

Information Brief on Green Power Marketing

Fourth Edition

Blair Swezey and Lori Bird



NREL

National Renewable Energy Laboratory

1617 Cole Boulevard
Golden, Colorado 80401-3393

NREL is a U.S. Department of Energy Laboratory
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Up-to-date information on green power market trends can be found on the Green Power Network at <http://www.eren.doe.gov/greenpower>.

Executive Summary

For the first time in many decades, consumers are being given a choice of who supplies their electric power and how that power is generated. One of these choices is to support electricity generation from more environmentally beneficial energy sources. The term “green power” generally refers to electricity supplied from renewable energy sources. By some estimates, nearly one-quarter of all U.S. consumers will have the option to purchase green power by the end of 1999, either from their regulated utility provider or in competitive markets. As of July 1999, consumers can choose to purchase competitively marketed green power in California, Massachusetts, Pennsylvania, and Rhode Island. As competition spreads in the electric power industry, more consumers will have this choice.

The purpose of this *Information Brief* is to provide electric industry analysts with information on green power market trends. Descriptive information on green power marketing activities in both competitive and regulated market settings, as well as other pertinent data and information, are included.

Competitive Green Power Marketing

California

- The California electricity market was opened to competition on March 31, 1998. After more than 1 year of competition, just 1.4% of all eligible utility customers have chosen to switch suppliers: 1.1% residential, 3.4% commercial, and 20% of industrial customers. Virtually all of the residential customers that have switched are receiving green power.
- Several high-profile business and institutional customers, such as Toyota Motor Sales USA and Patagonia have chosen to buy green power. Santa Monica became the first city to switch all of its municipal facilities to 100% green power and dozens of other cities have followed suit. And several large religious organizations are encouraging their members to buy renewable power.
- Thirteen electric service providers have registered with the California Energy Commission as renewable power suppliers. Seven of these companies are certified to use the *Green-e* logo, offering a total of 13 products that meet the program’s criteria of at least 50% renewable energy content. Some companies offer multiple products, containing anywhere from 50% to 100% “eligible”¹ renewable power—with the remaining power coming from large hydro, natural gas, or system power.
- Most green power marketers are, by necessity, selling power from existing renewable resources, such as geothermal, small hydro, and biomass projects but plan to add new renewable resources

¹Under the definition established in California’s electric industry restructuring law (AB 1890), eligible renewables may include solar, wind, geothermal, solid fuel biomass, whole waste tire combustion, municipal solid waste, landfill gas, and hydropower with a generating capacity of 30 MW or less.

in the future. Some marketers have also upgraded their products to increase the amount of power that comes from new renewable resources—five of the 13 *Green-e* certified products now claim 5% to 25% new renewables content.

- Throughout 1998, green power marketers charged price premiums that generally ranged from 1.1¢ per kilowatt/hour (kWh) to 2.5¢/kWh. However, in early 1999, three marketers announced price reductions to as low as 5% below the California Power Exchange (PX) price. These price cuts were made possible by a 1.5¢/kWh state credit, which is available to purchasers of qualifying renewable electricity.

Pennsylvania

- Starting January 1, 1999, two-thirds of Pennsylvania's electricity customers can choose an electricity supplier, with the remaining one-third eligible to participate a year later. As of July 1, 448,000 customers, or about 12% of all eligible customers, had switched suppliers. It is estimated that as many as 15% of these customers have chosen a “green power” supplier.
- A greater percentage of customers are participating in the Pennsylvania market because of competitive market rules that were designed to encourage consumers to switch providers. Under the state's restructuring rules, customers receive a “shopping credit,” which is the energy rate against which customers can shop for price savings with other suppliers. Customers who do not switch suppliers are guaranteed only a small rate reduction. In addition, a state-run education campaign actively promotes customer choice.
- Three green power suppliers are active in Pennsylvania. Four green power products contain at least 50% renewable energy content and are *Green-e* certified. These power products contain small hydro, biomass, and landfill gas. Two of the four products include a small fraction (3%-5%) of new renewable resources, which will come from landfill gas facilities. One marketer recently announced plans to build a 10 megawatt (MW) wind power facility, which would be the first large wind project ever constructed in the state.

New England

- Electricity competition began on January 1 and March 1 of 1998, in Rhode Island and Massachusetts, respectively. However, little competitive marketing has developed because the incumbent utilities can sell electricity at below-market prices. The “default” utility energy price, often called the “standard offer” price, will rise in future years. At present, there is only one supplier of green power in New England.

Competitive Market Pilot Programs

As a precursor to full competition, several states and utilities established retail access or portfolio choice pilot programs in which a small segment of customers were given supply choices, some of which included green power. In some programs, between 15% and 30% of participating residential customers have chosen to purchase green power, containing varying amounts of renewable energy,

where this option has been available. These relatively high green power responses should be tempered by the likelihood that a disproportionate number of consumers interested in purchasing green power signed up to participate in the pilot programs.

Utility Green Pricing Programs

- More than 50 utilities in 18 states have either developed or announced intentions to develop green pricing programs for their customers. Many of these programs have resulted in new renewable energy project development. Utilities with established programs report high customer retention rates, indicating high rates of customer satisfaction. Several utilities are expanding or plan to expand the size of their programs because of continued positive customer response.
- Actual or proposed price premiums for energy-based green pricing offerings range from 0.4¢/kWh to 5.0¢/kWh with a mean of about 2.0¢/kWh.
- A total of 55 MW of new renewable energy capacity have been developed through green pricing programs with more than 20 MW of additional capacity planned by the end of 1999.
- Most utilities have targeted their marketing programs to residential customers. However, many report that they are developing marketing schemes to target business customers as well, which represent a large and relatively untapped market.
- Customer participation in utility green pricing programs has been as high as 4%, but is generally around 1% to 2% or less. The low overall participation rates can be attributed to any number of factors, including the experimental nature of many programs for which capacity and subscription limits are imposed, the narrow scope of most green pricing offerings, and generally indifferent corporate and marketing commitments.
- Utilities have begun to design programs to better reflect the types of services that might be offered to customers in a competitive market, such as allowing customers to purchase blocks of renewable energy or meet up to 100% of their electricity needs from green power.

Introduction

The essence of green power marketing is to provide market-based choices for electricity consumers to purchase power from environmentally preferred sources. Green power marketing has the potential to expand domestic markets for renewable energy technologies by fostering greater availability of renewable electric service options in retail markets. Although renewable energy development has traditionally been limited by competitive cost considerations, customer choice allows consumer preferences for cleaner energy sources to be reflected in market transactions. In survey after survey, customers have expressed a preference and willingness to pay more, if necessary, for cleaner energy.

Green pricing is an optional utility service that gives customers an opportunity to support a greater level of utility company investment in renewable energy technologies. Participating customers generally pay an additional amount on their electric bill to cover the incremental cost of the renewable energy. Many utilities are offering green pricing to build customer loyalty and expand business lines and expertise in advance of electric market competition. To date, more than 50 utilities have either implemented or announced plans to offer a green pricing option.

The more general concept of *green power marketing* refers to selling green power in a competitive marketplace, in which multiple suppliers and service offerings exist. Early retail access pilot programs provided limited opportunities for power marketers and customer aggregators to test green power offerings in competitive markets. Indications from these and other programs are that the demand for green power products and services in a more competitive electric marketplace is potentially very large. In a Massachusetts pilot, nearly one-third of residential participants chose an “environmentally preferable” service provider. In New Hampshire, 37% of customer participants polled said they were either “strongly influenced” or “moderately influenced” by the environmental message or image of their chosen supplier.

Beyond these experimental programs, electricity markets are now open to competition in California, Massachusetts, Pennsylvania, and Rhode Island.² Several green power marketers, offering green products and services to residential, commercial, and wholesale customers, are active in California and green power products have also been introduced in New England and Pennsylvania.

Even the limited experience with restructured markets has highlighted a number of issues that will drive the success of green power markets. Primary among these are the new rules and market mechanisms that states establish for competition. Other needs include the education of customers about environmentally preferable market choices and verification of product marketing claims.

This document provides descriptive information on green power marketing activities in U.S. electricity markets as well as other pertinent data and information.

²As of July 1, 1999, 23 states had either enacted legislation on electric restructuring or had issued comprehensive regulatory orders under which all customers will be allowed to choose an electricity supplier. However, the effective dates for customer choice differ widely. Regularly updated information on state electricity restructuring activities is available from the U.S. Energy Information Administration at <http://www.eia.doe.gov>.

Competitive Green Power Marketing

As of mid-1999, consumers can choose to purchase competitively marketed green power in four states: California, Massachusetts, Pennsylvania, and Rhode Island. As a result of marketing activities in these states, more than 20 MW of new renewable energy capacity have been added to the electricity grid and another 20 MW are planned. The California and Pennsylvania markets have been the most active for green power providers. In Pennsylvania, the established competitive market rules encourage customer switching activity. And while the California market rules are not particularly favorable to customer switching, readily accessible renewable power sources and state-based market incentives have encouraged a large number of companies to sell green power in the market. In New England, because low-priced "default" service limits the ability of green power providers to offer competitively priced products, there is little green power marketing activity.

Green power has also been available as an option in some competitive market experiments in New England and the Pacific Northwest. This section provides summary information on competitively marketed green power programs, including experience to date in restructured electricity markets.

California

More than a year has passed since California opened its \$20 billion a year electric power market to competition, giving customers of investor-owned utilities the opportunity to select a different electric service provider (ESP). Data collected by the California Public Utilities Commission show that, through June 30, 1999, just 1.4% of all eligible utility customers have actually switched suppliers: 1.1% residential, 3.4% commercial, but 20% of industrial customers.

Most market commentators attribute the lack of switching among smaller customers to the inability of marketers to offer price savings to these customers. Since the default energy price in California is the wholesale price determined in the California Power Exchange (PX), there is no retail energy price margin against which marketers can compete.³ Thus, during the competitive "transition period," the only true market for smaller customers is the "value-added" market, in which alternative electricity products, such as green power, must be sold at a premium to the retail price.

Though the initial customer switch numbers may seem underwhelming, there is no lack of interest among green power suppliers and marketers. Thirteen ESPs have registered with the California Energy Commission (CEC) as selling renewable power. Seven of these suppliers are certified to use the *Green-e* logo, offering a total of 13 products that meet the program's criteria of at least 50% renewable energy content. Several other companies sell *Green-e* certified power in the wholesale market.

³ This situation will persist as long as the utilities continue to recover their "stranded" investments or the cost of investments that cannot be recovered in the competitive market. California's restructuring law gives the utilities a maximum period of 4 years to recover these costs.

Initially, green power marketers charged a price premium that generally ranged from 1.1¢/kWh to 2.5¢/kWh for a customer using 500 kWh monthly. However, early in 1999, three green power marketers announced price cuts. In January, Commonwealth Energy announced that it would sell its 100% renewable energy product at a discount from the PX price and switch all of its customers to the new green power product. Subsequently, green power providers Clean 'n Green and Green Mountain Energy also announced price cuts. Green power products are now being offered by these companies at prices as low as 5% less than the PX price.

The discounts are possible because of a 1.5¢/kWh state credit that is available for customer purchases of qualifying renewable electricity. The credit will be available through the transition period. With green power premiums averaging about 0.5¢/kWh, this leaves green power marketers with about 1.0¢/kWh to cover operating costs and provide customers with a discount to the default utility price.

Nearly all of the 100,000 residential customers that have switched to an alternative supplier are now receiving green power. Some high-profile nonresidential customers, including businesses, churches, and municipalities, have also chosen to purchase green power. In May 1998, Toyota Motor Sales USA became the first large business customer to publicly commit to green power when it announced its intent to purchase 12 MW of 100% green power to serve four of its California facilities. And in July of last year, Patagonia became California's first business customer to commit to purchase 100% of its electricity needs from newly constructed wind turbines.

Santa Monica became the first city to switch all of its municipal facilities to 100% green power when city staff signed a 1-year contract to purchase 5 MW of geothermal power at a 5% premium. Since then, both the San Diego Association of Governments (SANDAG) and the Association of Bay Area Governments (ABAG) have committed to purchase green power for their member cities and agencies. And the California Episcopal Diocese adopted a resolution instructing the state's 87 churches to buy renewable power. As of May 1999, nine Bay Area Episcopal churches had voted to switch to green power.

Despite a low overall customer switching rate, a number of positive trends are developing in the California green power market. The number of green power marketers continues to increase and some green power products are now being sold for less than the default electricity price. Green power providers are also upgrading their products to increase the amount of power that comes from new renewable resources—five of the 13 *Green-e* certified products now consist of 5% to 25% new renewable sources. Finally, the growing participation of businesses and local governments in green power purchasing will build greater awareness of green power choices among all types of customers. Non-residential customers now account for more than one-half of all competitive green power purchases in the state.

Green Power Companies

Calpine Corporation— Calpine recently acquired 700 MW of geothermal power plants from Pacific Gas and Electric Company. With these acquisitions, Calpine will own and operate more than 800 MW of geothermal generation, which it plans to sell into the competitive power market.

Calpine has struck geothermal power deals with Commonwealth Energy and the Sacramento Municipal Utility District (SMUD). SMUD will purchase 50 MW of electricity from the plant through 2001 at market prices, plus a renewable power premium. And, Calpine will sell up to 125 MW of power to Commonwealth over the next 3 years. Finally, Calpine struck a deal with ABAG to supply its members with up to 63 MW of geothermal power.

cleen 'n green—As of March 1999, cleen 'n green energy sells a green power product consisting of 100% renewable energy sources, with 20% coming from “new” renewable sources. The company purchases its green power from independent California generators through the Automated Power Exchange (APX) Green Power Market, a week-ahead forward market that matches buyers and sellers of renewable power. cleen 'n green sells its *Ecosave* green power product at a slight discount to the PX wholesale price.

Commonwealth Energy Corporation—Commonwealth claims to be serving more than 50,000 residential and small business customers throughout California, which would make it the leading competitive power supplier in the state in terms of numbers of customers. Commonwealth began as a discount power seller but switched to selling green power in early 1999 when the price benefit of the state’s 1.5¢/kWh green power purchase rebate became apparent. Commonwealth now offers green power at a discount to the PX price.

In May 1999, Commonwealth struck a 3-year deal with Calpine Corporation for renewable energy supply. The agreement calls for Commonwealth to purchase 60 MW of power from Calpine in 1999, increasing to 100 MW in 2000 and 125 MW through June 2002. The power will come from Calpine’s geothermal plants located at The Geysers. Commonwealth has also struck some high-profile customer deals, most notably with the City of Santa Monica, SANDAG, and the North American Coalition on Religion and Ecology.

Edison Source—Edison Source, a subsidiary of Edison Enterprises, is offering three *Green-e* certified products to California customers, featuring 50% and 100% renewable power and a 100% renewables product that includes 10% new renewables. According to the company, the cost of the 50% option is approximately the same as 1997 customer electricity rates,⁴ while those who choose 100% renewable energy will pay approximately 15% more, or a premium of about 2¢/kWh.

In April 1998, Toyota Motor Sales USA, the fourth largest auto company in the United States, announced a 2-year agreement to purchase 12 MW of green power (38 million kWh annually) from Edison Source to power its U.S. headquarters and several other Southern California facilities.

Enron Energy Services—After conducting an aggressive marketing campaign in late 1997, prior to the opening of the California market, Enron suspended its efforts to market alternative electricity services to residential customers. An Enron spokesperson cited an inability to provide significant discounts to customers as the primary reason for withdrawal from the California market. Enron was marketing Earth SmartSM Power, an electricity product containing 50% renewables, with the balance

⁴By law, residential customers were guaranteed a 10% rate cut when direct access began in 1998.

guaranteed not to come from coal, nuclear, or petroleum sources. Enron is still supplying green power to customers who signed up before the program was suspended.

In July 1998, Patagonia, a Ventura-based outdoor clothing manufacturer, announced that it would purchase 100% renewable energy from Enron to power its 14 California facilities. Enron will supply the power from a new 16-MW wind power facility being constructed near Palm Springs, California.

Green Mountain Energy—Green Mountain Energy (GME) offers two products in the California market:

- *100% Renewable Power*, which has 100% renewables content and will contain 5% new renewables and be priced approximately 5% below the California Power Exchange price
- *Wind for the Future*, for which 25% of the power content will come from new wind turbines.

The remainder of the electricity for the *Wind for the Future* product will be supplied by small-scale hydro, biomass, geothermal, and landfill gas. Both Green Mountain products are *Green-e* certified.

In July 1998, GME launched Green Mountain Solar, offering rooftop photovoltaic (PV) systems for California homeowners. The rooftop systems will enable residential customers to produce between 20% and 50% of their total electricity needs. The remainder of the power will be supplied by the supplier of the customer's choice. Because of subsidies available in California, the PV system costs will be reduced by at least one-half from typical market prices.

Keystone Energy Services—Keystone offers two green power products for residential and wholesale markets. *EarthChoice 100* is comprised of 100% in-state renewable power and *EarthChoice 50* is comprised of 50% in-state renewables, with the remaining 50% coming primarily from large hydropower. Both products are *Green-e* certified. Keystone obtains its green power supplies and schedule coordination services through the APX Green Power Market. As of May 1999, Keystone reported that it was serving more than 7,000 customers.

PacifiCorp—PacifiCorp is a wholesale provider of green power. The utility has constructed two new, 700-kW wind turbines in California's San Geronimo Pass to provide power for Green Mountain Energy's *Wind for the Future* product.

PG&E Energy Services—PG&E Energy Services offers two green power products. *Clean Choice 50* is comprised of 13% new renewable sources, 37% current renewable sources, and 50% large hydroelectric sources. *Clean Choice 100* is based entirely on renewable energy generation, and is comprised of 25% new renewable sources and 75% current renewable sources. Both products are *Green-e* certified.

Sacramento Municipal Utility District—In June 1999, SMUD announced a deal to supply the U.S. Environmental Protection Agency's (EPA) Richmond, California research laboratory with 100% renewable electricity. Under a 3-year agreement reached with the Federal General Services Administration, SMUD will provide the facility with *Green-e*-certified power from its GreenergySM

product, which consists of 60% geothermal energy from plants located at The Geysers and 40% landfill gas from a new facility being constructed in Sacramento. The EPA laboratory uses about 1.8 million kWh of electricity annually, which is the equivalent of 200 average Sacramento homes.

Other California Providers—Several other companies have registered with the CEC to market green power in California. Among these are Eagle Power (*Natural 50* and *Natural 100*), New West Energy Corporation (*Green-e* certified *GreenValue* products), Omni Electric Company (100% renewables product for commercial customers), Powercom Energy & Communications Access Inc. (two products), PowerSource (*PowerGreen 25* and *PowerGreen 100*), and Utility.com (*ValuePower* and *PowerAce*).

Other Organizations

Automated Power Exchange—APX is a fully automated electricity exchange through which sellers and buyers can make power transactions in the California electricity market. APX also operates a green power exchange. The APX Green Power Market is a week-ahead forward market that matches renewable energy producers with retail providers who want to provide “green” or renewable power to their customers. This market includes only those resources that meet state eligibility criteria. APX participates in the *Green-e* program. APX has also introduced a “green ticket trading” system, that allows the particular attributes of a power product, such as resource and technology type or whether the electricity comes from a new or pre-existing facility, to be separated from the electricity commodity.

California Energy Commission—The CEC manages the 4-year, \$540 million renewables fund that was established in the state’s restructuring legislation. A portion of the fund is being used to provide credits to customers who purchase renewable power meeting certain eligibility criteria. Eligible customers can receive a credit of up to 1.5¢/kWh. The value of the credit is generally reflected in the price of the green power offered by the supplier. The CEC also created a “power content label” that, by law, all ESPs must use to disclose information to customers about the energy resources used to generate the electricity they sell.

Pennsylvania

Starting in January 1999, two-thirds of Pennsylvania electricity customers were eligible to select a new power provider, with all customers to be eligible 1 year later. The new competitive market was designed to encourage consumers to switch providers. Under the state’s restructuring rules, customers receive a “shopping credit,” which is the energy rate against which customers can shop for price savings with other suppliers. Customers who do not switch suppliers are guaranteed only a small rate reduction. The Pennsylvania Public Utility Commission (PUC) is also actively promoting choice through a statewide education campaign. Three companies or organizations are offering green power in the state.

The Pennsylvania Office of Consumer Advocate (OCA) reported that, as of July 1, nearly 450,000 Pennsylvania customers, or about 12% of those eligible to switch, were being served by alternative

electricity suppliers. Hard data are not available on how many of these consumers have switched to green power providers; the number may be as high as 15%.

Pennsylvania Market Participants

Conectiv Energy—Conectiv offers two *Green-e* certified power products: *Nature's Power 100*, which contains 100% renewable electricity resources, and *Nature's Power 50*, which contains 50% renewable and 50% non-renewable sources. Conectiv also supplies renewable energy to members of the Energy Cooperative Association of Pennsylvania.

Energy Cooperative Association of Pennsylvania—ECAP, a 20-year-old, Philadelphia-based fuel oil cooperative, is offering green power to its members, with the energy supplied by Conectiv Energy.

Green Mountain Energy—GME offers three green power products in Pennsylvania: *Eco Smart*, *Enviro Blend*, and *Nature's Choice*. Two of the three products have been certified by the *Green-e* program as containing at least 50% renewable energy. In October 1998, Green Mountain announced a partnership with Sun Power Electric to build 100 kW of photovoltaics in the state to serve its customers and committed to build additional solar capacity as it signs up more customers. In addition, Green Mountain also offers a rooftop PV option for residential customers. The company also recently announced plans to build a 10-MW wind farm in southwestern Pennsylvania.

New England

Electricity competition began on January 1 and March 1 of 1998, in Rhode Island and Massachusetts respectively. As of February 1999, 17 energy suppliers and nine brokers were licensed to do business in Massachusetts and 35 suppliers were registered in Rhode Island. But little competitive marketing has developed, particularly for smaller customers, because the “default” electricity price, often called the “standard offer” price, was set initially below the wholesale price of energy. In Rhode Island, only 0.3% of electricity customers have switched suppliers. At present, only one company supplies a green power product in New England.

New England Market Participants

AllEnergy Marketing Company—In May 1997, AllEnergy, a joint venture formed by New England Electric System and Eastern Enterprises, announced the formation of a new division offering environmentally preferable electricity services: ReGenSM Technologies. ReGen was formed to facilitate the development of new renewable generation projects using clean technologies such as wind and solar to supplement existing regional resources.

ReGen offers a renewable power service that “upgrades” the environmental quality of the electricity used by the customer, without requiring the customer to switch electricity providers. Residential and small commercial customers can purchase blocks of renewable service at a premium of \$8 per block per month for the first block and \$6 for all subsequent blocks—one block equals approximately 30% of the average customer’s electricity use. Large commercial and industrial customers can purchase

the service on a per kWh basis. Initially, AllEnergy will supply renewable power from a new landfill gas project, but plans to add PV and wind to the mix.

Boston Oil Consumers Alliance—BOCA, a heating oil cooperative serving Eastern and Central Massachusetts, is purchasing green power for its members. In December 1998, the group established a “Green Electric Co-op” to obtain renewable electricity at discounted prices. The co-op is currently purchasing renewable energy from AllEnergy at a 25% discount. With the discount, co-op members can sign up to purchase 2,000-kWh annual blocks of green power for \$6 a month, which equates to a price premium of 3.6¢/kWh. After 2 months of marketing, which consisted of informational mailings, nearly 2% of BOCA’s 6,000 members had signed up for the renewable upgrade service.

Essential.com— Essential.com™, a web-based power marketer, is offering electricity at discount prices for a limited number of residential customers in the service areas of Massachusetts Electric Company and Boston Edison Company. The company is bundling electricity and telephone services to achieve savings. Essential.com is a licensed broker of AllEnergy Products and is also marketing AllEnergy’s ReGen green power product.

Other Organizations

Bonneville Power Administration—In 1996, BPA signed a 5-year agreement to provide Salem Electric Cooperative with 7 average megawatts (aMW) of capacity at a price of 3.5¢/kWh (a premium of 1.0¢/kWh). The power is being supplied by BPA’s 15-MW purchase share of PacifiCorp’s Arlington, Wyoming wind project.

BPA is also marketing a green power blend in the Pacific Northwest, consisting of 90% small hydro and 10% wind energy. For the wind energy component, BPA has contracted to purchase an additional 1.8 MW of wind generated from three new turbines located at the Arlington site. As of July 1999, BPA was selling a total of 14.5 MW of the power blend to four utility customers: Emerald People’s Utility District, Flathead Electric Cooperative, Orcas Power & Light, and Snohomish County Public Utility District #1.

Center for Resource Solutions—In concert with green power marketers and consumer and environmental stakeholders, CRS launched the country’s first voluntary certification and verification program for environmentally preferred electricity products. The program’s centerpiece—the *Green-e* logo—identifies electricity products that contain at least 50% renewable electricity content. The *Green-e* program is active in California and Pennsylvania, and is also being considered for New England.

Participating green power companies pledge to authenticate the renewable content of their electricity products, abide by a code of conduct governing their business practices, and provide customers with regular information about the sources of the electricity that they purchase. In addition to power marketers, companies that purchase significant amounts of *Green-e* certified power are eligible to use the logo in marketing and advertising materials. Both Toyota Motor Sales USA and Patagonia have been approved to use the *Green-e* logo.

Environmental Resources Trust—ERT is an independent, nonprofit organization, founded with the help of the Environmental Defense Fund, which brokers “electric power sources that offer clear and demonstrable environmental benefits.” ERT signed an agreement with BPA to broker environmentally beneficial power products, including unscheduled power generated from federal hydro facilities as a result of fish recovery operations, power generated from renewable projects, and power from instream flow improvements enabled by ERT water purchases. Proceeds from the sales are to be invested in fish and wildlife and other on-the-ground environmental projects.

National Association of Attorneys General—Noting problems with defining what type of power can and should be labeled as “environmentally friendly,” NAAG established a task force to recommend language requiring disclosure when green power or marketing claims are used by electric utility providers. While taking no position on the environmental benefits of different types of power sources, the attorneys general emphasized that every state should ensure that consumers understand the exact nature of any green power marketing claims. NAAG is drafting a set of “Green Guidelines for Electricity” that are intended for use by industry and law enforcement agencies to clarify how environmental marketing claims can be made in a non-deceptive manner.

Renewable Energy Alliance—The REA is a national trade association of companies directly engaged in the production or sale of renewable energy in competitive markets that was formed to pursue a common agenda to address regulatory issues and undertake market-building activities in support of renewable energy market development. Members include *AllEnergy* Marketing Company, Green Mountain Energy, PacifiCorp, and PG&E Corporation. The group is working to support policies and regulations that establish fair market structures for environmentally preferable power sources and that foster the use of accurate environmental claims in the promotion of differentiated power products.

Competitive Market Pilot Programs

Some states or utilities have offered limited customer choice programs in advance of fully competitive markets. Retail access pilot programs have been established as market experiments to offer customers a choice of products and suppliers. And, utilities have offered portfolio choice programs under which a subset of customers, while not having access to competing suppliers, can select from among several different offerings supplied by the incumbent utility. In either case, these pilot programs provide important, although limited, information on the potential demand for green power among electricity consumers.⁵ This section provides a brief summary of programs that have been implemented in New England and the Pacific Northwest. Only programs in which green power options were available are reviewed.

Retail Access Pilot Programs

Massachusetts Electric—The MECo pilot was the first pilot to explicitly include green power options in the program design. MECo opened as much as 100 million kWh in four cities to competition; four companies were selected to provide “environmentally sensitive” or “green” service options. Green options included not only generation from renewable resources, but also energy efficiency programs, retirement of emissions credits, and donations to environmental groups and projects. Overall, 31% of residential and 3% of small business participants chose one of the four green options offered. Interestingly, one of the more expensive residential green power products, offered by Working Assets, received the highest market share among the green options. Given the significant interest in green power suggested by these figures, it is important to note that only 3.5% of the residential customers eligible participate in the program chose to switch suppliers.

New Hampshire—A statewide pilot program was ordered by the New Hampshire Legislature in June 1995 to determine the implications of retail competition in the electric industry. The pilot began in May 1996 and was originally scheduled to run through April 1998. In June 1998, the Public Service Commission extended the program indefinitely—a legal challenge has delayed the start of full retail competition. Under the pilot program, approximately 3% of each electric utility’s peak load, or a total of about 50 MW statewide, is available to competition. Initially, more than 30 power suppliers registered and about 16 competed actively for customers. When the pilot program was launched, six suppliers used green marketing themes to sell their products, although most companies attempted to project an environmentally friendly image rather than work substantively towards the addition of renewable energy resources. Market share data are not available. However, in a survey of participating customers, 37% said they were either “strongly influenced” or “moderately influenced” by the environmental message or image of their power supplier.

Portland General Electric—PGE offered about 54,000 residences and businesses (approximately 10% of all customers) in four area communities the opportunity to receive power from an alternative

⁵ Although green power has been a popular choice in several of these programs, it has been argued that many customers who choose to participate in pilot programs may do so precisely because of the availability of a green power option. Thus, pilot program participants may have a greater predisposition toward choosing a green power option than the general customer base.

supplier beginning December 1997 for a period of 1 year. All large commercial and industrial customers were allowed to buy as much as 50% of their electricity from competing providers.

The Oregon PUC certified 14 energy service providers for the program, but only eight providers actively marketed their services. Two providers served the residential market, and only one, Electric Lite, offered a green power product. Four months after the pilot began, Electric Lite offered a green power product containing at minimum of 50% solar, wind, geothermal, or landfill gas. The company also guaranteed that at least 85% of the product would not contain coal or nuclear resources. The green power product was priced at 2.822¢/kWh, which was a 1¢/kWh premium over the company's discounted electricity offering—the product was marketed as “a penny for the planet.” The green option was offered for a period of several months but Electric Lite later withdrew from the program. Electric Lite's withdrawal left no other companies to market alternative service options to PGE's residential customers (Enron had withdrawn earlier).

About 15% of all eligible customers, representing 54% of the eligible load, switched suppliers during the pilot. At the peak of the program, 14% of eligible residential customers, 31% of commercial, and 69% of large industrial/commercial customers had switched. According to surveys conducted by PGE, the majority of customers were not aware that a green power option was available. Of those that were aware, PGE reported that about 5% of residential customers and 7% of the commercial customers chose green power. Electric Lite reported that only about 1% of its customers chose the green power option.

One unique feature of the PGE pilot was that electricity suppliers were required to provide an information label to help consumers compare power generation sources and environmental emissions. According to surveys conducted by PGE, customers felt that this information was useful, despite the fact that few selected the green power option.

Portfolio Choice Programs

Avista Corporation—Avista, formerly Washington Water Power, is providing 7,500 customers, or 3% of the utility customer base, with a menu of energy service alternatives. The pilot program began in July 1998 and will run for 2 years. Customers could sign up anytime during the first year of the program to receive power at a market rate or from renewable resources. Avista is offering four different renewable resource options—a 25% wood power mix, a 25% wind power mix, a 100% wood power mix, and a 100% wind power mix. The wind power, which is being sold at a 2¢/kWh premium, is supplied from PacifiCorp's Wyoming wind project and the biomass, sold at a 1.37¢/kWh premium, is supplied from an existing, Avista-owned wood-waste generating facility. Of the 7,500 eligible customers, only 84 (about 1.1%) switched to a different service and only 14 (0.2%) chose one of the four green power options—10 customers chose a wind power option, with four of those choosing the 100% option, and one customer chose the 100% biomass option.

According to an Avista spokesperson, one possible reason that green power may not have been attractive to the pilot participants is that the system resource mix is comprised of 65% hydro with the remainder coming from natural gas and biomass resources. Therefore, customers may already consider the existing resource mix to be “clean.”

Clark Public Utilities—In March 1998, Clark Public Utilities (Washington) began a 1-year pilot program involving nearly 6,000 customers (2% of the customer base). These customers were offered a choice of four different service options: (1) the standard resource mix from Clark, (2) power from the BPA, (3) green power, and (4) a market-priced option. Customers could choose more than one type of power supply, with a minimum of 25% from each source. The green power was supplied by PacifiCorp from an existing geothermal facility in Utah and the company's new Wyoming wind project. The green power premium was 1.5¢/kWh above the traditional supply option and 1.1¢/kWh above the BPA option. The market rate option fluctuated with the market price of energy.

Only 18% of the eligible customers responded to the participation offer. Of these customers, 9.2% chose to receive at least 25% of their power from green resources, with 1.7% choosing the 100% green option.

Indianapolis Power and Light—In 1998, IPL began offering customers three new pricing options, including a green power purchase option. The *Elect PlanSM Green Power Program* is open to all residential and commercial customers with less than 2,000 kW of monthly demand and offers the option of purchasing 25%, 50%, or 100% of their monthly electricity demand from renewables. The green power is currently being supplied with purchases of California-based geothermal power from Enron, but IPL is evaluating small hydro and methane gas resource options submitted in response to an RFP issued in September 1998. Program participants currently pay a cost-based premium of 0.9¢/kWh but this premium might change based on the future mix of resources. IPL is working with local environmental groups to market the program.

Midwest Energy, Inc—In October 1998, Midwest Energy, Inc., a Kansas-based rural electric cooperative, announced that it would offer a green service option as one component of a planned customer choice program. Pending approval from the Kansas Corporation Commission, customers will be able to choose between their current rate structure and alternative pricing options, including green power, energy efficiency, and other choices.

Pacific Power—Pacific Power initiated a 1-year portfolio program in July 1998 with two separate enrollment periods. The pilot program gave residential and small commercial customers and schools in Klamath County, Oregon, a choice of service from a portfolio of electricity pricing options, including market-based pricing, renewable energy, and a community-based option to support low-income customers. Schools were able to participate at 100% of their electric load, and customers with demand greater than 5 MW could participate for up to 50% of their load. The green power option is a blend of 80% existing geothermal and 20% wind energy from PacifiCorp's Wyoming wind project. Customers pay a 12% price premium for the green power option.

PacifiCorp reported that 28% of customers who elected to participate in the second round of the pilot program chose the green power offering. The percentage of customers selecting green power was nearly double the 15% that chose the green power option in the first round. In total, about 6% of eligible customers chose to participate in the pilot, meaning that slightly less than 2% of eligible customers received green power.

Market Participants

Electric Lite—Electric Lite, a South Carolina-based power company, provided residential and commercial service in PGE’s Customer Choice pilot, including a green power option. Foresight Energy supplied the green power, which was priced at a 1¢/kWh premium. The resource mix was reported to be 26% existing geothermal, 25% new landfill gas, and 25% existing hydro, with the remaining 24% from natural gas, oil, coal, and nuclear resources. About 8 months into the pilot, Electric Lite withdrew from the program, stating that they could not justify continued marketing unless the program was expanded to provide more customers.

Green Mountain Power—GMP participated in the New Hampshire electricity pilot program, offering customers a “green” electricity service consisting of 97% existing hydro (from Hydro Quebec), 1.5% natural gas, and 1.5% nuclear resources. The participation in New Hampshire pilot was a precursor to the establishment of Green Mountain Energy Resources, which, although no longer a part of GMP, is now a leading green power marketer.

Working Assets Green Power—WAGP participated in both the New Hampshire and Massachusetts retail access pilot programs. In both pilot programs, WAGP marketed its power as “non-coal, non-nuclear, and non-Hydro-Quebec.” The company contracted with New England Electric System for its power supplies, which included unit commitments from 11 power plants providing a mix of hydroelectric, oil-fired, and gas-fired generation. The company also donated 1% of its pilot revenues to environmental groups in each state. WAGP chose not to participate in the California market because of what it considered to be unfavorable market rules.

Utility Green Pricing Programs

Green pricing is an optional utility service that gives customers an opportunity to support a greater level of utility company investment in renewable energy technologies. Participating customers pay a premium on their electric bill to cover the incremental cost of the additional renewable energy. To date, more than 50 utilities have developed or have announced intentions to develop green pricing programs for their customers.⁶ Customer participation in these programs has resulted in installation of about 55 MW of new renewable resources and plans for installing another 20 MW.

Utilities Offering or Planning Green Pricing Programs

Investor-Owned Utilities

Arizona Public Service
Detroit Edison
Florida Power and Light
Gulf Power Company
Hawaiian Electric Company
Madison Gas and Electric
Nevada Power Company
Public Service Company of Colorado
Southwestern Public Service
TXU Electric
West Texas Utilities
Western Resources
Wisconsin Electric Power
Wisconsin Public Service

Rural Electric Cooperatives

Dairyland Power Cooperative
Flathead Electric Cooperative
Great Lakes Energy Cooperative
Great River Energy
Holy Cross Energy
Orcas Power and Light
Pacific Northwest Generating Cooperative
Tri-State G&T

Publicly Owned Utilities

City of Alameda
Austin Energy
City of Bowling Green
Colorado Springs Utilities
Eugene Water and Electric Board
Fort Collins Utilities
Gainesville Regional Utilities
Lincoln Electric System
Los Angeles Dept. of Water and Power
Moorhead Public Service
Nebraska Public Power District
City of New Smyrna Beach
Sacramento Municipal Utility District
Salt River Project
City of Tallahassee
Traverse City Light and Power
Turlock Irrigation District

Federal

Tennessee Valley Authority

⁶ In some cases, several distribution cooperatives may be marketing green power supplied by a generation and transmission cooperative. For example, about half of Tri-State G&T's 32 member systems are marketing the cooperative's green power product. However, only the supplier organization is listed here.

Types of Green Pricing Programs

There are three basic types of green pricing programs, which are described further below. One key difference among program types is the ability of customers to substitute some amount of green power for the utility's standard resource mix.

Contribution program—Customers can contribute to a utility-managed fund for renewable project development. In general, these projects are not developed to offset any part of the customer's electricity usage. Nearly all of the projects developed under contribution programs have used PV and have been relatively small, with the exception of the Sacramento Municipal Utility District, which has developed a total of 1.5 MW of PV since 1993 through its PV Pioneers green pricing program.

Capacity-based program—Customers can choose to purchase a fixed block of electric capacity to be generated from renewables. Capacity-based programs have offered PV exclusively, in rooftop or localized applications. Monthly premiums range from \$2.50 to \$6.59 per 100 watts of capacity. Generally, the capacity blocks subscribed are well below the capacity necessary to serve the customer's total electricity requirements.

Energy-based program—Customers can choose to purchase a fixed block or percentage of their electric energy requirements from renewables. In many of these programs, a customer can choose to purchase 100% of their electricity usage as green power. This type of program generally offers renewable energy sources that are most competitive with bulk power generation—17 of the 23 energy-based programs that are either already in place or planned will use wind power. The green power price premium charged in these programs vary from 0.5¢/kWh to 5.0¢/kWh.

Summary information on the three different types of utility programs is provided in Tables 1-3.

Green Pricing Program Summaries

Arizona Public Service—In 1996, APS established a solar tariff to develop as much as 400 kW of "centralized photovoltaic systems" for its *SolarPartners* program. The power is being sold in 100-watt capacity blocks at \$3.00/block/month. The program costs are being partially subsidized with a grant from the Utility PhotoVoltaic Group (UPVG). The program is open to all APS customers.

The first project was built in Flagstaff. The initial customer response well exceeded the utility's target and the project was expanded from 41 kW to 82 kW. APS then announced plans to expand the program statewide and constructed a second 82-kW PV project at an existing power plant site in Tempe.

APS is constructing several new solar plants during 1999 in response to continued high levels of customer and community interest: two systems totaling 180 kW at the Glendale Municipal Airport and a 34-kW PV shaded parking structure in Scottsdale. A second installation is planned for Flagstaff but details have not yet been finalized. Future plans include facilities in Yuma and Prescott Valley. The new projects will involve partnerships with the host cities.

Table 1 - Green Pricing Contribution Programs

Utility	Technology	Size	Inception Date	Notes
Florida Power and Light	PV	10 kW	1997	Utility site
Gainesville Regional Utilities	PV	10 kW	1993	Demonstration project at utility site property
Gulf Power	Solar	10 kW	1996	School project; no additional projects planned
Hawaiian Electric	PV	30 kW	1996	Schools-based projects
Nebraska Public Power District	Unspecified	--	1999	Will build new facilities
Nevada Power Company	PV	40 kW	1998	One 16-kW system and one 24-kW system
City of New Smyrna Beach	PV	4 kW	1999	Plan to install 150 kW of PV with green pricing and buy-downs
Public Service Company of Colorado	PV PV	40 kW 52.8 kW	1993 1998	Several small off-grid Solar Schools
Sacramento Municipal Utility District	PV	1500 kW	1993	PV Pioneers
		7 kW	1997	Community-based systems
City of Tallahassee	PV	10 kW	Planned	Public building
Wisconsin Public Service	PV	48 kW	1996	Schools-based projects
	PV	small	1998	Small systems for public areas

Table 2 - Capacity-Based Green Pricing Programs

Utility	Size	Premium	Inception Date	Notes
Arizona Public Service	378 kW	\$3.00/100 watts	1996	5 central PV projects; 3 planned
Austin Energy	153 kW	\$3.50/50 watts	1997	3 commercial-scale PV projects
Detroit Edison	28.4 kW 26.4 kW	\$6.59/100 watts	1996	2 central PV projects
Salt River Project	200 kW	\$3.00/100 watts	1998	Central projects at utility power plant

Table 3 - Energy-Based Green Pricing Programs

Utility	Technology	Size	Premium	Inception Date	Notes
City of Alameda	Unspecified	Unspecified	1.0¢/kWh	1999	Unspecified investment in renewables
Austin Energy	Wind/landfill gas	Unspecified	0.4¢/kWh	1999	Negotiating 10-year purchase agreement for up to 26 MW
City of Bowling Green	Small hydro	6.0 MW	1.38¢/kWh	1999	Selling power from new small hydro facility. Funds to be used to develop new wind/solar
Colorado Springs Utilities	Wind	1.0 MW	3.0¢/kWh	1997	Wholesale purchase from PSCO
Dairyland Power Cooperative	Wind	--	3.0¢/kWh	1997	Wholesale purchase from Great River Energy
Eugene Water & Electric Board	Wind	6.5 MW	3.2¢/kWh	1999	EWEB's share of Wyoming wind project
Flathead Electric Cooperative	Wind/small hydro	1.0 MW	2.0¢/kWh	1999	Purchase from BPA
Fort Collins Utilities	Wind	1.2 MW	2.5¢/kWh	1996	Wind purchase from Platte River Power Authority; two 600-kW turbines operational; additional turbines planned for late-1999
Great Lakes	Wind	700 kw	Not determined	2000	New wind turbine to be operational in spring 2000
Great River Energy	Wind	1.98 MW	2-3¢/kWh	1997	Power supplied to distribution co-ops
Holy Cross Energy	Wind	1.75 MW	2.5¢/kWh	1997	Wholesale purchase from PSCO; may purchase another 1.25 MW
Los Angeles Department of Water and Power	Unspecified	Unspecified	0.64¢/kWh	1999	Launched May 1999. 20% of power from new renewables
Lincoln Electric System	Wind	1.32 MW	4.3¢/kWh	1998	New 660-kW turbine. Second turbine planned for late 1999

Table 3 - Energy-Based Green Pricing Programs (continued)

Utility	Technology	Size	Premium	Inception Date	Notes
Madison Gas and Electric	Wind	11.22 MW	3.3¢/kWh	1997	New project operational June 1999
Moorhead Public Service	Wind	750 kW	0.5¢/kWh	1998	New wind turbine
Orcas Power & Light	Wind/small hydro	0.5 MW	2.5¢/kWh	1999	Purchase from BPA
Pacific Northwest Generating Cooperative	Landfill gas	1.05 MW	1.8-2.0¢/kWh	1999	Portion of 2.5-MW project marketed as green power
Public Service Company of Colorado	Wind	20 MW	2.5¢/kWh	1997	New Colorado-based wind project
Sacramento Municipal Utility District	Geothermal and landfill gas	8.3 MW (LFG)	1.0¢/kWh	1997	Power purchases from Geysers and new 8.3-MW LFG project
Southwestern Public Service	Wind	660 kW	3.0¢/kWh	1998	A second turbine will be added if warranted by customer demand
Traverse City Light and Power	Wind	600 kW	1.58¢/kWh	1996	Built dedicated wind turbine
Tri-State G&T	Wind	2.65 MW	2.5¢/kWh	1999	Power purchase from Platte River Power Authority and Terra Moya; new turbines available late-1999
Turlock Irrigation District	Small hydro	--	~1.0¢/kWh	1999	Existing utility-owned small hydro plants
TXU Electric	Wind	6.6 MW	4.0¢/kWh	1999	Wind purchase from Big Spring project (4 new 1.65-MW turbines)
West Texas Utilities	Small Hydro	1.2 MW	2.0¢/kWh	1997	Existing small hydro
Western Resources	Wind	1.5 MW	5.0¢/kWh	1998	Two 750-kW turbines operating
Wisconsin Electric Power	Wood/Hydro	5.0 MW	2.0¢/kWh	1996	Wholesale purchases
	Wind	1.32 MW		1998	Two new wind turbines operational June 1999

APS reports that 1,500 of its residential customers are participating in the program with another 600 on a waiting list. The Glendale project will provide enough capacity to serve the waiting list and an additional 1,400 customers. APS plans to begin another marketing push once the new capacity comes on line.

City of Alameda—The City of Alameda (California) Bureau of Electricity began offering a green pricing option to its electricity customers in January 1999. Alameda, which already obtains more than 75% of its power resources from renewable energy sources, rolled out the *Clean Future Fund*, under which customers can support investment in “future renewables or new investments for upgrades and retrofits for existing renewable sources” or research and development of electric vehicle technology. Participants will pay a premium of 1.0¢/kWh to 1.5¢/kWh depending on which option they choose. The Bureau already offers a net metering program to customers with rooftop solar systems.

Austin Energy—The City of Austin’s municipally owned electric utility, Austin Energy, offers customers the opportunity to purchase 50-watt increments of power from PV systems installed in various applications. The monthly premium is \$3.50 per 50-watt block. The utility changed the block size from 100 watts to make the program accessible to a larger customer base and because some customers felt the original premium, at \$7.00 per block per month, was too high

In August 1998, Austin Energy dedicated its first project, a 32-kW system that provides shaded parking at a local “Park and Ride.” The utility has since installed two additional projects: a 10-kW installation located at a city library and a 111-kW system at Austin-Bergstrom International Airport. As of February 1999, approximately 1,000 customers had subscribed to 1,400 blocks of the total 3,000 blocks of power available from these three projects. The Austin Energy program was developed under the UPVG TEAM-UP (Technology Experience to Accelerate Markets in Utility Photovoltaics) PV Friendly Pricing program.

In January 1999, Austin issued a request for pricing for a planned 100-MW renewables purchase. In response, the utility received 12 bids to supply power from a mix of wind, landfill gas, solar, geothermal and biomass resources.

In April 1999, Austin announced plans to initiate a new, voluntary green power purchasing program in the fall. Austin Energy recently received authorization from the City Council to negotiate ten-year contracts for the purchase of as much as 77,000 MWh of wind energy and 150,000 MWh of landfill gas electricity, enough power to serve 22,000 typical households. Starting in September, the utility plans to offer customers an option to purchase the green power at premium of 0.4¢/kWh. Funds collected will be matched dollar-for-dollar by the utility to purchase additional green power beyond the 100-MW commitment.

City of Bowling Green—The City of Bowling Green (Ohio) electric utility is offering its customers the opportunity to purchase “green power” from a newly constructed, run-of-the-river hydro facility. Customers can purchase up to 100% of their electricity needs, in 25% increments, through the program at a price premium of 1.38¢ per kWh of green power purchased. The power will be supplied from a 42-MW, municipally constructed project of which Bowling Green owns a 6-MW share. The

city will use the additional funds collected from customers to construct new solar or wind resources next year. The city plans to advertise the program in bill inserts.

Colorado Springs Utilities—Colorado Springs Utilities signed a contract with Public Service Company of Colorado (PSCo) to purchase 1 MW of wind power from PSCo's *WindSource* program to sell to its residential and commercial customers. Utility surveys indicated that customers want the utility to pursue clean energy for environmental reasons and to gain experience with new technologies. More than 900 customers have signed up to purchase the wind power at a premium of \$3.00 per 100-kWh block (see also PSCo summary).

Dairyland Power Cooperative—Under the *EvergreenSM Renewable Energy Program*, Dairyland Power Cooperative of Wisconsin offers wind power to its 27 member distribution cooperatives for a price of \$3.00 per 100-kWh block. Dairyland has contracted to purchase one-third of the output from Great River Energy's 2.0-MW project. As of February 1999, approximately 925 customers are purchasing 1850 blocks, with more customers on a waiting list. Dairyland plans to expand the program under the current power purchase agreement or using alternative resources (see also Great River Energy summary).

Detroit Edison—In 1995, Detroit Edison developed a green pricing program to support the installation of centrally located PV projects. Customers pay for 100-watt blocks of solar generating capacity rather than for the electricity generated. The monthly premium is \$6.59 per block. The first 28.4-kW project, installed in 1996, was cost-shared by UPVG.

The Michigan Public Service Commission (PSC) approved an expansion of the program in July 1997. In October 1997, Detroit Edison dedicated a second solar electric facility with a capacity of 26.4 kW. The utility also expanded the program to include commercial customers. Less than 300 customers are participating in the program, purchasing an average 140 watts of PV capacity with an average monthly bill increase of \$9.23 or 15%. In addition, six area businesses committed to participate in a new program that donates solar-generated electricity to Southeastern Michigan school districts. Participating school districts also receive a 2-week solar and renewable energy curriculum.

Eugene Water and Electric Board—In March 1999, EWEB began marketing power from its share of the newly constructed Wyoming wind project to its residential customers in Oregon. The 41.4-MW project is owned jointly by EWEB (8.8 MW) and PacifiCorp (32.6 MW). EWEB is selling 2.28 MW of power to the Bonneville Power Administration and intends to sell the remaining 6.5 MW to its retail customers over a 3-year period. Customers can purchase wind energy to provide from 10% to 100% of their electricity needs at a price premium of 3.2¢/kWh. EWEB estimates that it will take 30% of its residential customers subscribing at the 10% level to fully subscribe the available capacity.

Less than 2 months after the utility began actively marketing the option, about 1,700 of EWEB's 66,589 residential customers (2.6%) had signed up to buy almost a quarter of the power available. More than half of these customers chose to purchase 25% or more of their electricity requirements from wind energy—EWEB had anticipated that most customers would choose the 10% option. Because of the higher level of subscription amounts, EWEB may only need 6,000 customer sign-ups

to fully subscribe the 6.5 MW of wind power capacity. The utility plans to offer the green power option to its commercial and industrial customers later in 1999.

Flathead Electric Cooperative—Flathead, which serves 47,000 customer accounts throughout Northwest Montana, announced that it has entered into a two-year contract with Bonneville Power Administration (BPA) to purchase 1 MW of "environmentally preferred" power. Beginning October 1, 1999, BPA will provide the cooperative with electricity from its standard green power mix, which is a blend of new wind power from the Arlington, Wyoming wind project and small hydro resources (under 30 MW). Flathead plans to give all of its customers the option of purchasing the green power at a premium of 2¢/kWh and will begin marketing the program in August 1999.

Florida Power and Light—Pursuant to a settlement agreement with the Legal Environmental Assistance Foundation, FP&L developed a green pricing program to support construction of PV systems. FP&L launched the "Solar Research Partnership" in 1997 and recently installed a 10-kW PV unit at one of its power plants with \$90,000 in customer donations. In another recent settlement agreement, FP&L has agreed to expand its green power offering if a feasibility study shows sufficient consumer interest. The new agreement sets a goal for the utility to obtain 10,000 customers for a green pricing program that would install 150 kW of PV by 2003.

Fort Collins Utilities—Approximately 500 residential and small-business customers subscribe to a pilot program that offers wind energy at a premium of 2.0¢/kWh. The Colorado municipal utility is contracting to purchase power from two 600-kW wind turbines installed in Medicine Bow, Wyoming. The turbines, which are owned and operated by the Platte River Power Authority, began generating power in April 1998. Residential subscribers are required to purchase all of their power from wind, while commercial customers can purchase wind power in 1,000-kWh blocks.

In June 1999, Fort Collins announced that it was expanding the program and will purchase half of the energy generated by five new 660-kW wind turbines that will be installed at Medicine Bow by Platte River. One of the turbines will serve the load of New Belgium Brewing Company, Inc., which has subscribed to purchase its entire annual electricity requirement from wind power at a premium price for 10 years. Fort Collins is also increasing the wind power premium from 2.0¢/kWh to 2.5¢/kWh—the utility found that the lower premium did not fully cover the costs of the pilot program. Also, residential customers will now have the option of purchasing the wind power in 400-kWh blocks for \$10.00 per month extra. Customers can still choose to service their entire electricity requirement with wind power.

Gainesville Regional Utilities—In January 1997, GRU completed a 10-kW PV demonstration project at the utility's Electric System Control Center in Gainesville, Florida. The project was funded by community donations and with grants from the Florida Energy Office and UPVG. GRU garnered community support for the project through its monthly customer bulletin and inserts in the local newspaper. More than 600 customers contributed to the project over a 3-year period.

While customer participation has dropped off for the demonstration project, GRU is exploring opportunities to expand their green power offerings to include a rooftop PV program or a capacity-based program to implement a centralized PV system.

Great Lakes Energy Cooperative—In January 1999, GLE, which serves over 100,000 customers in 24 counties in Michigan, announced that it was studying a proposal to construct a \$650,000 wind turbine in northern Michigan. The wind turbine project was recommended in a study and would be similar to the project developed by Traverse City Light and Power in 1996. Construction of a 700-kW turbine is set to move forward based on positive customer feedback and will likely begin operation in the spring of 2000. The turbine will generate enough power to serve the average annual consumption of 87 homes; GLE serves 106,000 customers in total.

Great River Energy—GRE was formed in December 1998 through the merger of *Cooperative Power Association* (CP) and *United Power Association* (UPA), both generating and transmission cooperatives serving a total of 29 member distribution cooperatives in Minnesota and both offering green power products. Each will continue to offer their green power products separately through 1999. After that, Great River reports that the programs will be combined into one.

In 1997, CP implemented a program to procure wind energy for its distribution members to sell in green pricing programs. As of February 1999, 14 member co-ops are participating, with more than 3,600 100-kWh blocks subscribed. Participants are now purchasing power from the newly completed, 2-MW wind project consisting of three 660-kW turbines located in Chandler, Minnesota. With the program fully subscribed, CP is now exploring options to expand the program possibly with additional wind or biomass resources. CP was able to lower its wind power premium from a range of \$3.00 to \$4.00 per block to \$2.00 per block because of a state production incentive.

UPA offers a wind power product to its 12 member distribution cooperatives for sale to their customers. The wind power is being sold in 100-kWh blocks in a 1-year test program. UPA purchases the wind power from both Great River and Northern States Power. As of February 1999, 350 UPA customers are purchasing approximately 600 blocks of power per month.

In 1997, the Minnesota PUC approved a tariff filing by *Dakota Electric Association*, a distribution customer of Great River, to offer its customers a wind energy purchase option. Dakota is purchasing one-third of the output from the 2.0-MW Chandler project and selling the power for \$1.40 per 100-kWh block. Dakota was able to lower the wind price premium from an originally estimated \$4.00 per block because of “efficiencies in wind technology and state incentives.” A 12-month subscription commitment is required. The program is currently oversubscribed with 775 customer participants.

Gulf Power—In 1996, Gulf Power, which serves over 300,000 customers in Northwest Florida, undertook a program to install a variety of solar energy technologies at public schools using customer contributions leveraged with utility funds. The program was designed to offset conventionally generated electricity and to increase community awareness of renewable energy technologies. As of February 1999, Gulf Power had collected approximately \$16,000 from 9,000 participants—more than 4% of eligible customers—and installed a 10-kW solar desiccant cooling and dehumidification system at a local school. Participating customers have contributed an average of \$1.75 per month. In a recent settlement agreement with the Legal Environmental Assistance Foundation, Gulf Power has agreed to offer a new green pricing program that, if found to be feasible, would install 500 kW of PV by 2004.

Hawaiian Electric—In 1996, HECO initiated a program with a minimum goal of installing 20 kW of PV systems on public school facilities to be funded in part with customer contributions. Customers can make voluntary monthly fixed-dollar contributions or lump-sum contributions at any time. As of February 1999, more than 2,600 customers had contributed \$90,000 to the program; HECO has contributed \$140,000 of utility funds. A total of 30 kW of PV have been installed at 17 schools. The original 2-year program has been extended for a second 2-year period. HECO is planning additional marketing and hopes to increase program participation from the current level of 0.7% to more than 1% of its customers.

Holy Cross Energy—Holy Cross, which serves Colorado’s Roaring Fork Valley, has a program through which its customers can purchase 100-kWh blocks of wind energy at a rate premium of 2.5¢/kWh. Holy Cross is a wholesale customer of PSCo and has committed to purchase 1.75 MW of wind power through PSCo’s WindSource program and is in negotiations for another 1.25 MW.

As of February 1999, the utility had garnered subscriptions for 2,500 blocks of wind power from 630 residential, commercial, and municipal customers, representing 1.5% of total customers. The City of Aspen is purchasing 500 blocks per month, which is equivalent to about one-third of the city’s electricity use. The Community Office for Resource Efficiency (CORE) is assisting the utility with customer recruitment (see also PSCo summary).

Holy Cross is also partnering with CORE on the *Sun Power Pioneers* program through which customers can receive cash incentives of up to \$3,000 for PV installations. The incentive is in the form of a 3-year energy payment of 25 cents/kWh for power generated from systems installed under the program. The funding is being provided by the Turner Foundation, the Cities for Climate Protection Campaign, and Aspen Skiing Company.

Lincoln Electric System—In April 1998, LES began seeking customer support for construction of a wind turbine in Lincoln, Nebraska. Within 48 days of program rollout, the utility had fully subscribed the wind turbine with 3-year commitments from about 900 customers to purchase 1,400, 100-kWh wind energy “units.” While initially priced at 6.0¢/kWh, LES was able to reduce the wind price premium to 4.3¢/kWh because of the Renewable Energy Production Incentive available from the U.S. Department of Energy. The 660-kW turbine began operation in December 1998. Because of continuing customer sign-ups for the *Renewable Energy Program*, LES has contracted to build a second turbine that will be operational by the end of 1999. Nearly 2,000 of the utility’s 108,000 customers have signed up for the program and, on average, are purchasing about 150 kWh of wind energy per month. The average residential customer uses about 800 kWh per month.

Los Angeles Department of Water and Power—In May 1999, LADWP officially launched its *Green Power for a Green L.A.* program that gives customers the option to receive 100% renewable energy at an additional cost of only \$3.00 per month for the average residential customer. Twenty percent of the power will come from new renewable sources. A novel twist to the program is that participating customers will be given free energy-efficiency products and services to help reduce their bills and offset the increased cost of the green power. Commercial and industrial customers can also participate “by adding a minimum to their total energy bill for green resources.”

Madison Gas and Electric—In October 1997, MGE, which serves 124,000 customers in and around Madison, Wisconsin, announced plans to construct, own, and operate an 11.22-MW wind farm in northeastern Wisconsin. Construction of the 17-turbine project was completed in June 1999. A portion of the project output is being marketed to customers as a green power option. As of July 1999, 4,200 of MGE's electric customers had signed up to purchase more than one-third of the power available through the program. The utility is selling the power in 150-kWh blocks for \$5.00 each—a premium of 3.3¢/kWh over the standard electricity rate. Sign-ups are averaging about 1.7 blocks per customer. In addition, all customers are being charged about 20 cents more per month to help pay for the \$15 million project.

Moorhead Public Service—In May 1998, MPS (Minnesota) announced that it had signed up more than 400 residential and commercial customers to participate in its *Capture the Wind* green pricing program. Based on this response, the utility constructed a 750-kW wind turbine that became operational in May 1999. The utility charges a premium of 0.5¢/kWh for the wind power. Residential customers must make a 3-year purchase commitment and can choose to serve 100% of their electricity needs with wind or purchase blocks of 1,000 kWh per month. Commercial customers pay the same premium and can purchase power in blocks of 1,500 kWh per month. Moorhead State University has committed to purchase 83,000 kWh each month or more than half of the turbine's output. More than 100 other customers have been placed on a waiting list. MPS serves 13,000 customers in total.

Nebraska Public Power District—In February 1999, NPPD announced that it will offer its customers a voluntary program through which they can contribute to a utility-managed fund for new renewables development. Participation in the program will require a minimum contribution of \$6.00 per month and business participation will be encouraged. Based on participation rates in similar "green" energy programs in the Midwest, NPPD projects that as many as 11,500 Nebraskans may choose to participate in its *Prairie Power* program.

City of New Smyrna Beach—In June 1999, the City of New Smyrna Beach (Florida) Utilities Commission launched a green power contribution program to fund local renewable energy projects. The municipal utility's 20,000 customers can sign up to donate \$5 or \$10 per month to support the installation of solar electric systems on local public buildings. In June, the first 4-kW system, which will be funded through future contributions, was installed on a local elementary school. The city has set a goal of installing 150 kW of photovoltaics over the next 4 years through its green pricing program and other solar energy programs. The utility also recently initiated a rooftop PV buy-down program that enables customers to purchase systems for \$2/watt.

Nevada Power Company—NPC won approval from the Nevada Public Utility Commission for a program that allows residential and commercial customers to specify a fixed monthly contribution or to "round up" their monthly bill for the utility to develop PV systems. NPC proposed to construct as many as forty-six 20-kW PV systems over a 10-year period, with an initial commitment to two systems, one each in 1998 and 1999. The first installation is a 16-kW system located at the Desert Research Institute in Las Vegas. A second, 24-kW system will be installed by the end of 1999. NPC reports that over 600 customers are contributing an average of \$5.43 per month.

Orcas Power and Light—Orcas, an electric cooperative serving Washington’s San Juan Islands, has agreed to buy 0.5 MW of green power from the Bonneville Power Administration. The green power product is a mix of small hydro and wind energy. Participating customers can choose to purchase the green power in blocks of 100, 200, 400, 800 and 1,000 kWh at a price premium of 3.5¢/kWh above the standard residential rate of 5.1¢/kWh.

Pacific Northwest Generating Cooperative—PNCC is a not-for-profit, private energy services cooperative owned by 11 electric cooperative utilities in the Pacific Northwest. PNCC owns and operates the Coffin-Butte landfill gas generation facility, which became operational in 1995. While the output of the 2.5-MW plant is shared proportionally among the member cooperatives, three Oregon-based members are test-marketing the output to their customers as a premium green power service. The three utilities are *Central Electric Cooperative*, *Douglas Electric Cooperative*, and *Umatilla Electric Cooperative*. The green premium ranges from 1.8¢/kWh to 2.0¢/kWh. The most successful of these efforts appears to be with Central, where more than 3% of the utility’s customers have reportedly subscribed to purchase one or more 100-kWh blocks. PNGC hopes to expand the size of the project in the near future.

Public Service Company of Colorado—PSCo established one of the first green pricing contribution programs in 1993. Approximately 13,000 customers, representing more than 1% of residential customers, contribute to the Renewable Energy Trust, either through fixed contributions or using a bill “round up” option. Through the Trust, PSCo has deployed about 40 kW of off-grid PV systems. The Trust is now implementing school-based PV systems under the *Solar Schools* program. Twenty-two school systems had been installed by mid-1999 with another eight systems planned by the end of the year.

In 1997, PSCo introduced its *WindSource* program, which offers its customers an option to purchase 100-kWh blocks of electricity from a new wind project in northeastern Colorado at a 2.5¢/kWh rate premium. Customers can also choose to receive their entire monthly electricity consumption from wind energy. As of May 1999, more than 11,000 customers had subscribed for a total of 18 MW of wind energy capacity. The *Land and Water Fund of the Rockies* is helping PSCo market the program. PSCo is also supplying a total of 2.75 MW of wholesale wind capacity to Holy Cross Energy and Colorado Springs Utilities.

Sacramento Municipal Utility District—Since 1993, SMUD has operated the *PV Pioneers I* program under which customers can pay a \$4.00 flat monthly fee (for 10 years) to have a 2-kW to 4-kW, grid-connected PV system installed on their rooftops. SMUD installs, operates, maintains, and owns the hardware. More than 450 residential and 30 commercial systems have been installed under the program. Although total installations have been limited to around 100 systems per year, SMUD receives approximately 1,000 new applicants annually and currently has 75 customers on a waiting list.

In October 1998, SMUD received approval for the *PV Pioneers II* program, through which customers can purchase PV systems for their own use under a net metering arrangement. SMUD will “buy-down” more than half of the \$10,000-plus system cost. As of February 1999, there were 150 customers on a waiting list to participate. SMUD expects to install approximately 400 systems (about

1,200 kW) per year and plans to move to customer-owned systems entirely at some point in the future, thus eliminating the *PV Pioneers I* program.

Looking toward the competitive retail market in California, SMUD developed a new “green rate” that allows its customers to obtain all of their electricity needs from renewable sources; SMUD already meets nearly half of its power needs with renewables. Customers can choose to receive 100% of their power from renewable energy sources for an additional 1.0¢/kWh or choose a 50% renewables service for an additional 0.5¢/kWh. SMUD is currently purchasing a power mix of geothermal (60%) and landfill gas (40%) resources to supply the program, including power from a new 8.3-MW landfill gas plant. As of February 1999, more than 5,400 customers had signed up for the *Greenergy* program, representing more than 1% of total residential customers.

Another *Greenergy* product, the *Community Solar* program, allows customers to contribute 1.0¢/kWh for the purchase and installation of photovoltaic systems on schools, churches, and other community facilities. Through March 1999, 600 customers had signed up for the program and three PV systems had been installed in the community.

Salt River Project—SRP provides a solar energy purchase option to its customers from two 100-kW, single-axis tracking photovoltaic plants located at the company’s Santan Power Plant in Gilbert, Arizona. Dubbed the *Solar Choice* Program, SRP customers can purchase 100-watt blocks of solar power capacity for \$3.00 per month. Customer purchases are limited to three blocks of power. The customer funds are supplemented with a UPVG grant.

In the first month of marketing (August 1998), 1,900 customers requested about 2,900 power blocks, easily meeting the 1,000 block commitment necessary to fully subscribe the first 100-kW plant. As a result of the large response, SRP decided to construct the second plant. Approximately 1,300 SRP customers have now fully subscribed both systems and there is a waiting list of more than 800 customers.

Southwestern Public Service—SPS has installed one, 660-kW turbine near Clovis, New Mexico to serve its New Mexico-based customers. The wind power is being sold as an optional service to interested customers at a premium of \$3.00 per 100-kWh block, or 3¢/kWh. Similar to the *Windsorce* program of its sister company, PSCo, customers can choose to purchase as few or as many blocks of wind energy as they want, up to their total monthly consumption. The turbine will produce the equivalent of 1,540 blocks per month—the average customer uses 700 kWh to 800 kWh of electricity monthly. The utility has committed to build a second turbine if warranted by customer demand. SPS is the first utility in New Mexico to offer its customers the opportunity to purchase wind energy.

City of Tallahassee—Pursuant to a settlement agreement with the Legal Environmental Assistance Foundation, the City of Tallahassee is developing a green pricing program that will utilize PV technology. Tallahassee will match customer contributions to install a 10-kW solar PV system on or near a city building. The utility plans to launch the program in September 1999.

Tennessee Valley Authority—In 1998, TVA issued a request for proposals for green power that it plans to offer through its 159 distributors beginning in 2002. The amount of green power

purchased will depend on the level of customer interest expressed, but TVA estimates that it could purchase up to 300 MW. TVA is currently working with nine of its distributors with a customer base of 700,000 to launch a market test of the program in late 1999. The green power will be a mix of solar, landfill gas and wind. The green power premium is yet to be determined.

Traverse City Light & Power—Since 1996, Traverse City (Michigan) has operated a green pricing program for its residential and small commercial customers, selling the output from a 600-kW wind turbine that was built on the edge of town. Residential and commercial customers pay a 1.58¢/kWh premium to purchase 100% of their power from wind energy; the premium represents a 17%–25% increase in the average monthly bill. Currently, there are 140 residential and 20 commercial customers participating in the program, representing nearly 2.0% of the total customer base. Another 75 customers are on a waiting list. Traverse City is currently exploring options to expand the program. One option is to join with other local entities in the construction of a 1.6-MW wind project planned for the fall of 1999.

Tri-State G&T—Tri-State, a wholesale supplier of electric power to 32 rural electric systems in Colorado, Wyoming, and Nebraska provides a green power product to its member distribution systems—about half of the member systems are participating in the program. Tri-State is currently purchasing wind power from PacifiCorp’s Wyoming wind project under an interim agreement but plans to switch to power from two new Wyoming projects later this year, including additional turbines being erected by Platte River Power Authority in Medicine Bow and an innovative stacked vertical axis turbine project. Tri-State offers the power to its member systems in 100-kWh blocks at a rate premium of 2.5 cents/kWh.

Turlock Irrigation District—TID will offer a small-hydro-based electricity product to its customers beginning in August 1999. Billing itself as “the first municipal utility in the United States to offer a 100% small hydro green product,” the utility will offer *TID Green Valley Energy* for an additional monthly fee of \$3.50 to \$8.50 depending on the type of customer subscribing. The power will come from small hydro plants that Turlock already owns and operates on its irrigation canal system. Turlock also owns a 68% share of the 203-MW Don Pedro hydro facility and part of a geothermal power plant in Lake County. As a publicly owned utility, TID is exempted from California’s electricity restructuring law unless the utility decides to “opt in” to the competitive market. As of now, the utility has no plans to open its system to competition.

TXU Electric—TXU Electric, formerly TU Electric, unveiled a voluntary green pricing program that will be test marketed in Waco, Texas and six surrounding communities. The power supply for the *TU Renew* program will come from four new, 1.65-MW, Vestas wind turbines that will be added to an existing wind power project at Big Spring, Texas. The four wind turbines will be the largest ever installed in the United States for commercial production and, collectively, will produce enough power for the annual needs of 1,300 Waco homes. TXU is contracting for the power from York Research Corporation. The wind power is being offered to customers at a premium of 4.0¢/kWh and can be purchased in 100-kWh blocks or as a percentage of monthly electricity use.

West Texas Utilities—WTU, a regulated utility subsidiary of Central and South West Corporation (CSW), runs the *Clear Choice* pilot program, which offers residential and small business customers in San Angelo, Texas, an option to purchase power from an existing 1.2-MW small hydro project.

Participating customers pay a premium of 2¢/kWh for the renewable electricity and can subscribe for fixed monthly blocks of 250 kWh, 500 kWh, or 1,000 kWh. As of February 1999, the program had 180 customer subscribers, equivalent to about 0.5% of eligible customers. Though not fully subscribed, the utility is no longer actively marketing the program.

Western Resources—Western Resources is the first Kansas-based utility to offer a green pricing option to its customers. The power is being supplied from two recently completed 750-kW wind turbines. The *Westar Wind* program is available to all 620,000 customers served by KPL and KGE, which are Western's retail operating companies. The wind power is being sold in 100-kWh blocks at a price premium of \$5.00 per month, or 5¢/kWh. Participants must enroll in the program for at least 1 year. The two turbines will generate 3.6 million kWh of electricity per year, enough to supply the annual electricity needs of about 400 households.

Wisconsin Electric Power—Wisconsin Electric offers an optional renewable electricity service to residential, farm, and small commercial customers from sources procured by the utility in the wholesale power market. Customers can choose to receive 25%, 50%, or 100% of their power from renewables at a premium of 2.0¢ for each renewable kWh purchased. The renewable power provided for the first 2 years of the program came from existing hydro and biomass projects, totaling 5 MW.

In 1998, Wisconsin Electric issued two Requests for Proposal for additional green resources focusing on in-state suppliers and also announced that it would build two 660-kW wind turbines; the wind turbines became operational in June 1999. About 12,000 customers (approximately 1.0% of those eligible) are now participating in the *Energy for Tomorrow*TM program. The utility plans to expand the program to allow large business customers, as well as residential and small commercial customers on time of use (TOU) rates, to participate.

Wisconsin Public Service—The WPS *SolarWise for Schools* program has resulted in three 12-kW and three 4-kW PV system installations at local high schools since 1996, with funding coming from a combination of 3,100 customer participants, the company's R&D budget, and the UPVG TEAM-UP program. The average customer contribution is \$1.70 per month. These six schools will receive curriculum packages designed for students to study renewable energy resources. WPS recently announced that another six schools will receive 4-kW PV systems and curriculum packages over the next 2 years and plans to install three additional systems each year after that.

Under the *Round-Up for Renewable Energy* option, customers can round-up their electric bill to support the installation of small PV lighting or water-pumping systems for parks, zoos, nature centers, and other public areas. Approximately 200 customers are participating in this program. The WPS Community Foundation, a nonprofit educational foundation, administers both programs.

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13. ABSTRACT (<i>Maximum 200 words</i>) For the first time in many decades, consumers are being given a choice of who supplies their electric power and how that power is generated. One of these choices is to support electricity generation from more environmentally beneficial energy sources. The term "green power" generally refers to electricity supplied from renewable energy sources. By some estimates, nearly one-quarter of all U.S. consumers will have the option to purchase green power by the end of 1999, either from their regulated utility provider or in competitive markets. As of July 1999, consumers can choose to purchase competitively marketed green power in California, Massachusetts, Pennsylvania, and Rhode Island. As competition spreads in the electric power industry, more consumers will have this choice. The purpose of this Information Brief is to provide electric industry analysts with information on green power market trends. Descriptive information on green power marketing activities in both competitive and regulated market settings, as well as other pertinent data and information, are included.			
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