel confident that abuses are not taking place.⁵ How green markets address these intangibles is discussed in the next chapter.

INFORMATION AND THE VIRTUAL VALUE CHAIN

In a competitive retail market, a key asset is effective communication and information exchange at every level of the value chain. The literature on value chain analysis¹ points out that every business today competes in two worlds: a physical world of resources and a virtual world made of information called the marketspace. The value chain in the world of information is referred to as the virtual value chain. This world of information is particularly important for competitive green power markets where the physical product that the customer receives remains functionally unchanged. The real change is the central importance of information in the value-based green market. Green power in a competitive market is sold based on its perceived values as a non-polluting, more healthful, more sustainable generating resource, not by being the lowest priced product. Although price plays a role, it is only one of a number of criteria considered by most consumers in making their choice of green electricity products. Information and the virtual value chain become critical elements of this product differentiation, as shown in figure 4.



Image

In retail markets, wind has an “informational” advantage from a marketing perspective. One respondent noted, “Wind is sexy; consumers like windmills. They are easy to visualize; they are often photographed in pretty settings; they are a tangible image.”

At the same time, inadequate attention to siting can create a negative public perception about specific wind projects, particularly relating to visual or environmental impacts. In that case, the marketer with that project in its portfolio may lack credibility as a green power provider.

That caveat aside, the image value of wind makes it a popular addition to any renewable-based electricity product. In consumer surveys, wind consistently scores high as a preferred source of energy.² The benefits of wind are intuitively obvious to many consumers. To differentiate an intangible product such as electricity, it is helpful if consumers can visualize the product attribute (for example, renewable-based generation) being differentiated. Selling 100 percent “pure” wind keeps the product simple and easy to sell. This has worked well for utility green pricing programs, but it may not be as economically feasible in competitive markets.³

Although wind has great consumer support, marketers report that people in their focus groups saw the value of a portfolio of renewable resources as a hedge against technology and resource risks. Moreover, given that wind is not always the least expensive renewable resource, blending it with power from less costly sources makes it more attractive economically. Teaming wind with other renewable technologies also may offset its seasonality and may increase its capacity value. The only disadvantage is if wind is teamed with a resource that is unpopular with the public in that market region.

Product Disclosure

In order to differentiate an electricity product based on value, consumers must have reliable information about the products being offered in the marketplace.⁴ In several of the emerging competitive markets, this information is being provided by uniform information disclosure—or labeling—mandated by state legislation and regulatory rulemaking. The information disclosed may cover average price, price variability, contract terms, generation resource mix and some environmental impact information.⁵ This information becomes a part of the virtual value chain.

However, there is disagreement about the desirability of information disclosure. The Edison Electric Institute, for example, argues that the need for uniform disclosure has not been demonstrated and that there are adequate consumer protection laws in place to prevent or correct deceptive advertising claims.⁶ Although there is debate about the cost, technical feasibility and policy rationale behind mandatory disclosure, electricity labeling has been promoted by nongovernmental organizations, regulatory agencies and legislatures, demonstrating another of the new roles being played by these stakeholders.

Those interviewed for this report believe that uniform information disclosure is advantageous both to consumers and to marketers. It helps consumers compare all products in a consistent way, allowing them to express their preferences accurately and leading to increased market efficiency. From the marketers’ perspective, it is advantageous because the uniform appearance increases consumer confidence that the information is not merely advertising publicity. This, in turn, leads

to an increased willingness by consumers to switch suppliers, a necessary step in overcoming market inertia.⁷

Product Certification and Endorsements

One aspect of electricity markets is that the product is invisible and intangible. Customers have no obvious way of verifying that when they buy an electricity product for its other values, they actually are getting what they are paying for (such as, it comes from wind generation).⁸ Because a premium often is paid for renewable-based electricity, there may be a temptation for some companies to try to capitalize on the customer preference for technologies such as wind without actually purchasing power from those resources.

In the New Hampshire pilot project, for example, one product was advertised as hydropower from a specific pumped storage facility, but did not discuss what resources were used to supply the pumping power.⁹ Other marketers presented a green image, but with little or no difference in the type of resources used to generate the electricity. Renewable resource advocates feared that incomplete representations such as these could undermine green power credibility and could have a chilling effect on future green market development.

Rather than attribute the incomplete information to an intent to deceive, the root of this controversy may be perceived as a lack of consensus about what is “green”.¹⁰ Certainly, different people or groups have different definitions of what constitutes green power.

In addition to the fact that electricity is intangible and its color difficult to discern, green electricity products may be marketed by companies that are unfamiliar to the consumer. Because electricity is viewed as a critical service in today’s society, consumers may be reluctant to purchase from an unknown company and risk the reliability of their electricity supply.

These concerns have resulted in the emergence of other information-based services in the green power market: certification/verification and endorsements by credible organizations.

The voluntary Green-e program, begun by the Center for Resource Solutions in California and now moving into other regions of the country, was designed specifically to deal with these consumer information needs.¹¹ The program establishes renewable-based product criteria and definitions that help consumers more easily make product comparisons. The program requires resource labeling, simplified contract disclosure and a code-of-conduct that specifies proper treatment of consumers. Product-specific consumer information is reviewed for compliance with the code of conduct. Product purchases are verified through an independent audit process. A trademarked symbol is used for easy consumer identification of the program’s certified products. In recent research,¹² third-party certification/verification and endorsements were ranked as “very important” by retail marketers. This program could have been undertaken by a governmental institution or by a trade organization rather than a nongovernmental organization. Regardless of the stakeholder, however, providing consumers with confidence in the veracity of green products is a crucial link in the virtual value chain for competitive markets.

Closely associated with the certification/verification information described above is the topic of endorsements. Endorsements can play a particularly important role in selling a value-based product. Because green products are valued particularly for their environmental benefits, having an environmental organization endorse a green product provides added credibility to the com-

pany selling the product as well as to the product itself. As one marketer noted, “Endorsements by or cooperation with the environmental community can result in a pre-qualified customer base and the advantage of having someone else to do some of your marketing for you.” Testimonials from the environmental community are extremely valuable in building credibility. One respondent noted, “From a retailer’s perspective, getting an unqualified endorsement could be a huge advantage, but as yet no one has.”

Many environmental groups are interested in finding ways to get markets to work in support of environmentally superior products. Some members of the environmental community are very sophisticated about marketing green products—through the use of catalogues, direct mail, telephone solicitations (for member organizations)—and have years of experience selling to their constituents. If green marketers are able to learn from these groups, they can quickly increase their customer base.

There also may be opportunities for co-marketing. The characteristics of environmental group membership overlap significantly with the characteristics of expected green power product early adopters. Given the leadership role that may be played by environmental organizations in influencing green power purchases, these groups may offer valuable opportunities for collaboration. For example, the Land and Water Fund of the Rockies has helped educate consumers and has lent credibility to the green pricing program of Public Service Company of Colorado through its marketing partnership, while the Natural Resources Defense Council provides an example of an environmental organization that has identified a group of competitive green products that has met their “environmentally preferable” screening criteria. Environmental groups also may play a vital role in influencing policy decisions that support emerging green markets.

CONCLUSIONS

There are many new roles and valuable niches yet to be explored in the value chain of new and emerging green markets. Using the value chain concept in this analysis helps to identify potentially valuable activities. Experiences in regulated markets and adversarial proceedings make it difficult for some stakeholders to effectively visualize the skills and knowledge needed to successfully adapt their organization to new market situations. This problem is further complicated by the emergence of new stakeholders, including new affiliates of traditional players. Participants at every level are seriously reassessing their company's role, its relationship to other stakeholders, and the value chain activities within the company. Knowledge and expertise are the assets in greatest demand in creating niches for new market stakeholders.

Partly due to the intangible nature of electricity as a consumer product, information becomes an extremely important aspect of the green market value chain. The world of business increasingly demands a shift from supply-side to demand-side thinking. Nowhere is this more dramatic than in the electricity market, where there is the opportunity to sense and respond to customers' desires rather than simply to make and sell a product. Information is not only a support element for green electricity products, it is an integral part of the product itself. Market players will need to be acutely aware of the roles played by the various stakeholders—as well as consumers' motivations and values—to contribute successfully to the wind market value chain in the future.

APPENDIX A. QUESTIONS FOR WIND STUDY CONTACTS

1. What features of emerging/restructured markets most benefit wind?
 - What do you see as the future of green pricing given the move toward restructured electricity markets? How will it affect the market for wind?
 - What are the primary opportunities for wind in markets with state renewable energy funds? Are there any disadvantages? What are they?
 - What are the primary opportunities for wind in markets with a renewable portfolio standard (state or federal)? Are there any disadvantages? What are they?
 - What are the primary opportunities for wind in direct access markets? Are there disadvantages? What are they?
2. What are the pre-conditions and market attributes for building merchant wind plants in restructured electricity markets? Are there strategies that can share the risks and benefits among wholesale and retail marketers and developers?
3. What are the green power marketing opportunities associated with unbundling environmental benefits? Are there any disadvantages? If so, what? (Value of a green power exchange?)

(For interviewees in states not operating in restructured markets)
4. Are restructured markets in other/nearby areas offering benefits for wind? What and how?
5. How do developer relationships differ with various marketing entities — utilities, wholesale/retail marketers, and aggregators?
6. Are there benefits in wind size, scale, modularity? How can they be used to develop wind in new electricity markets? (Are there advantages to being small? Big? Do they see a market different from what is developing?)
7. What, if any, are distributed wind benefits, and how can stakeholders take advantage of them in emerging markets?

8. What are the advantages and disadvantages of teaming wind with other renewable technologies for selling into new retail markets?
9. What are the advantages and disadvantages of marketing partnerships/relationships with environmental organizations?
10. Have you been involved with or know of any strategies for offering consumers the opportunity for direct investment in wind plants?
11. If strategies were developed that improve the dispatchability of wind—storage, improvements in short-term wind forecasting—what would be the value/importance (for developers vis-a-vis new markets)?

APPENDIX B. WIND MARKET ASSESSMENT STUDY CONTACTS

The following companies were interviewed for the Wind Market Assessment Study:

Utilities

1. Sacramento Municipal Utility District
2. Public Service Company of Colorado
3. Wisconsin Electric
4. Central and South West

Aggregators

1. City of Palm Springs, California
2. City of San Jose, California
3. Barnstable County, Massachusetts

Retail Marketers

1. Green Mountain Energy Resources
2. AllEnergy Marketing Company
3. Electric Lite

Wholesale Marketers

1. PacifiCorp
2. Foresight
3. FPL Energy Group
4. VisionQuest Wind Electric

Developers

1. ENRON Wind
2. Bergey Windpower
3. Calwind Resources
4. Distributed Generation Systems

NOTES

Introduction

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

2. This paper 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 paper 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.

Incorporating the Value of Wind Power in Changing Electricity Markets

1. Michael E. Porter, *Competitive Advantage: Creating and Sustaining Superior Performance* (New York; The Free Press, 1985).

2. Consumer preference for clean, renewable energy has been well documented. See Barbara C. Farhar, "Energy and the Environment: The Public View." *REPP Issue Brief No. 3* (College Park, Md.: Renewable Energy Policy Project, October 1996). Price stability is a feature that has been incorporated into green power products offered by Traverse City Light & Power, Wisconsin Electric and Sacramento Municipal Utility District, among others. Preference for domestically or locally produced energy stems from increased tangibility and visibility of the green power facility, and from the local economic development benefits that accrue from local sources. In-state resources also have begun to be identified as a source of product differentiation by some California green power marketers. See Edward A. Holt, "Green Pricing Experience and Lessons Learned," *Proceedings of the 1996 ACEEE Summer Study*, 9:133-140 (Washington, D.C.: American Council for an Energy-Efficient Economy, 1996); Lee Bergquist, "'Green Power' Cost Irks Environmental Groups," *Milwaukee Journal Sentinel*, June 25, 1996.

3. Porter, *Competitive Advantage*, p. 36.
4. Public Utility Commission of Texas, "Order Denying Petitions for Rulemaking." PUC Project No. 19087, Rulemaking to Address Renewable Energy (Green Pricing) Tariff for Electric Utilities, August 18, 1998.
5. Indianapolis Power & Light Company, "IPL Launches Elect Plan Customer Options Program." Press release, July 21, 1998.
6. Examples include utility regulators, resource agencies and siting authorities, as well as environmental organizations concerned about siting issues.
7. None of the utility representatives interviewed had any particular opinion on future prospects.
8. Ryan H. Wiser and Steven J. Pickle, *Selling Green Power in California: Product, Industry and Market Trends* (Berkeley, Calif.: Lawrence Berkeley National Laboratory, May 1998).
9. Retailers may include independent marketers, investor-owned utility affiliates, cooperatives, municipal utilities, tribes, facility owners and others.
10. In addition to state utility regulators, federal regulators, including the Federal Trade Commission and the Federal Energy Regulatory Commission, claim some jurisdiction over retail electricity markets.
11. While for-profit retail marketers are subject to Federal Trade Commission jurisdiction regarding advertising statements, nongovernmental organizations, as nonprofit entities, are not. Instead, these organizations are held accountable by the quality of their ideas and reputations, which ultimately are judged by the court of public opinion.
12. This is consistent with the consumer information compiled for the first report in this series, as well as with the interviews conducted with stakeholders for this report. See Edward A. Holt and Ryan H. Wiser, "Understanding Consumer Demand for Green Power," prepared for the National Wind Coordinating Committee (Denver, Colo.: National Conference of State Legislatures, December 1998).
13. Of course, the Production Tax Credit (PTC), which will expire June 30, 1999, if not extended by Congress, is an important factor in making wind competitive. Without the PTC, green consumers would have to pay more for wind and this would undoubtedly affect its economic attractiveness. Nevertheless, a recent assessment by the Electric Power Research Institute and the U.S. Department of Energy shows wind to be among the most economically attractive of renewable technologies, even without the PTC. See U.S. Department of Energy and Electric Power Research Institute, *Renewable Energy Technology Characterizations*. EPRI TR-109496 (Palo Alto, Calif.: Electric Power Research Institute, December 1997: 7-3).

14. There tends to be strong opposition in many regions of the country to building new hydroelectric facilities and also resistance to some types of new biomass plants.

Forging New Relationships in Emerging Green Power Markets

1. Ryan Wiser and Edward Kahn, *Alternative Windpower Ownership Structures: Financing Terms and Project Costs* (Berkeley, Calif.: Lawrence Berkeley National Laboratory, May 1996).

2. Merchant financing (or merchant plants) refers to the construction of a power plant, the output of which is not fully contracted for in advance, based on an expectation that the uncontracted power will be able to be sold in the future.

3. "House load" refers to power used on the project site.

4. Fossil fuel plants are not all alike in their risk profile either. Coal plants, like renewable technologies, are capital intensive and historically have experienced little variation in fuel costs. For this reason, we differentiate here between coal and natural gas plants.

5. However, the sale of environmental assets also could reduce the value of green electricity to consumers if the "greenness" is separated from the electricity.

Information and the Virtual Value Chain

1. Jeffrey F. Rayport and John J. Sviokla, "Exploiting the Virtual Value Chain," *Harvard Business Review* (November-December 1995): 75-85; Philip B. Evans and Thomas S. Wurster, "Strategy and the New Economics of Information," *Harvard Business Review* (September -October 1997): 71-82.

2. Holt and Wiser, "Understanding Consumer Demand for Green Power," 1998.

3. In addition to questions about the economic feasibility of 100 percent wind in competitive markets, some policymakers and regulators in the northeast have questioned the credibility of a pure wind product, apparently referring to its intermittency and assuming that generation must match demand over short periods instead of balancing over a one-year period.

4. It is interesting to note that websites and toll-free numbers have become critical elements in marketing electricity to smaller customers. Since electricity is a virtual product never seen by the customer, media of all types become the marketplace within which the product is sold.

5. See, for example, 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 1997); Environmental Futures Inc., Synapse Energy Economics, and Tellus Institute, *New England Tracking System* prepared for the New England Governors' Conference, October 1998; Renewable Energy Alliance, *Disclosure: A Vital Tool for Consumers*, October 1998.

6. Edison Electric Institute, *Consumer Labeling and Disclosure of Price, Fuel, and Emissions for Retail Electric Services* EEI Discussion Paper Series on Public Purpose Issues, No. 1 (Washington, D.C.: Edison Electric Institute, 1998).

7. W.A. Magat and W. K. Viscusi, *Informational Approaches to Regulation* (Cambridge, Mass.: MIT Press, 1992); 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); Kenneth Winneg, et al., *Label Testing: Results of Mall Intercept Study* (National Council on Competition and the Electric Industry, April 1998).

8. Although there is no way of assuring where specific electrons go, money and contracts can be traced. It is possible to verify that electricity from renewable resources was generated into the grid and purchased in the appropriate amount for the demand being served (e.g., the customers who purchased the green product).

9. A few months later in a Massachusetts pilot program, the same company marketed a hydropower product that was not specific about the generating facility. Some have argued that this is an example of a self-correcting market based on competitor or consumer pressure.

10. Other reasons may include inexperience in retail marketing of electricity and unfamiliarity with environmental marketing guidelines published by the Federal Trade Commission.

11. Karl Rábago, Ryan Wiser and Jan Hamrin, "The Green-e Program: An Opportunity for Customers," *The Electricity Journal* 11, no. 1 (January/February 1998): 37-45. Two of the authors of this paper (Hamrin and Wiser) are associated with the Green-e program.

12. Ryan H. Wiser, Steven J. Pickle and Joseph H. Eto, "Details, Details ... The Impact of Market Rules on Emerging 'Green' Energy Markets," in *Proceedings of ACEEE 1998 Summer Study on Energy Efficiency in Buildings*. (Washington, D.C.: American Council for and Energy Efficient Economy, August 1998).

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