Renewable Power Sparks Financial Interest

Decentralized electricity production is getting a boost from a new federal law and tax credits, but both are under attack

For more than half a century, utility companies have enjoyed a virtual monopoly on the generation and sale of electricity in the United States. But a new breed of energy companies has recently begun to offer some competition in electricity production. Funded mostly by venture capital and other private sources, these companies have been established to generate electricity from renewable resources or to cogenerate electricity and steam for use in industrial processes. They hope to turn a profit by selling their surplus power to the utilities.

The emergence of these entrepreneurial energy companies stems from the rising price of oil and coal and the escalating cost of building central generating plants. But they have also benefited from a federal law that has removed many barriers to decentralized electricity production, and from generous tax credits for investments in alternative energy systems. The federal law is under legal challenge, however, and proposed changes in the tax codes could reduce the investment incentives. The present favorable climate for small power production and cogeneration could therefore change for the worse in the coming months, and some entrepreneurs believe that several planned projects could be in jeopardy.

The new law that favors decentralized electricity production is a relatively little-known provision in a package of energy bills passed by Congress in 1978. Known as section 210 of the Public Utility Regulatory Policies Act (PURPA), it guarantees a market for small power producers by requiring utilities to buy power from them at premium rates (see box). PURPA, says one enthusiast, "marks the dawn of a new age in electricity generation: It eliminates an electric utility's exclusive right to generate and sell power."

Most utilities are not so lyrical in their descriptions. The Mississippi Power and Light Company, together with the state of Mississippi, has filed suit claiming that PURPA is unconstitutional because it usurps the authority of the states to regulate utilities within their borders. A Mississippi court has already ruled in the utility's favor, and the case has been appealed by the federal government directly to the Supreme Court. A second challenge has been mounted by a coalition of utilities led by Consolidated Edison of New York and the American Electric Power Company, which owns utilities in Indiana, Kentucky, Michigan, Ohio, Tennessee, Virginia, and West Virginia. They have lodged a court case against some of the key regulations that underpin PURPA. And a third line of attack is coming from utilities such as Arkansas Power and Light that can see economic attractions in getting into decentralized power production themselves, but argue that PURPA puts them at a disadvantage in competition with unregulated small power producers. They are hoping to persuade Congress to change the law in a way that would effectively deregulate all small power production and cogeneration.

The controversies swirling around PURPA place the Reagan Administration in an interesting position in deciding how vigorously it will defend and enforce the law. On the one hand, PURPA represents a modest step in the deregulation of electricity supply by opening up an area of power production to competition, and it also encourages small business ventures. This should appeal to the Administration's economic philosophies. But on the other hand, the Mississippi case raises the issue of states' rights—an issue on which the Administration is especially sensitive. PURPA, moreover, seeks to encourage development of energy resources to which the Reagan team has so far given short shrift.

The Reagan Administration's attitude toward tax incentives for decentralized energy production is also unclear. Current tax laws provide a substantial impetus to investment in energy systems, for they allow investors to claim a 10 percent investment tax credit plus an 11 percent energy investment tax credit for the full value of a project. Thus, for example, if a partnership is formed to develop a $1-million hydroelectric project and the partners put up $500,000 and secure a bank loan for the rest, the partnership can claim a 21 percent tax credit on the entire $1 million even though the members contributed only half the finance themselves. This arrangement provides an attractive avenue of investment for wealthy individuals, for it gives them a healthy tax write-off.

The Administration's original tax proposals would have greatly reduced this incentive. In an attempt to plug a loophole that was providing bogus tax shelters in areas such as movie productions, the Administration proposed that tax credits could be claimed only on the amount that investors had placed "at risk." Thus, in the hydroelectric development project cited above, the partnership could claim tax credits on only $500,000. After intense lobbying by lawyers representing small energy producers, the Administration backed off a little. The tax bill, which was formally introduced on 9 June, would permit tax credits to be claimed on total project costs where part of the finance comes from regulated institutions such as banks or insurance companies. Projects funded partly by loans from pension plans or mortgage companies would still come under the "at risk" provision, however. According to the National Alliance for Hydroelectric Energy (NAHE), up to 30 percent of the projects planned under the

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current tax laws may be in jeopardy if the proposed revisions go through. "The proposals are anti-energy, anti–small business, and contrary to the direction the Administration has been taking," asserts Stewart Gamage, NAHE's executive director.

These clouds have appeared on the regulatory and financial horizons for decentralized energy production just as signs of intense activity were emerging. Experience with the current arrangements has, however, been short.

Although PURPA has been on the books for almost 3 years, its impact is only now beginning to be felt. It took the Federal Energy Regulatory Commission (FERC) 18 months to draft detailed regulations to implement PURPA, and the state utility commissions were given until 20 March 1981 to come up with plans to carry out FERC's regulations at the local level. Among other things, the commissions were supposed to determine the rates the utilities will pay for electricity they buy from small power producers and cogenerators. Only a handful have met the deadline, however, and the legal challenges to PURPA have compounded the delays. A few states, such as California and New Hampshire, adopted their own legislation to guarantee markets for small power producers even before PURPA came into effect, however, and their experience provides an indication of the potential national impact of PURPA.

An environmental impact assessment published by FERC last April estimates that PURPA alone will stimulate the buiding of 12,000 megawatts of capacity by 1995. That would be equivalent to about 12 nuclear power plants. Others have put the potential even higher. Officials from the Department of Energy testified before Congress last year that cogeneration alone could provide 40,000 megawatts of electrical capacity by 2000.

Because the field is in its infancy, it is not easy to predict its potential with any accuracy. But it is already clear that PURPA and other financial incentives have begun to encourage the development of a novel type of energy company seeking to attract venture capital into small-scale electricity production and cogeneration. "There is a great deal boiling in the financial community," says Philip Huyck, a vice president of the First Boston Corporation who handles energy projects. "There is all sorts of activity out here—it's like real estate development," says Martin Ringo of the Energy Law Institute in Concord, New Hampshire.

Perhaps the most ambitious of this new breed of energy companies is Windfarms Ltd., a San Francisco–based company that is planning to sell electricity generated by clusters of wind machines. Windfarms has already embarked on the world's largest wind project, the construction of 80 megawatts of capacity on the island of Oahu, Hawaii. The company has a contract with Hawaiian Electric for the sale of the electricity from these machines (*Science*, 15 February 1980, p. 739).

An even more ambitious Windfarms venture is now under negotiation in northern California. The company has signed a tentative agreement with Pacific Gas and Electric and the California Department of Water Resources to build a 350 megawatt cluster of wind machines near San Francisco and to sell the power to the utilities.

PURPA Forces Utilities to Buy Power

Congress passed the Public Utility Regulatory Policies Act (PURPA) in 1978 to encourage the production of electricity from renewable resources and from cogeneration systems. Cogeneration is the combined production of electricity and useful thermal energy. A cogeneration plant, for example, may be an industrial boiler that produces steam which is run through a turbine to generate electricity and then used to provide heat for an industrial process. Because the thermal energy is usually discarded in a central power plant, a cogeneration system makes much more efficient use of primary fuels.

Before PURPA came into force, cogenerators and small power producers faced many barriers in selling their surplus electricity. Utilities were not obliged to buy power from them, and owners of even a single wind machine were subject to a maze of regulations if they wanted to sell a few kilowatt-hours of power. PURPA set out policies to remove some of the barriers, and in March last year the Federal Energy Regulatory Commission (FERC) published detailed regulations to implement the law.

The heart of the law is a requirement that utilities must buy electricity from cogenerators or small power producers at a price equal to what it would have cost them to generate the power themselves. This rate, called the avoided cost rate, includes the cost of fuel that the utility would have to burn to generate an equivalent amount of electricity, together with any capital costs that the utility can avoid by buying power rather than building its own new plants. The state utility commissions were given until 20 March 1981 to draw up avoided cost rates for the utilities under their purview, but few have met the deadline. Among those that have, the rates vary from about 3 cents per kilowatt-hour in states where the purchased power would displace nuclear or coal-generated electricity to more than 8 cents in states such as New Hampshire where oil-generated electricity would be displaced.

Another key provision is that the utilities must provide backup power to cogenerators or small power producers at their average rates, which are usually lower than the avoided cost rates. Utilities, moreover, can bill decentralized power producers only for the actual costs of hooking them up to the grid. These provisions are designed to prevent the utilities from charging discriminatory rates to cogenerators and small power producers.

To qualify for the benefits of PURPA, small power producers are limited to a capacity of 80 megawatts at any one site, and they must use renewable energy resources or waste products. There is no size limit for cogeneration facilities, but those that burn oil or natural gas must meet efficiency standards to qualify.

Finally, PURPA stipulates that qualifying facilities cannot be owned by utilities; a utility's share of the investment in a qualifying small power plant or cogeneration facility must be less than 50 percent. Facilities that meet these conditions are exempted from most of the regulations that now govern the electricity supply industry. In other words, the owner of a small hydroelectric plant would no longer be treated like Con Ed.—C.N.

Windfarms was established in 1979 with funding mostly from wealthy individuals such as former Transamerica Corporation president Edward Scarff. It plans to own and operate wind machines, which will be built under contract by corporations such as Hamilton Standard. The First Boston Corporation is putting together the financing.

Another wind energy company launched recently with private venture capital is U.S. Windpower, a Massachusetts-based company that already has contracts to supply small amounts of electricity to utilities in California and New Hampshire. Unlike Windfarms, it will build its own machines. By the end of this year, it hopes to have close to 100 wind machines, each of 50 kilowatt capacity, installed near Livermore, California. Pacific Gas and Electric has agreed to buy the power.

A more established technology that is attracting a good deal of entrepreneurial activity is small-scale hydroelectric generation. In recent months, a clutch of new companies have been formed to refurbish old dam sites, attract financing into hydroelectric development, and to stake claims on promising dam sites. FERC, which handles applications for permits to develop hydroelectric sites, is being swamped with applications. Requests for preliminary permits are expected to leap from just 18 in 1977 to about 1800 this year.

Much of this activity involves individual projects in which dam owners hope to generate power from a single site. But some ventures have been formed to develop hydropower on a broader scale. One such company is Energenics Systems Inc., a fledgling corporation based in Washington, D.C., that hopes to launch hydropower projects, cogeneration development, and other decentralized electricity production in several states.

Energenics was launched last year with backing from a Texas investment bank. It has already filed for permits on dozens of hydroelectric sites, and is pursuing other dispersed energy projects ranging from the production of electricity from urban wastes to the cogeneration of electricity and steam for industrial plants. The company arranges project financing, and intends to own and operate the power facilities, sometimes in partnership with dam owners or industrial corporations. Granville J. (Pete) Smith, vice president of operations for Energenics, says that the ability to sell power to the utilities at their avoided cost rates "is the key element needed to lower the risk in hydro, wind, cogeneration," and other decentralized energy developments.

As for cogeneration, FERC has so far received applications for certification under PURPA from prospective cogenerators who have plans to install a total of about 1000 megawatts of capacity. These are mostly industrial corporations that are intending to cogenerate electricity and steam using fuels ranging from natural gas to waste products such as walnut shells.

The new economic and regulatory environment for decentralized power production is clearly promoting financial interest in cogeneration, but for many corporations, investing in new cogeneration facilities does not represent an attractive proposition. Unless the payback period is very short, few manufacturing companies will rush to divert investments into power production, which adds nothing to their manufacturing output. For this reason, companies such as Energenics believe that there are attractive opportunities for specialized cogeneration companies to build, operate, and own cogeneration facilities and sell steam to manufacturing firms and surplus power to the utilities.

Some utility companies have spotted the same opportunity. But they argue that they are in the best position themselves to build cogeneration facilities for industrial users of electricity and steam. There is nothing to stop the utilities from developing cogeneration now, but they believe that PURPA puts them at a disadvantage because it essentially deregulates all other cogenerators and guarantees them a market for their power, while leaving utility-funded cogeneration projects tightly regulated.

Utilities such as Arkansas Power and Light have therefore proposed that PURPA should be amended to allow the utilities to set up independent, unregulated subsidiaries to develop cogeneration and small power production. These subsidiaries would be able to compete with other companies for cogeneration projects and they would be able to sell surplus electricity to their parent companies at the avoided cost rate. The proposal has been introduced into Congress by Representative William Alexander (D–Ark.). It has generated a good deal of debate.

If the measure is passed, it would provide a strong incentive for utilities to move into decentralized power production, for their unregulated subsidiaries would be able to take advantage of the premium prices allowed under PURPA. Many of the entrepreneurs who have launched their own decentralized electricity companies worry, however, that the utilities would use their muscle to squeeze out the competition.

Department of Energy

Banking on the wind

Investors are backing wind power.

This debate could, however, be rendered moot if the Supreme Court decides that PURPA is indeed unconstitutional. The case probably will not be heard until the fall, and a judgment is not expected until early next year. In the meantime, the case brought by Con Ed and the American Electric Power Company is expected to move through the federal courts in Washington, D.C.

Whatever the outcome of those legal skirmishes, PURPA has already achieved one substantial objective. It has forced the utilities and the public utility commissions to calculate the marginal costs of generating electricity and to examine the economics of decentralized power production. Pete Smith of Energenics regards this as the act's most lasting achievement, for it has sharpened the economic arguments surrounding renewable energy technologies. He says it has also made it easy to see which utilities are in trouble, and consequently it provides his company with a good guide in determining which utilities to deal with. Russel Wolfe of U.S. Windpower agrees. PURPA, he says, "has forced the utilities to really give attention to renewable energy production for the first time."—COLIN NORMAN