Feature Article

Renewable Resource Electricity in the Changing Regulatory Environment

by Michael J. Zucchet[1]

Abstract

The United States has been a leader in the development of renewable resource electricity[2] since the early 1980s. During the past 15 years, many renewable technologies have advanced beyond the research stage and into commercial development. But despite its advances, the commercial renewable energy industry makes up a very small share of the electricity market,[3] and the near-term prospects for more renewable energy development remain uncertain. Much of this uncertainty has arisen in a regulatory environment that is changing to make the electric industry increasingly competitive. Heightened competition through the deregulation and restructuring of electricity generation could present several challenges for future renewable energy development. New and proposed regulatory policies may also hurt renewables by reducing the importance of their nonmarket benefits[4] in the resource planning process. This article surveys those recent actions and proposals and summarizes their implications for the renewables industry.

The current form of the renewable energy industry in the United States was spawned during the 1970s, when oil embargoes, rising energy prices, and increased pollution concerns raised questions about the Nation's continued dependence on fossil fuels. As world oil prices increased by 300 percent in 1974, alternative energy sources became a national priority. To spur renewable energy development, the Federal Government provided investment tax credits and research and development funds that topped out at $718.5 million in 1980.[5] Taking advantage of these incentive packages, private industry responded by pioneering new renewable technologies and applications. Consumer interest in alternative energy sources provided the political support for the Federal incentive programs and laid a strong foundation for an industry that grew rapidly.

While these economic and environmental forces lifted renewable energy off the ground, Federal regulation built the industry. The single most important factor in the development of a commercial renewable energy market was the passage of the Public Utility Regulatory Policies Act (PURPA) in 1978. Among other things, PURPA encouraged the development of small-scale electric power plants, especially those fueled by renewable resources. The renewables industry responded to such incentives by growing rapidly, gaining experience, improving technologies and reliability, and lowering costs.

New and proposed regulatory reforms during the 1990s, and especially in 1995, have adversely affected the near-term outlook for renewable electric technologies. Potentially critical regulatory and legislative changes have been proposed in two areas: (1) changes

[1]The author is an economist with the Renewable Energy Branch in the Energy Information Administration's Office of Coal, Nuclear, Electric and Alternate Fuels. He gratefully acknowledges the guidance and contributions to this article provided by Harry Chernoff, senior economist, Science Applications International Corporation. The author also wishes to thank Leon Lowery of the Office of Electric Power Regulation at the Federal Energy Regulatory Commission for his editorial comments and review. Comments may be directed to Mr. Zucchet at 202-426-1192 or via Internet E-Mail at mzucchet@eia.doe.gov.

[2]For the purposes of this article, "renewable" energy refers to wind, biomass, waste-to-energy, photovoltaic, and solar thermal-electric technologies. Hydropower is considered a mature, conventional energy technology and is not covered in this article.

[3]The Energy Information Administration's *Annual Energy Outlook 1995*, DOE/EIA-0383(95) (Washington, DC, January 1995), estimated 1993 nonhydropower renewable electricity generation at 79 billion kilowatthours, comprising about 2.5 percent of the Nation's electricity supply.

[4]Nonmarket benefits are the desirable byproducts of economic activity that accrue to parties not directly involved in market agreements. These benefits are typically diffuse and are not bought and sold in a market, yet society still values them. In the case of renewable energy production, nonmarket benefits include reduced environmental damages relative to fossil fuel energy production, and reduced supply risk resulting from a more diverse national fuel mix.

[5]M. Silverman and S. Worthman, "The Future of Renewable Energy Industries," *Electricity Journal* (March 1995).

related to PURPA, including the possible repeal of sections of the Act, and (2) changes related to the restructuring and deregulation of electricity generation. While some recent State and regional initiatives continue to provide incentives for renewable energy development, the Federal changes have the potential to severely affect the entire renewable energy industry.

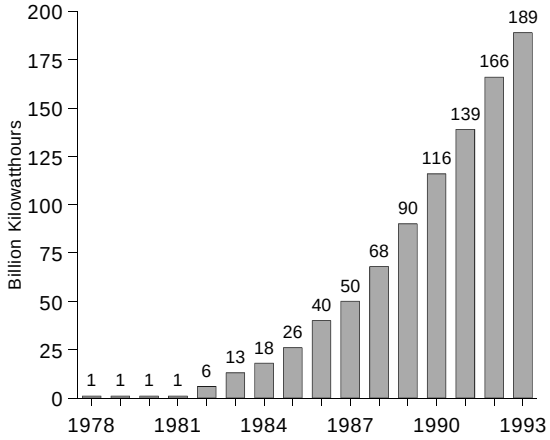
PURPA Power

In enacting PURPA, President Jimmy Carter and the U.S. Congress sought to decrease the Nation's dependence on foreign oil and increase domestic energy conservation and efficiency. To achieve those ends, PURPA encouraged the development of cogenerators[6] and small power producers by eliminating certain barriers that had prevented their entry into a market controlled by public utilities.[7] PURPA defined a class of independent generators as "qualifying facilities" (QFs)[8] and mandated that utilities purchase power from QFs at the utility's full avoided cost. In other words, PURPA required utilities to pay QFs what they would otherwise spend to generate or procure power.[9] The Federal Energy Regulatory Commission (FERC), responsible for the oversight of PURPA implementation, left it to the States and their utility commissions to determine the utilities' avoided costs.

PURPA mandated that utilities interconnect with QFs and buy whatever amount of QF capacity and energy was offered. It also simplified contracts, streamlined the power sales process, increased financial certainty for creditors and equity sponsors, and generally eliminated several procedural and planning problems that had made entry into the electricity market prohibitive for most of the smaller energy producers. These PURPA provisions provided a substantial boost to nonutility power producers (Figure FE1). They also enabled nonutility renewable electricity production to grow into the 1990s, while utility production of renewable electricity declined slightly (Figure FE2).

The renewables industry used its newfound market niche to improve technologies, increase efficiency, and decrease costs. Thanks primarily to PURPA, renewable and nonrenewable QFs now comprise large amounts of new and existing generating capacity in certain markets. For example, one-third of the California Edison Company's generating capacity is QF capacity, a substantial fraction of which is renewable energy.[10]

Figure FE1. Purchases by Electric Utilities from Nonutility Power Producers, 1978-1993



Source: Energy Information Administration, *Annual Energy Review 1994*, DOE/EIA-0384(94) (Washington, DC, July 1995).

By the mid-1980s, some States (most notably, California) had mandated that QFs receive long-run avoided cost rates that today substantially exceed current market prices. These rates were based on expectations of sharply rising oil and natural gas prices (Figure FE3), as well as the expectation of future increases in the demand for electricity and construction of new generating capacity. From the perspective of the QFs, these above current avoided cost rates (6 cents per kilowatthour or higher) and long terms (often 10 years) were essential to establish the QF power market.

By the late 1980s and early 1990s, however, oil prices had stabilized, natural gas prices had declined, and excess generating capacity in most regions of the country, especially the Southwest and the Northeast,

[6]A cogenerator is a generating facility that produces both electricity and usable thermal energy (such as heat or steam) for industrial, commercial, heating, or cooling purposes.

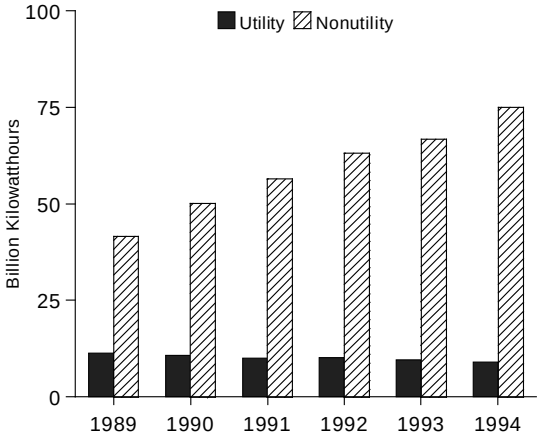
[7]The term "utility" is used generally throughout this article specifically to connote "electric utility."

[8]The rules that implement PURPA stipulate that a small power facility can achieve qualifying status provided that its rated capacity does not exceed 80 megawatts and no more than 50 percent of the plant is owned by a utility. Such a facility is considered to be a renewable QF if 75 percent or more of its fuel is derived from renewable sources. See S. Williams and B.G. Bateman, *Power Plays: Profiles of America's Independent Renewable Electricity Developers*, 1995 Edition (Investor Responsibility Center, June 1995).

[9]Avoided cost is defined in PURPA as the ". . . incremental cost of alternative energy . . . the cost to the electric utility of the electric energy which, but for the purchase from such cogenerator or small power producers, such utility would generate or purchase from another source."

[10]J.R. Bloom and J.M. Karp, "The Folly of PURPA Repeal," *Public Utilities Fortnightly* (July 1, 1995).

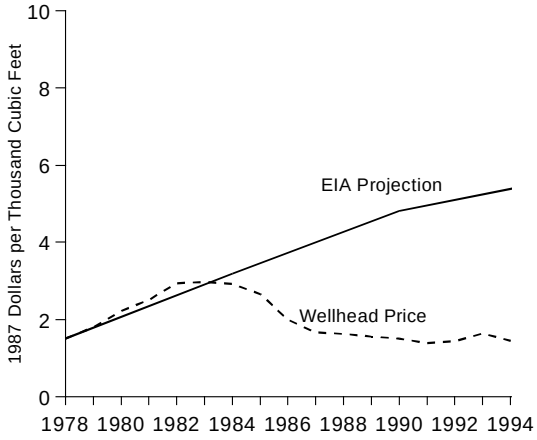
Figure FE2. Net Generation of Renewable Electricity by Utility and Nonutility Power Producers, 1989-1994



Notes: Renewable sources are geothermal, wood, waste, wind, and solar. Nonutility power producers are cogenerators, independent power producers, qualifying facilities, and other small power producers of 1 megawatt capacity or more. Nonutility generation is based on EIA estimates. Utility generation in 1994 is based on preliminary EIA data.

Source: Energy Information Administration, *Annual Energy Review 1994*, DOE/EIA-0384(94) (Washington, DC, July 1995).

Figure FE3. 1979 Projections and Actual Historical Prices for Natural Gas, 1978-1994



Notes: EIA was one of several forecasting organizations that projected substantial increases in natural gas prices throughout the 1980s and into the 1990s. The wellhead price of natural gas is calculated by dividing the total reported value at the wellhead by the total quantity produced, as reported by the appropriate State and Federal agencies. All prices were standardized into 1987 dollars using price deflators from the Bureau of Economic Analysis, U.S. Department of Commerce. The 1994 actual natural gas price is based on EIA estimates.

Sources: **EIA projection:** Energy Information Administration, *Annual Report to Congress 1979*, DOE/EIA-0173(79)/3 (Washington, DC, 1979). **Actual**: Energy Information Administration, *Annual Energy Review 1994*, DOE/EIA-0384(94) (Washington, DC, July 1995).

allowed utilities to buy capacity and energy at much lower prices than had been forecast a decade earlier. The utilities' actual avoided costs dropped lower than in the mid-1980s and were considerably lower than the levels required by the long-term contracts imposed by State commissions. Utilities in California, New York, Maine, and other proactive States were especially affected by long-term QF contracts above current avoided cost.

While some State public utility commissions (California and Wisconsin, for example) still favor long-term contracts and incentive rates, other commissions and almost all affected utilities have complained about above-market energy costs and higher rates. Many utilities contend that PURPA has caused dramatic hikes in retail electric rates, and that new regulatory action must be taken to correct past misjudgments.[11] FERC has recently addressed some of these issues in the form of case decisions that could have a profound impact on the future of renewable energy.

FERC Decisions Involving PURPA

FERC oversees several aspects of the utility industry in the United States. Among its functions are the regulation of wholesale and interstate utility power and transmission transactions and the oversight of PURPA and any rates, terms, or conditions set by State public utility commissions under PURPA. While the States set and mandate the avoided-cost rates paid to QFs, the process used by each State to set these rates is subject to review by FERC.

In response to several cases involving utilities appealing to overturn mandated QF rates, FERC has made rulings that may change the way QF power is purchased and will affect the ability of State commissions to dictate the resource energy mix of their future capacity. In separate cases involving Connecticut Light & Power Company and two California utilities (Southern California Edison Company and San Diego Gas & Electric Company), FERC refused to allow the State to set rates above the current avoided cost of capacity and energy. The most significant of these cases for renewables was the California case, where FERC disapproved the Biennial Resource Plan Update (BRPU) of the California Public

[11]At least nine utilities have formed a coalition to lobby Congress to eliminate the mandatory power purchase provisions of PURPA: Allegheny Power System, Central Maine Power, Consolidated Edison, General Public Utilities, New York State Electric & Gas, Niagara Mohawk, Northwest Utilities, Oklahoma Gas & Electric, and San Diego Gas & Electric.

Utilities Commission (CPUC). BRPU structured a bidding process where only QFs bid against one another for new capacity, and it required renewable "set-asides," forcing utilities to purchase a certain percentage of energy from renewable sources. FERC disallowed the plan, ruling that BRPU forced utilities to pay above avoided costs by excluding some potential generation sources from the bidding for the QF segment of the bid.[12] Citing Section 210(b) of PURPA, FERC ruled that the States must include *all* alternative sources of capacity and energy in their calculations of avoided cost.

While the utilities involved in the cases were satisfied, independent power producers and the CPUC were stunned. CPUC, which has been a leader in the evolution of electric markets, claimed that the FERC order was irreconcilable with California's progressive State energy policy.[13] CPUC further asserted that the FERC rulings limited the ability of States to initiate set-asides or other resource planning activities, which is not a proper role for FERC, according to CPUC. The FERC rulings regarding QF treatment under PURPA are especially critical given the terms of many QF contracts. The majority of QFs in California and, to a much lesser extent, in other States, are now facing an avoided cost "cliff," as 10-year contracts written at rates in the 6-9 cents per kilowatthour range in the mid-1980s expire over the next few years. With current avoided costs in the 3-4 cent range, rolling over the contracts at today's rates would create financial problems for QFs.

Although FERC has since reaffirmed its California decision rejecting QF rates above avoided cost, it has also asserted that States can favor specific energy sources as long as such action does not result in rates above avoided cost. For example, FERC said that States may influence costs incurred by utilities through taxes or tax credits on generation produced by a particular fuel. What FERC explicitly disallowed was the addition of "externality adders" in avoided-cost calculations. Since renewable energy production is environmentally benign relative to most fossil fuel energy technologies, some States have included these adders in their avoided-cost calculations to "level the playing field" between renewables and fossil fuels. FERC ruled, however, that policies that constitute environmental externality adders that result in rates above avoided cost would not be acceptable.

In short, if a State wishes to encourage renewable generation, FERC has indicated that it may do so through the tax code (or some other broad policy measure), but it may not use a rate-setting mechanism that results in a rate that is above avoided cost. CPUC has responded to this directive by considering a proposal mandating that utilities that sell at retail in the State obtain 12 percent of their energy from renewable resources. This approach is designed to support renewables and circumvent the FERC orders rejecting QF rates above avoided cost.

In other cases brought before FERC, the Commission has repeatedly rejected utilities' requests to abrogate existing QF contracts. In unrelated cases involving Niagara Mohawk Power Corporation and New York State Electric and Gas Corporation, FERC reaffirmed its unwillingness to cancel existing QF contracts simply because avoided-cost rates have changed and the deals have gone sour in changing electricity markets. FERC ruled that it will not disturb existing above-avoided-cost QF contracts if they were not challenged at the time they were signed.

In rejecting these petitions, FERC made several key findings. First, it affirmed that PURPA regulations permit QF rates to remain in effect even if avoided cost rates decline over time. Second, it affirmed the policy of relying on States to do the factual determination of avoided cost. And finally, the Commission plainly stated its disposition not to disturb executed contracts.[14]

While the positions of most utilities and QFs are quite evident (and opposite), State public utility commissions and residential and industrial energy consumers are not necessarily decided on the issue of favorable QF treatment. Most State commissions are in favor of the States' ability to control their own energy planning, although not all have endorsed the idea of above-avoided-cost QF contracts as a means to their planning ends. The Nevada Public Service Commission, for example, recently disallowed the rates set for a geothermal development because they were deemed too far above avoided cost to be reasonable, even though the QF and the utility both supported the rates. Many consumers, especially large industrial consumers, do not necessarily favor or oppose renewables but want to ensure both that power purchases are competitive and that utilities cannot exert monopoly power over QFs

[12]Barring a settlement between the CPUC and the California utilities, the FERC decision effectively cancels 1,500 megawatts of new QF capacity, almost 600 megawatts of which was to be provided by renewables. See National Renewable Energy Laboratory, *Public Utility Regulatory Policies Act Briefing Book* (April 10, 1995).

[13]"IPPs Stunned, State Miffed—Just Another Day on the PURPA Front," *Inside F.E.R.C.* (February 27, 1995).

[14]"NYSEG Request for Relief From QF Contracts Blown Out of the Water," *Inside F.E.R.C.* (April 17, 1995).

and independent power producers. On the other hand, some smaller consumers, especially residential consumers, have shown a willingness to pay for environmentally benign electricity.[15]

Proposal to Repeal PURPA

On June 6, 1995, the Energy Production and Regulation Subcommittee of the Senate Energy and Natural Resources Committee, chaired by Senator Don Nickles (R-OK), held a hearing on S. 708, The Electric Utility Ratepayer Act, which would repeal Section 210 of PURPA.[16] Section 210 mandates the purchase of power from QFs at avoided-cost rates.

Proponents of PURPA repeal assert, among other claims, that increased competition in the electricity generation industry makes PURPA unnecessary, and that mandating power purchases from QFs is actually quelling real competition. Many critics of the proposal for repeal argue that while changes are clearly needed in some areas of PURPA, repealing Section 210 would be premature because of continued utility monopoly power over transmission. They add that repeal should not take place until the transmission grid is open to all wholesale buyers and sellers of electricity.

While interests on each side of the debate argue the merits and faults of PURPA, the renewables industry waits in a state of anxious uncertainty. PURPA repeal could seriously hamper renewable energy development, potentially eroding what little market share renewables currently enjoy. One-quarter of all existing QFs are renewables, and without PURPA, much of this renewable capacity likely would not exist. PURPA has provided renewables with the opportunity to compete in an electricity market that was previously dominated by large-scale energy producers. The larger producers were the only ones who could undertake the complicated process of bidding for new capacity, arranging transmission, and securing financing without the guarantees provided by PURPA. PURPA lifted several of those procedural and planning burdens and moved QFs to the head of the energy pack. Repealing PURPA could mean a return to the situation where smaller power producers, including renewables, would have a difficult time penetrating the electricity market.

Restructuring, Deregulation, and Competition

Perhaps the most important regulatory issue affecting the future of renewable energy development is the trend toward utility restructuring and the deregulation of generation.[17] A competitive electricity market may create an opportunity for more customer choice, with some energy consumers willing to pay more for electricity generated from renewable sources (see box on page xxx). But competition will likely force utilities to make resource choices based more heavily on short-run internal costs, meaning that opportunities for valuing the nonmarket benefits of renewables will be diminished. While the overall outlook is uncertain, the renewable energy industry will face serious challenges in a utility environment more focused on short-run cost competition among generating sources.

In recent years, the U.S. electric industry has been under substantial regulatory and economic pressure to become more competitive. These pressures have arisen primarily from three sources. First, a large portion of new capacity additions has been developed by large independent power producers (IPPs), which are non-utility generators that do not qualify as QFs under PURPA. These plants are subject to rate regulation by FERC, but are generally permitted to sell their power at market prices to regulated utilities. Using mostly low-cost, highly efficient gas-fired systems and some advanced coal-fired plants, the IPPs have been able to underprice new and some existing utility generators. In particular, the advancement of combined-cycle gas turbines has made competition more likely by making it possible to build cost-effective power plants that are smaller than conventional fossil steam electric plants. Combined-cycle gas turbines have taken the cost advantages of large-scale electricity production away from utilities, and in so doing have helped to weaken utilities' monopoly position over generation.

Second, large commercial and industrial users have explicitly or implicitly forced limited "retail wheeling" in some States. Retail wheeling refers to the ability of electricity customers to choose their provider and use the local utility for transmission. Large commercial and industrial customers have become increasingly able to

[15]See "Green Pricing" box on page xxx.

[16]L.A. Burkhart, "Lawmakers Target PURPA for Repeal," *Public Utilities Fortnightly* (July 1, 1995).

[17]With some notable exceptions, the electric power industry historically has been composed primarily of investor-owned utilities. These utilities have been predominantly vertically integrated monopolies (combining electricity generation, transmission, and distribution) whose prices have been regulated by State and Federal government agencies. Restructuring the industry entails the introduction of competition into at least the generation phase of electricity production, with a corresponding reduction in regulatory control. Restructuring may also modify or eliminate other traditional aspects of investor-owned utilities, including their exclusive franchise to serve a given geographical area, assured rate of return on their investments, and vertical integration of the production process.

Green Pricing: Encouraging the Development of Renewables in a Deregulated Environment

"Green pricing" programs allow electricity customers to express their willingness to pay for renewable energy development through direct payments on their monthly utility bills. Green pricing represents a market solution to various problems associated with regulatory valuation of the nonmarket benefits of renewables. Under green pricing programs, utilities can encourage the development of renewable energy while simultaneously measuring customer support for renewables under semi-competitive conditions. Customers willing to pay a price premium for renewable energy can do so by adding some incremental amount of money to their regular electricity bills. Such programs are currently available from several utilities, and they are under consideration at many more utilities across the Nation. Examples of some existing programs follow:[a,b]

Public Service Company of Colorado: Participants in the Renewable Energy Alternatives Program (REAP) support the accelerated growth of renewable generating resources through voluntary monthly pledges. Currently more than 6,000 customers participate, at an average monthly pledge of approximately $2.

Traverse City Light and Power: About 200 customers volunteered to pay a 3-year premium of 1.58 cents per kilowatthour to fund construction and operation of a 600-kilowatt wind turbine.

Sacramento Municipal Utility District: Participants in the Photovoltaic Pioneers Program pay a 15-percent premium (about $6 per month) over a 10-year period to have a 4-kilowatt, grid-connected photovoltaic panel attached to their roofs. The full cost of the rooftop system is subsidized through other municipal income. Current participation is about 300 customers.

Portland General Electric: The "Penny Jar" program enables customers to "round up" their monthly utility bills, at an average of 50 cents a month. This amount supports future renewable energy generation programs.

Detroit Edison: Participants in the "Solar Currents" program pay a monthly premium to help fund the development of a planned 28.4-kilowatt photovoltaic facility. The utility will use $113,600 in Federal funds to pay a portion of the construction costs for the facility.

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[a]K. Baugh et al., "Green Pricing: Removing the Guesswork," *Public Utilities Fortnightly* (August 1995).
[b]"Detroit Edison to Offer PV Program as Michigan PSC Okays 'Green Pricing'," *Electric Utility Week* (August 7, 1995).

wield their market power over utilities, forcing them to either allow service from outside providers or match the rates available from those providers by threatening to cogenerate, move, or expand in a different service territory. As the large customers have been successful in pressuring utilities, some smaller nonresidential customers have demanded equal treatment. The trend toward retail wheeling, where any customer can receive service from any interconnected utility, has the effect of forcing utilities to compete more aggressively on price. In addition, some States, including Massachusetts, New Hampshire, and California, have formal proposals before their public utility commissions to explicitly permit some form of retail wheeling.

Finally, electric utilities are facing additional competitive pressures from end-use conservation programs. Demand-side management and other end-use conservation initiatives have reduced capacity demand in some areas,[18] forcing utilities to compete for a share of a diminishing overall market.

These competitive pressures could affect the future of renewables in several ways. First, as utilities are forced to compete more heavily on price in the short term, the flexibility to experiment with new or unproven technologies, including renewables, is diminished. The premium for short-term certainty and short-term cost minimization increases substantially, squeezing out

[18]According to the Energy Information Administration's *Annual Energy Outlook 1995*, DOE/EIA-0383(95) (Washington, DC, January 1995), demand-side management programs are expected to reduce the demand for electricity by 73 billion kilowatthours in 1997, relative to the level that would have been reached in their absence.

technologies that are not as cost-effective in the short run. Utilities that might otherwise invest in projects that might be cost-effective in the long run but carry high short-run costs (or high capital costs) would be less likely to do so in a price-competitive market. As the ability of the utility to compete on price in the short term becomes paramount, long-run investments may become less appealing. And if customers are permitted to shop the power market for low-price electricity, utilities with expensive power plants (or expensive QF contract obligations) may strand investments,[19,20] which could be financially damaging in a competitive market that does not allow utilities to recover those costs. Where a utility could previously roll expensive generation together with less costly generation, it must today consider each power source separately and determine whether each source is competitive. Under these conditions, the economic viability of renewable energy may be severely compromised. Renewable technologies, with their relatively high capital costs and low operating and maintenance costs, may be cost-effective in the long run, but they are less attractive to an industry facing severe near-term competitive pressure.

Another implication of competition and utility restructuring is the reduction in ratepayer-funded research, development, and demonstration (RD&D). With increasing competition, utilities no longer have as much flexibility or as many incentives to spend money on the development of new technologies that offer common benefit to all generators. To a large extent, this has already happened at both the State and national levels. In California, for instance, RD&D in advanced generation technologies plummeted by 88 percent in 1995 from 1993 levels. Contributions from California utilities to the Electric Power Research Institute, a utility-funded research and development organization, were also reduced by 50 percent in 1995 from 1994 levels.[21]

Increased price competition will also have the effect of limiting the importance of the beneficial (but mostly external) attributes of renewables. Renewable energy technologies are environmentally benign relative to conventional energy technologies, and they reduce the risks associated with fuel prices and availability by offering a more diverse fuel mix and by decreasing the Nation's dependence on foreign energy supplies. However, because these benefits accrue to the public in general, they are not usually explicitly counted in cost decisions and are not captured in electricity market prices. Even if these benefits were to be included in resource planning decisions, as some States have tried to do, they can be extremely difficult to measure. The acknowledgment and treatment of these benefits in the Nation's future energy policies may dictate the path to commercialization for renewable energy in the United States.

Although these electric industry trends will likely have a negative effect on renewable energy development, direct government incentives or mandates could still provide the necessary foundation to make renewables more cost-competitive at some point in the future. On the national level, for example, wind and biomass energy producers receive tax credits under the Energy Policy Act of 1992. State policies and incentives will also continue to play a major role in the development of renewables.

State and Regional Renewables Incentives

California is the leader in providing incentives for environmentally friendly technologies, especially renewable energy technologies. The California Public Utilities Commission has consistently developed State energy plans that favor the use of renewables, although, as discussed above, the most recent resource plan was struck down by FERC. The CPUC has responded by proposing that utilities keep and promote their current use of renewable energy through quantity mandates rather than price mandates. The success of this proposal could encourage and persuade other States interested in renewable energy development to enact similar policies.

Wisconsin is another State that provides an incentive for renewables development. Wisconsin's Advance Plan 6, passed in 1992, made it the only State to offer renewable energy incentives through direct payments on generation. Investor-owned Wisconsin utilities with qualifying wind, solar thermal, or photovoltaic generation receive a payment of 0.75 cents per kilowatthour, while all other qualifying renewable generation receives a payment of 0.25 cents per kilowatthour. The incentive payment applies to facilities that receive construction authority by December 31, 1998.

Like the CPUC, the Wisconsin Public Service Commission recognized that utility ratepayers would ultimately bear the costs of these incentives, but accepted the tradeoff in the interest of promoting renewables and obtaining such nonmarket benefits as fuel diversity and

[19]Stranded investment refers to financial impairment—not necessarily plant closure in the physical sense—when the price of plant output falls to a level at which the owner can no longer earn a sufficient return on investment.

[20]"Stranded What, Exactly?" *Public Utilities Fortnightly* (December 1, 1994).

[21]"CEC Hearings to Explore Restructuring's Effect on Utility RD&D Spending Levels," *The Solar Letter* (January 20, 1995).

emissions reductions. Given the regulatory climate on the national level, State initiatives take on increased importance in guiding the future of renewable energy development.

The Uncertain Future of Renewable Energy

The FERC rulings limiting the use of above-avoided-cost renewable set-asides may severely affect the commercial renewable electricity industry. The industry is also facing increasing competition among generating plants and the possible repeal of PURPA. The extent to which the renewables industry will be able to continue to grow under these conditions is uncertain.

The immediate future of renewables is largely dependent on three factors. First, most renewables depend on the willingness of the public (expressed in the form of direct State and Federal government incentives or green pricing programs) to support renewable energy development. The programs and initiatives of State and local governments are especially important, and the States' continued involvement in the promotion of renewables will have a large impact on the future of renewables. Second, continued improvement in the technical and cost merits of renewable technologies will increase the probability of their commercialization. Simply put, if performance and cost measures continue to improve relative to alternative energy sources, more renewable technologies will become cost-competitive with conventional technologies. Finally, the prices of fossil fuels, especially natural gas, will establish the baseline for determining renewable energy's cost competitiveness. As prices change over time, so too does the economic viability of renewables. As the technologies develop, and especially if fossil fuel prices rise, renewables have the potential to compete with conventional fuels in all areas, including cost.