The ‘Windmill Case’: Facing Up to Appropriate Technology

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THE ‘WINDMILL CASE’: FACING UP TO APPROPRIATE TECHNOLOGY

Terry J. Lodge*

I. INTRODUCTION

A. Structure of the Electric Utility Industry

The history of electric power production in the United States may be likened to the construction of the ancient pyramids. Beginning with the decentralized, small-scale coal and hydroelectric plants of the late nineteenth century, utility companies slowly merged into increasingly larger systems. By the 1920’s, the General Electric combine of John P. Morgan headed the list of holding companies which controlled this capital- and equipment-intensive industry.¹ By the 1930’s, even while state regulatory agencies were guaranteeing minimum rates of return to the power companies, the device of “pyramiding”—the purchase of controlling stock in holding companies so as to control all subsidiaries—resulted in an even greater centralization of ownership.² As utilities grew, these holding companies diversified their holdings, buying up coal fields, oil supplies, electric equipment factories, railroads, phone companies, and, inevitably, smaller utility corporations. A relatively small number of utility corporations took virtual control over the industry.

The 1930’s, ‘40’s, and ‘50’s saw competition being reintroduced into the power industry by means of federally-sponsored programs such as the Tennessee Valley Authority.³ Modest congressional reforms during the New Deal era culminated in the Public Utility

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¹ J. RIDGEWAY & B. CONNER, NEW ENERGY 53 (1975).
² Id. at 54.
Holding Company Act,\textsuperscript{4} which broadened the federal Securities Exchange Commission's trust-busting powers and temporarily limited the control which the few held over the power industry.\textsuperscript{5} Still, no less than four congressional studies in the past quarter-century have documented the excessively concentrated ownership by utilities of generating capacity, transmission facilities, fossil fuel supplies, and electrical equipment manufacturers.\textsuperscript{6}

Persistent centralization of control has caused the conventional electric service industry to be characterized by the phenomenon of "vertical integration." Electricity is most efficiently and economically produced, it is said, through utility control over generation, transmission, and surplus power sales among regions—control, in fact, over the entire process from production to consumption. Moreover, depending upon the generating demands of the moment, a single utility company may be simultaneously producing four distinct products which correspond to the markets extant within the electric industry.\textsuperscript{7} This phenomenon has led the body of utility regulatory law to hold the notion that centralized corporate production is the only way that economies of scale, capital pooling, and efficient power generation may be achieved. State utility regulation has effectively substituted centralized power production for competition among small suppliers.\textsuperscript{8} When one contemplates the huge amounts of capital needed even to enter the industry, it would seem virtually impossible that new commercial generators could ever appear.

\section*{B. Blowing in the Wind}

Against this background of utility structure, an obscure tariff case recently settled by the New York Public Service Commission (Commission) has interesting ramifications for the future of corporate electrical production and transmission. Following administrative hearings in late winter, 1977, the Commission issued Special Permission Order No. EL-1656.\textsuperscript{9} Behind that obscure, bureaucratic tag

\textsuperscript{5} NEW ENERGY, \textit{supra} note 1, at 63.
\textsuperscript{6} Id. at 65.
\textsuperscript{7} These products are base load power, peaking power, reserve power, and economy power. See Garfield, \textit{Regulation, Competition and Your Local Power Company}, 1974 \textit{Utah L. Rev.} 785, 790.
\textsuperscript{8} Id. at 799.
\textsuperscript{9} Based upon Item 209, S.A.P.A. EI-39, Filing by Consolidated Edison Company of New York, Inc., \textit{Amendments to Schedule P.S.C. No. 8 - Electricity: Staff Report} (March 23, 1977) [hereinafter cited as \textit{Staff Report}]. This document embodies the technical discussions be-
hid a surprising confrontation: Consolidated Edison Company of New York, Inc. (Con Ed), one of the largest utilities in the nation, had taken on the owners of a small, windmill-powered electrical generator.\textsuperscript{10} The insurgent device was not an ordinary farm windmill, however, but a generation-old "Jacobs" brand triblade, a dozen feet in diameter and capable of generating two kilowatts of usable household alternating electric current in sufficient wind conditions.\textsuperscript{11} The machine's owners, occupants of a cooperatively owned apartment house in New York's impoverished Lower East Side,\textsuperscript{12} had hooked the offending machine directly into the building's electrical circuitry which ordinarily drew its power from Con Ed. During periods when the mill was generating more current than was needed in the building, the surplus power flowed backward through Con Ed's meter, thus causing a rollback (decrease) in the meter's measure of electricity usage. This process, known as "backfeed," touched off the biggest head-on clash to date between conventional energy suppliers and the tiny but growing number of individuals who have come to rely upon so-called "appropriate technology."\textsuperscript{13} Following extensive mediation between Con Ed and the cooperative, the Commission amended Con Ed's rate tariffs to allow up to 25 windmill generators to hook directly into Con Ed's electrical grid for an experimental period of time. This decision pioneered in the recognition of the practical application of alternative, self-renewing energy supplies.

Following upon the social and economic tenets of such economists and philosophers as E.F. Schumacher,\textsuperscript{14} appropriate technologists stress the use of small-scale, renewable, ecologically compatible resources for energy, food, and fuel. The Lower East Side windmill was constructed with assistance from the National Center for Ap-

\textsuperscript{11} See generally \textit{Wind Power Digest}, Dec. 1976, at 19. Briefly, a kilowatt expresses a quantum of 1,000 watts of electricity. A 100-watt light bulb, for instance, uses 100 watts (or 1/10th kilowatt) at any given period. The typical middle-income single family household requires about 1 1/2 - 2 kilowatts per hour at times of peak usage.
\textsuperscript{12} Located at 519 East 11th Street, the co-op has been christened "the 11th Street Movement" by observers. Moorhead, \textit{Rooftop Hydroponics Emerge as Gardens of the Future}, \textit{The Blade}, July 31, 1977, at C-1.
\textsuperscript{13} See text at notes 14-15, infra.
\textsuperscript{14} See generally \textit{E.F. Schumacher, Small is Beautiful} (1973).
propriate Technology, a project of the U.S. Community Services Administration. The Center numbers among its widely-scattered demonstration projects such emerging approaches as household solar heating, urban greenhouses, practical garbage recycling, basement hydroponics, and composting toilets. The aims of this movement, to decentralize power and capital needs while increasing reliance upon independent or semidependent resources, pose an obvious threat to the capital-intensive, concentrated public utility sector.

The formal incorporation of backfeed power into a utility grid will create a hybrid entity: the electricity consumer will, for the first time in history, also be the electricity producer. This unique new role poses a number of economic and legal questions with which utility regulators have rarely, if ever, come to grips. This article will focus upon the history and future of wind energy as a technology, the specific findings of the Windmill Case in New York, and some of the legal and economic implications of the widespread use of small-scale power production. Ultimately at issue is the problem of re-establishing competition while maintaining operating efficiencies within the unusual utility structure which results from the interconnection of conventional and alternative technologies.

II. Wind Power

A. The History of Wind Power

The harnessing of wind power to economize upon human labor dates back at least 4,800 years to the ancient Egyptians, and perhaps further. Electricity was first produced from wind power in 1891 by Paul La Cour, whose inventions powered a Danish village for more than half a century. From the 1920's until well into the 1950's, Marcellus Jacobs sold thousands of his patented "wind-gennies" to America's remote western homesteaders to produce electricity. It was more than two decades after the founding of the U.S. Rural Electrification Administration in 1935 before these "Jacobs" were no longer competitive with commercial power generation.

A pioneering example of commercial wind power was the massive

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19 W. Clark, ENERGY FOR SURVIVAL 516 (1975).
20 Id. at 533.
1,250 kilowatt plant built in 1941, at Grandpa’s Knob in the central Vermont mountains. That particular adaptation of the technology produced an average 700 kilowatts for Vermont Public Service Corporation during its 18-month generating life, until structural problems not related to electrical generation caused the mill to lose one of its eight-ton blades in 1943. The mastermind of the Vermont power station, Palmer C. Putnam, unsuccessfully sought aid from the federal government after World War II to solve the problems of inadequately inventoried wind speed data and the tying of wind-generated electricity into regional and national grids. The postwar government, more concerned with traditional forms of economic expansion for returning GI’s, was simply not interested in Putnam’s vision.

B. Current Wind Power Technology

The evolutionary improvement of inverters since the 1940’s has made it possible today to hook up even small generators directly into incoming electrical lines. At least three advantages accrue from such an arrangement. First, utility power may be used to supplement windplant generation, and it can be stepped up automatically as wind power declines or as household demand increases. Second, unlike many alternative energy systems, windmills do not require batteries and related inversion equipment, thus greatly reducing (by perhaps 40% to 50%) the costs of a wind system. Finally, efficiencies are obtained by backfeeding excess wind-converted power directly into transmission lines rather than simply grounding out the surplus. To date, the technical arguments raised by Con Ed against the backfeed characteristics of the windmill hinge only peripherally upon possible damage or overloads on utility equipment. For the most part, Con Ed’s opposition stems from concerns about the unpredictability of having to provide supplemental or reserve power.
power when the wind generator is inoperable or providing insufficient energy.\(^{23}\)

Several obstacles stand in the way of widespread household use of wind energy machines designed to backfeed. For one, equitable tariffs must be established—a fair price must be set for the wind-produced power. Moreover, regulatory law must be changed in ways which will allow the entry of different sizes of windmills into the electricity market. Windmill generation on a wide scale must be anticipated in utilities’ facility plans. Finally, regulatory policy must be revamped to ascertain what forms of regulation might affect wind systems besides state public utility commissions.

III. THE WINDMILL CASE

A. Facts and Figures

The economic settlement of the *Windmill Case* is a balancing act which reflects an intriguing battle of legal policies.\(^{24}\) In rough terms, the conflict centers around whether or not Con Ed and the Public Service Commission staff would like to see wind power made economically prohibitive by regulatory practice.

In order to comprehend the rates imposed upon the windmill owners, some basic aspects of utility rate-setting must be understood. The cooperatively-owned windmill\(^{25}\) was designed as an adjunct to the residential electrical system of a large apartment building. In New York, the apartment falls into Service Classification (Class) 2\(^{26}\) which contains two components in its charge for service. One, a “minimum demand charge,” is a minimum charge imposed by the utility on all customers of the class, and covers Con Ed’s costs of maintaining plant capacity to service Class 2 customers at any given moment.\(^{27}\) The second charge, a “minimum customer charge,” is a basic amount billed monthly to the customer whether or not the customer takes any electricity.\(^{28}\) Costs typically recovered

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\(^{23}\) Ohio utility officials have expressed concern for the safety of repairmen working on a line which the power company has taken out of service, but to which an unmuzzled wind generator is attached. Interview with Tom Nichols, Vice-President, Product Development Institute, in Toledo, Ohio (July 29, 1977).

\(^{24}\) The windmill owners were represented by Ramsey Clark, former U.S. Attorney-General, among others. Holden, *supra* note 15, at 859.

\(^{25}\) The legal owner is Energy Task Force, Inc. *Staff Report, supra* note 9, at 3.

\(^{26}\) Officially defined as “General-Small” by the Commission, Class 2 is applicable to the use of service for light, heat and power for general purposes where the customer’s requirements do not exceed 10 kilowatts. *Id.*, at 2.

\(^{27}\) *Staff Report, supra* note 9, at 6.

\(^{28}\) *Id.* at 4.
by the “minimum customer charge” include relatively fixed expenses to the utility, such as meter reading, billing, maintenance and overhead. If the customer uses electrical service beyond a prescribed level, a separate additional charge is made.

The actual dollar terms of the settlement of the Windmill Case are fairly innocuous. A minimum demand charge was established at $6.80 per kilowatt per month (based on the windmill’s peak output capability top of two kilowatts); $15.60 was set as the minimum customer charge; $1.00 was set for a separate meter which would record backfeed from the windplant into Con Ed’s system, thus making it easy to credit accurately the cooperative’s account for the prevailing wholesale cost to Con Ed of purchased electricity from other utilities.

The owners of the windmill agreed to the minimum demand charge of $6.80 per kilowatt per month, but they hotly contested the $15.60 minimum customer charge. In a 1974 cost-of-service study, Con Ed had determined that $15.60 was the “real” cost of its fixed services, but the utility charged Class 2 customers only $4.96, letting other rate classes pick up the excess. For the windmill in Class 2, however, Con Ed demanded the full $15.60. The utility justified this differential treatment on the ground that the windmill cooperative was “attempting to avoid taking service and . . . the full customer costs must be recovered.” The owners countered that this charge was an undue penalty being assessed by the company to discourage windmill generators, and argued that Con Ed did not consistently recover its true per-customer costs from all customers within Class 2. With little explanation, the Commission staff recommended, and the Commission members ruled, that the windmill owners nevertheless “be required to compensate the utility, to some degree, for the costs incurred to supply [them].” The $15.60 minimum customer charge was thereby imposed, seemingly contradicting the staff’s finding that average electrical usage by Class 2 customers fell far below (at 536 kilowatt-hours per month, or more than 40%) the level of usage at which the customer would break even on a $4.96 monthly charge for 1,000 kilowatt-hours.

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30 Staff Report, supra note 9, at 6.
31 Id. at 4.
32 Id.
33 Id.
34 Id. at 5.
35 Id. at 6.
Beyond the economic settlement, however, the windmill owners won a major victory—the limited recognition of the commercial potential of wind power. The Commission ordered Con Ed to make provisions for a one-year data-gathering and demonstration period, commencing in 1979, during which up to 25 similar household windmills could be rigged directly into Con Ed’s utility lines.\textsuperscript{36}

\textbf{B. Consequences of the Decision}

The effect of the imposition of the $15.60 minimum customer charge could seriously hinder the economic acceptability of wind power for some time to come. A wind generator the size of that in the \textit{Windmill Case} likely would cost several thousand dollars.\textsuperscript{37} The time it would take to recoup that purchase price through decreased electricity purchases from one’s local utility could total five or more years.\textsuperscript{38} By simply making it $10 more expensive per month to hook up a windplant to utility lines, the period of time needed to break even on a windmill purchase may be extended by 50\% or more, that is, to seven or more years.\textsuperscript{39}

There is also a subtle psychological factor in the use of the minimum customer charge to surcharge the windmill owner. This more subtle effect was recognized by the Public Service Commission itself some years ago:

\begin{quote}
Regardless of facts and figures, the consumer is apt to consider the service charge, for which he is allowed to use no substantial amount of gas, as a charge for which the company renders no service or such small amount as to be negligible. It is frequently said to be ‘something for nothing.’ This viewpoint may be wrong, but the opposition to the service charge has led many utilities to abandon it. . . . In other words, \textit{the fundamental objection to the service charge is not so much economic or accounting as it is psychological}.\textsuperscript{40}
\end{quote}

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{36} \textit{Id.}
\item \textsuperscript{37} Interview with Tom Nichols, \textit{supra} note 23.
\item \textsuperscript{38} \textit{Id.}
\item \textsuperscript{39} \textit{Id.} In Toledo, Ohio, a small business which was planning to market windmills with backfeed characteristics, Product Development Institute, was forced by the local electric utility to alter radically its inverter mechanism so that it would no longer backfeed but would simply cut off outside electrical service during the windmill’s peak production periods. The effect of the changes, in terms of added technical components, combined with the loss of savings from backfeeding electricity, pushed the price of the firm’s windmills from about $3,000 to nearly $3,600, and raised the amortization time from about 5-6 years to 7-8.
\item \textsuperscript{40} \textit{N.Y. Public Service Commission Rep. No. PUR 1931C (1931), Re Rates \& Rate Structures of Corporations Supplying Electricity in New York City}, at 337 (emphasis in original).
\end{itemize}
\end{footnotesize}
In the case of the windmill, it is even more questionable whether, by imposing a higher customer charge, Con Ed was not in fact getting “something for nothing.” The utility was collecting a proportionately greater amount of its overhead expenses from the windmill owners than from other Class 2 customers; yet, the windmill’s backfeed lowered the proportionate demands on Con Ed power which would normally be expected from an apartment building. It is of further note that the “accepted rule” in evaluating discriminatory rates is that “a utility may charge but one rate for a particular service, and any discrimination between customers as to the rate charged for the same service under like conditions is improper.”

In the Windmill Case, the Commission should have looked beyond the classification of service to the actual characteristics of the customer. The setting here of what is unmistakably a rate class within a rate class raises a fundamental question as to whether the Commission denied the windmill owners equal protection of the laws in violation of the Fourteenth Amendment. A counterargument to this claim, of course, would be that when legislation is promulgated to affect the public generally, there will inevitably be individuals who will be adversely affected. While this principle might frequently be true, common sense would render it inappropriate in the Windmill Case. First, the adjustment of the Class 2 rate structure was clearly discretionary to the staff of the Public Service Commission which made certain economic decisions reflecting a pronounced bias toward one specific type of user. Second, the effect of the discriminatory rate was to foreclose much of the dollars-and-cents acceptability of wind power for a potentially indefinite period of time.

In examining the Commission’s findings, it is evident that the windmill owners did not attempt to litigate or appeal the minimum customer charge; they no doubt understood that a court test would forestall implementation of the 25-windmill experiment contained in the settlement. More important, it is speculative as to whether a future litigant on this equal protection question will appear. Even if one does, it is unclear whether the United States Supreme Court

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42 U.S. Const. amend. XIV §1, cl. 4. Under the Equal Protection Clause, the courts identify the legislative distinctions drawn between persons or classes and then insure that the legislature has not used these distinctions to treat those similarly situated in a dissimilar manner. Nowak, Realigning the Standards of Review Under the Equal Protection Guarantee—Prohibited, Neutral, and Permissive Classifications, 62 Geo. L.J. 1071, 1073-74 (1974) [hereinafter referred to as Nowak].
will offer much relief. Because it is an economic interest, the Court would apply the least protective standard of equal protection review.\(^4\) Thus, if the classification could reasonably further a legitimate state interest, it will be upheld as founded upon a "rational basis."\(^4\) The windmill owners would carry a substantial burden which would require demonstrating that the difference in regulatory treatment of themselves and other Class 2 customers bore no reasonable relationship to a legitimate governmental purpose.

Also to be considered is the historic reluctance of the judiciary to overrule expert administrative law determinations if supported by substantial evidence.\(^4\) Because of this doctrine and the dictates of the Administrative Procedure Act,\(^4\) courts will, in these settings, invoke a limited scope of judicial review. It is unlikely that a court will overrule the technical decisions of a public utility regulatory body.

Yet another bone of contention in the arrangements for the windmill was the "credit for self-generation,"\(^4\) the means by which the windmill owners would be compensated for its backfeed of excess electricity into Con Ed’s lines. Under the revised tariff, Con Ed was to credit the cooperative based upon the average cost of fuel and purchased power for the month in which the excess generation was recorded.\(^4\) The cooperative argued that this method would not accurately reflect the intrinsic value of the windmill’s energy, that is, the savings to Con Ed of not having to produce more power at peak

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\(^4\) Staff Report, supra note 9, at 6.

\(^4\) Id.
hours of the day.49 The owners were alluding to the fact that backfeed from the windmill into Con Ed’s lines during times of peak consumer demand would decrease the utility’s costs of producing power during those periods. Since it costs Con Ed more at peak demand times to produce more power, the owners contended, the credit given the windmill for providing power at those times should be higher.

The Commission staff agreed with these contentions, but dismissed the proposal on the ground that it would be prohibitively expensive to hook up to the windmill the sophisticated equipment that would correctly match the hourly output of the windmill with Con Ed’s cost of fuel during those same hours.50 While the staff’s reasoning is understandable, the decision had the effect of depriving both sides of the kind of precise data needed for an effective analysis of the potential of wind power backfeed.51

C. Looking Toward Mutual Reinforcement

On balance, the revised tariff set in the Windmill Case has established a minimal air of cooperation. But certain negative precedents were also created. As the Commission staff noted, “[t]he proposed tariff does little to encourage the use of windmills. Thus, a decision would have to be made in this instance of balancing cost justification with stimulating energy conservation.”52 Looking beyond the particular case, however, there should be a more enlightened recognition of the fact that interconnections among big and small power suppliers, if done on a sufficiently wide scale, can reduce the need for duplicative energy facilities and help the overall efficiencies of a transmission system.

Gainesville Utilities Dep’t v. Florida Power Corp.53 is a case with striking analogies to the Windmill Case on the question of interconnection. There, the Federal Power Commission had exercised its authority under §202(b) of the Federal Power Act54 to force a huge, 21,000 square mile utility (Florida Power) to interconnect its grid with a tiny, 22 square mile municipal electrical system (Gaines-

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49 Id.
50 Id. The Commission staff estimated this cost at $20-$30 per month minimum.
51 One wonders why the federal government was not approached for the funds to support this experiment, some $9,000 to meter and computerize the backfeed data. The U.S. Community Services Administration and the new Department of Energy are two possibilities.
52 Staff Report, supra note 9, at 10.
The FPC had refused to let Florida Power collect $150,000 annually from Gainesville for the mere privilege of standby or backup service from the interconnection.\textsuperscript{55} This standby charge, analogous to the "minimum customer charge" that Con Ed successfully levied upon the windmill owners, was disallowed because of a finding that Florida Power would also receive "substantial and important benefits"\textsuperscript{56} in the form of fiscal savings and corporate efficiencies. The FPC determined that the smaller utility was providing backup or standby service to the larger utility; that it would transmit any surplus power it might produce into Florida Power's lines; and that, therefore, mutual consideration was given for the interconnection according to the producers' proportionate capacities. The Supreme Court affirmed the FPC position, stating that the FPC had correctly applied a "proportionate burden"\textsuperscript{57} test.

In the Windmill Case, seeds of the same sort of beneficial interconnection exist. Had the Commission applied the "proportionate burden" analysis of Gainesville Utilities to the wind power problem, it might have more favorably construed the mutual benefits of the relationship. The windmill, like Gainesville's municipal plant, contributed at times of excess production to Con Ed's overall power supply. Of course, it is difficult to conceive of how one or a few backfeeding windmills can make a lasting contribution to system-wide production efficiencies in a dispersed commercial grid. Theoretically, however, a profusion of windplants scattered over a wide geographic area would ensure that at any given moment a few or many windmills would be backfeeding—and would likely be fostering a minimum level of constantly backfeeding power. If such a scale of backfeed production could be attained, it would pose important questions as to the postures to be taken by commercial utilities and state regulatory bodies.

III. From Appropriate Technology to People's Power

A. Forming a Federation of Wind-Gennies

The Windmill Case portends a lasting change in the nature of utility-customer relations. No longer can the consumer be regarded

\textsuperscript{55} The $150,000 would have paid only for the "effecting" of backup service from the interconnection, that is, the mere privilege of access by Gainesville to Florida Power's excess capacity, and not for any actual electric service. Gainesville Utilities Dep't. v. Florida Power Corp., 402 U.S. 515, 522 (1971).

\textsuperscript{56} Id. at 524.

\textsuperscript{57} Id. at 528-29.
only as a passive end-user of power; rather, the consumer may also be a producer. However, given the pioneering aspects of the case, and the hostility—for hostility it was58—between Con Ed and the windmill owners, there is reason to question the survival of alternative energy systems beyond the New York experiment. A variety of legal obstacles, many of which will be inspired by the very nature of the utility regulatory structure, may arise to block the potential for wind power.

As mentioned previously, there are few if any technical bugs which would stop the spread of household-scale wind power.59 If several thousand windmills were utilized throughout a utility system, it is almost certain that there would be a constant, albeit minimal, flow of electricity from some of these generators.60 Utilities would have to account for these facilities in planning for their own capital needs. And it is conceivable that backfeeding could significantly affect the ownership, generation, and distribution patterns of the typical electricity market.

The modern electricity market is actually three-staged.61 When utilities need power in excess of their own generating capacity, they purchase through the so-called “transmission market,”62 basically the interconnections of huge regional utility systems. Many large electric companies sell their surplus power to a remote purchaser by using the lines of an intermediary utility. In this process, known as “wheeling,”63 the intermediary becomes, in effect, a common carrier. The second level of the marketplace is the “wholesale market,”64 where a utility company either purchases power or generates its own with wholesale-cost fuel, labor, and equipment. Wholesale power is resold either in the transmission market or the “local retail distribution market,”65 the third tier.

Presumably, the local commercial utility would retain its dominance over the local retail market. However, it could not totally pre-
empt power generation in its jurisdiction if a sufficient number of windplants were backfeeding. The utility would have some degree of dependence upon the windmills for a portion of its available supplies, thus the utility would be susceptible to an organized threat from an aggregation of windplant owners.

The scenario of a federation of windmill owners extorting more favorable electricity rates from a local utility conjures up the spectre of collective bargaining. True collective bargaining, however, involves employee unions in mass negotiation with employers. Analysis of the private windmill owner’s relation with their local utility implies not a master-servant or employer-employee linkage, but a free agent or independent contractor status. This conclusion is based upon the nature of wind power generation; although a predictable monthly average output can be approximated, the conditions of production are left up to nature and the whims of the private owner. As an independent contractor, the private windmill owner would not be endowed with the extensive collective bargaining rights and protections granted by the Taft-Hartley Act as amended by the Landrum-Griffin Act. A federation of household-scale windplant owners could not engage in legally-sanctioned and regulated collective bargaining under existing statutes. However, certainly a group of windmill owners could federate and engage actively in negotiations with local utilities to determine on what terms windpower will continue to be supplied to a company.

A major ramification of this hypothetical federation’s entry into the utility marketplace would be a change in the philosophy of state regulation of utility service. Regulatory activity at the state level tends to be protectivistic; in exchange for the privilege of a monopoly franchise to sell electricity, the utility company submits itself

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84 Not waiting for independent competition, one of Con Ed’s northeastern utility brethren, New England Telephone Company, has installed a 3 Kilowatt-plus windmill generator on Block Island, Rhode Island, to provide “a substantial portion of the phone company’s electric requirements on the island. When the wind is low, electricity is drawn from the Block Island Power Company. However, when the windmill produces excess electricity, it is fed back to the power company.” CATALYST FOR ENVIRONMENTAL QUALITY, Oct. 1977, at 42.

85 See W. Sell, Agency §11 (1975):

In general, an independent contractor is one whom while exercising independent employment, contracts to do a piece of work according to his own methods and without the control of the employer as to his physical conduct, except as to result. However, there are some independent contractors who are not agents because they are not subject to their employer’s control as to the details of the work and are not fiduciaries.


87 See generally Chamberlain & J. Kuhn, Collective Bargaining 113 (1965).
to regulation of rates and income.\textsuperscript{70} An independent, new utility will usually encounter considerable regulatory obstacles prior to licensing.\textsuperscript{71} However, semi-dependent power sources, such as wind energy systems, present regulators with a means for promoting efficiency in existing power grids. Backfeeding windplants overlap into existing utility systems, supplement rather than duplicate generating capacity, and foster lower rates to consumers. By allowing windmill generators on a case-by-case basis in order to promote system-wide efficiency, state regulatory agencies could, in effect, confer upon this alternative energy source a \textit{de facto} finding of public convenience and necessity.

\textbf{B. Beyond the Local Grid}

So much for the limited use of residential windmills:\textsuperscript{72} what of the wishes of a theoretical federation of thousands of windplants which are backfeeding a large, steady supply of electricity into a utility system? If it attempts to compete with its utility to sell electricity on the wholesale market, a windmill federation would have to use the utility as its common carrier to "wheel"\textsuperscript{73} its power to third parties. Wheeling would become the central issue.

An especially recalcitrant or stubborn utility could make it economically prohibitive for windmill owners to transmit electricity beyond the utility's grid through, for example, high charges for use of the company's lines.\textsuperscript{74} Such balks by the utility could cast it in the role of an unfair competitor.

While the Federal Energy Regulatory Commission (FERC)\textsuperscript{75} has

\textsuperscript{70} Garfield, \textit{supra} note 7, at 787.

\textsuperscript{71} See Cottonwood Mall Shop, Ctr., Inc. v. Utah Power & Light Co., 440 F.2d 36 (1971), where a small coal plant built to provide power to tenants of a shopping mall was held to pose direct competition with the local utility. The court affirmed that the requisite of a certificate of public convenience and necessity had to be met before the mall could compete in supplying electricity.

\textsuperscript{72} To this point, discussion has centered around the means by which windmill backfeed could make a local grid more efficient. This process, known as "pooling," requires interconnection between two or more suppliers, transmission reliability, and central dispatching of power. \textit{Breyer \& MacAvoy, supra} note 63, at 97.

\textsuperscript{73} Id. at 115.

\textsuperscript{74} But the utility's surcharges would probably have to be very high to discourage backfeed transmissions. One wind energy authority put the per-kilowatt costs of wind vs. nuclear generated electricity at less than one-seventh the expense. See Heronemus, \textit{Wind Power: A Near-Term Partial Solution to the Energy Crisis}, in \textit{1 Perspectives on Energy} 374 (C. Ruedisili \& M. Firebaugh eds. 1975).

\textsuperscript{75} The FERC succeeded to the functions of the Federal Power Commission pursuant to Pub. L. No. 95-91, 91 Stat. 583 (1977), \textit{to be codified at 42 U.S.C. §7172}. 
not historically interpreted its enabling legislation to allow it to force a utility to wheel electricity, economic theory and the practical need for flexibility in the accommodation of alternate technology may dictate differently. Even if the FERC refuses to intercede directly in antitrust proceedings against a recalcitrant regional power consortium to compel competitive behavior, there are indirect ways by which that agency may act to force the same result. The FERC can, and indeed must, take anticompetitive utility practices into consideration prior to authorizing certain utility financing activities, such as bond issues. Moreover, the Supreme Court has upheld an order requiring a utility to sell wholesale power to small local retail utilities. In the case of Otter Tail Power Co. v. United States, the FPC had forced Otter Tail Power Company to wheel federally-generated hydroelectric power through its lines. The Court held that the FPC may compel a utility to wheel power on grounds that the action is “necessary or appropriate in the public interest,” and that the public interest standard outweighs mere civil antitrust considerations. Thus it would appear that the FERC has the potential to become a formidable “first line” of review over anticompetitive utility practices which limit entry into the power market by appropriate technologies. And if the FERC refuses to take action, the small utilities can. In Otter Tail, the Supreme Court upheld the use of a civil antitrust action by several municipal utilities against the recalcitrant larger company, holding that “there is no basis for concluding that the limited authority of the Federal Power Commission to order interconnections was intended to be a substitute for, or to immunize Otter Tail from, antitrust regulation for refusing to deal with municipal corporations.”

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78 See 16 U.S.C. §824a(b) (1970). The FERC has no authority in ordering an interconnection between utilities “to compel ... [a] public utility to sell or exchange energy when to do so would impair its ability to render adequate service to its customers.” Id. See also BREYER & MACAVOY, supra note 63, at 115, which discusses both the FERC’s (FPC’s) narrow construction of its own capacity to compel wheeling, and possible alternatives to those earlier interpretations.


81 Id. at 373.

82 Id.

83 Id.

84 Id. at 374.
Access to the wholesale power market and to transmission rights in general are integral to realization of the long-term commercial practicality of wind power. Until public utilities themselves follow the lead of the Vermont Public Service Corporation of a generation and a half ago,\(^8\) the spread of wind power will be sporadic and grassroots in character. A federation of small windmill owners and advocates pressing for commercial treatment of their backfeed energy could go a long way toward modifying the aura of the "natural monopoly" in which most utilities are shrouded. In the process, windplant proprietors could also induce more energetic antitrust activity in the power transmission and production areas. The federal forum may be the most appropriate mechanism for such resolution because of the national scope of the "energy crisis." The awakening of greater federal leadership\(^8\) and more stringent policymaking at the national level in matters of energy might be the most significant factors in overcoming utility monopolism.

IV. SOME ECONOMIC CONSIDERATIONS

A. Implications for Utilities

In establishing utility rates, regulatory agencies first compute a "rate base."\(^8\) They then calculate a fair rate of return—the utility's allowable profit, expressed as a percentage of the base.\(^8\) The larger the rate base, the larger the actual profit, even if the rate of return is relatively low. For example, if the rate of return is 5%, the actual profit differs greatly when applied to a rate base of $100 ($5 profit) versus a rate base of $1,000 ($50 profit). Oversimplified as this explanation may be, it is inescapable that utilities often invest heavily in plant and equipment, thus building up their rate bases, in order to maximize profits.

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\(^8\) See text at note 18, supra.

\(^8\) President Jimmy Carter's 1977 energy package alluded to the need for legal regulation of utilities to keep them from unfairly discriminating against alternative, privately-held, energy sources. President Carter's National Energy Plan (White House Doc., April 29, 1977), reprinted in, 21 ENERGY USERS REPORT 0715, 0719 (1977) [hereinafter cited as National Energy Plan].

\(^8\) The rate base is comprised of utility property dedicated to generating or providing service. Employee costs, maintenance, and upgrading of facilities expenses, etc., are costed into this property by various allocational and accounting methods. See M. FARRIS & R. SAMPSON, PUBLIC UTILITIES: REGULATION, MANAGEMENT AND OWNERSHIP 80 (1973).

\(^8\) See Smyth v. Ames, 169 U.S. 466 (1898), an early regulatory case which articulated many of the factors commonly used in computing rates of return: original costs of construction; expenditures for permanent improvements; bond and stock values; present vs. original costs of construction; probable earning capacity; and operating expenses.
For most commercial utilities, wind power will not prove a viable alternative source of power generation for at least two reasons. First, it is comparatively inexpensive per installed kilowatt of generating capacity, and thus is not an attractive asset from the perspective of building a large capital base upon which to calculate rates. Second, wind power is most likely at this time to develop on a household-by-household basis, due to the greater efficiency of wind power in its direct household application, and windmills adopted by private owners will not be includable in utilities’ rate bases unless leased or cooperatively owned or financed by utility companies.

A continuous level of backfeed from numerous windmills would cause the utility to use its own capacity less; over the short term, in fact, utility plans to expand facilities might be curtailed. Widespread use of windmills owned by private operators might even hamper a utility’s cash flow, assuming monthly fluctuations of the amounts of electricity which would have to be bought from, or credited to, windplant owners. Hence, the proliferation of wind generation in the coming decade could have a drastic effect on utility construction plans. Aside from the direct impact this phenomenon would have on rate bases, other profit-related mechanisms, such as federal tax advantages for depreciation, would become less lucrative as fewer assets were added into the utility base. In addition, with a large number of windmills tied into a grid, the regulatory commissions might begin to exclude unneeded corporate facilities from utility rate bases, thus further straining utility cash flow problems.

B. Ramifications for the Windmill Owner

The potential proliferation of wind power also presents economic considerations and obstacles for windmill owners. The major barrier for the small owner is the initial cash outlay for equipment. Other factors which threaten the economic attractiveness of wind power are the engineering requirements and possible government or utility inspections which are necessary, but likely expensive, evils.

Some relief might be attainable through the Internal Revenue Code. Foremost among the possibilities is the prospect of tax incentives for alternative energy uses, part of the ballyhooed energy pro-

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89 Heronemus, supra note 74.
90 See Staff Report, supra note 9, at 8-9, where the Commission staff considered the merits of engineering and inspection certifications for windmills included in the 25-windmill experiment.
gram of the Carter administration. A more traditional possibility is the classification of windplants as assets held in the conduct of a “trade or business.” In that circumstance, the owner could avail him/herself of tax benefits typically accorded to businesses—depreciation, investment credits, and deductions for maintenance, among others. Although it might appear farfetched to view the residential use of wind power as a business, at least two conceptual tacks may be taken toward this result. The first is direct: if the utility grants the windmill owner “credit for self-generation,” as was the arrangement in the Windmill Case, then the windmill owner effectively receives noncash “income.” If the generation credit is considered income, then that portion of the cost of maintaining the windmill which reflects the portion of its capacity which was “sold” to the utility as backfeed may be seen as a business-related expense. However, before a tax deduction can be taken for a business-related use of one’s home, that portion of one’s residence used for business purposes must be set aside exclusively and used regularly for such purposes; split business and personal uses are generally not allowable. A windmill could not be exclusively devoted to business purposes, inasmuch as backfeed, by definition, is the part-time transmission of excess energy from the windmill.

A second approach might to be consider the windmill as being “rented” to the utility which benefits from its backfeed. This approach would necessitate its being rented for a variable or sliding period of time each month, with the credit for self-generation being construed as rental income. The windmill would not have to be actually income-producing, so long as it was being held for the production of rents or royalties. Deductibles would include interest, taxes, depreciation, and other “ordinary and necessary” expenses.

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81 National Energy Plan, supra note 86, at 0721.
82 I.R.C. § 167.
83 Id. §§ 38, 46.
84 Id. § 212(2).
85 See Staff Report, supra note 9, at 6.
86 Such noncash income would be taxable under I.R.C. § 61(a)(2), which covers all “gross income derived from business.”
87 Id. § 280; see also [1977] MASTER TAX GUIDE (CCH) § 1067.
88 I.R.C. § 280.
89 [1977] MASTER TAX GUIDE (CCH) § 1004.
90 I.R.C. § 212(2). “In the case of an individual, there shall be allowed as a deduction all the ordinary and necessary expenses paid or incurred during taxable year: . . . (2) for the management, conservation or maintenance of property held for the production of income.”
91 TREAS. REG. § 1.212-1 (1953).
The rental or lease approach may prove to be the most convenient business arrangement for backfeed power because it circumvents the problems of devoting residential property exclusively to business purposes.

It is important to obtain clarifications of these and other possible tax benefits as soon as possible, while the national mood is more receptive than ever to energy-related tax incentives. Tax benefits of this sort might encourage many households which could finance small-scale alternative energy technologies to use them. As with most grassroots movements, middle-class acceptance may be crucial to its success.

V. CONCLUSION

Wind power is one of the most readily adaptable alternative technologies. Its technical feasibility has been demonstrated, and, despite the arrangements of the Windmill Case, its economics are not prohibitive. The Windmill Case highlights the possible ramifications of widespread consumer production of electricity. Nevertheless, many institutional obstacles and more than a few political battles lie ahead. The regulatory systems, both state and federal, are ingrown and closely tied to protecting the status quo of the utility industry. Antitrust questions will arise as a heretofore dormant subclass of alternative technologists grows in size and voice.

Perhaps the most persuasive advocacy of appropriate technologies will not be rational arguments concerning their self-renewability of supply, their pollution-free characteristics, their ease of adaptability, or their “low technology.” Rather, economics may be the most impressive factor, particularly when combined with personal desires for independence from manipulative, multinational energy consortia. If appropriate technology is to become a national movement, it must help in forging a completely changed view of both the role and control of energy production in this country. But more inevitably, “as prices continue to climb and resources diminish, more and more people will find themselves resorting to appropriate technology, whether or not they call it that.”102 When they do, the consumer will become the producer. By making power, people will be taking power.

102 Holden, supra note 15, at 859.