

# EFFICIENCY AND THE PUBLIC INTEREST: OF TRANSMISSION AND THE ENERGY POLICY ACT OF 1992

by  
*Peter Fox-Penner\**

## I. INTRODUCTION

### A. Background

Prior to the enactment of the Energy Policy Act of 1992 (Act),<sup>1</sup> most Federal Energy Regulatory Commission (FERC or Commission) deliberations involving transmission services did not occur in transmission rate or service proceedings *per se*. The Commission conducted a number of general inquiries or studies of the subject,<sup>2</sup> including setting the terms and conditions of transmission services as part of merger proceedings<sup>3</sup> and “market-based” pricing proceedings.<sup>4</sup>

With the passage of the Act, the FERC is likely to be asked to confront the advisability of requiring transmission services in a more direct manner. The Act permits “[a]ny electric utility, Federal power marketing agency, or any other person generating electrical energy for sale for resale” to petition the Commission for a wheeling order.<sup>5</sup> The FERC may order wheeling in accordance with section 212 of the Federal Power Act (FPA)<sup>6</sup> and a finding that such wheeling would “otherwise be in the public interest.”<sup>7</sup>

Section 212 contains a number of criteria the FERC must consider in deciding whether to mandate transmission services. Compulsory wheeling must occur at

rates, charges, terms, and conditions which permit the recovery by such [transmitting] utility of all the costs incurred in connection with the transmission services, including, but not limited to, an appropriate share, if any, of legitimate,

---

\* B.S., 1972, University of Illinois; Ph.D., 1985, University of Chicago Graduate School of Business. This work was supported in part by the Edison Electric Institute. Dr. Fox-Penner is a Vice President of Charles River Associates.

1. Pub. L. No. 102-486, 106 Stat. 2776 (1992) [hereinafter Energy Policy Act].

2. A partial list includes: A. Stewart Holmes, *A Review and Evaluation of Selected Wheeling Arrangements and a Proposed General Wheeling Tariff*, OFFICE OF REGULATORY ANALYSIS, September, 1983; *A Review of Selected Transmission Agreements*, OFFICE OF ELECTRIC POWER REGULATION, August 1984; Docket No. RM85-17 (Phase I), *Regulation of Electricity Sales for Resale and Transmission Service*, May 30, 1985; and *Electricity Transmission: Realities, Theory, and Policy Alternatives*, TRANSMISSION TASK FORCE'S REPORT TO THE COMMISSION, October, 1989.

3. For a recent summary, see John S. Moot, *Electric Utility Mergers: Uncertainty Looms Over Regulatory Approvals at the FERC*, 12 ENERGY L.J. 1 (1991).

4. A useful summary of these proceedings is Bernard W. Tenenbaum and Steven Henderson, *The History of Market-Based Pricing*, 4 ELECTRICITY JOURNAL 30 (December 1991).

5. Energy Policy Act § 721(2).

6. 16 U.S.C. §§ 791(a)-824(k) (1988).

7. Energy Policy Act § 721(2).

verifiable, and economic costs, including taking into account any benefits to the transmission system of providing the transmission service, and the costs of any enlargement of transmission facilities.<sup>8</sup>

Moreover, "the rates, charges, terms, and conditions shall promote the economically efficient transmission and generation of electricity," while being just and reasonable and not unduly preferential.<sup>9</sup>

### B. *Scope of the Article*

When compounded with the need to find that wheeling is in the public interest, the requirements set forth in section 212 are considerable. This article focuses on an important area of section 212 criteria, namely the interplay between the public interest and economic efficiency criteria in the case of Public Utility Regulatory Policies Act of 1978 (PURPA) Qualifying Facilities (QFs).<sup>10</sup> Two recent proceedings in which the FERC considered the need to provide transmission service guarantees for QFs are analyzed from the standpoint of public and private economic welfare.

The two proceedings examined are the merger of Utah Power & Light Company, PacifiCorp, PC/UP&L Merging Corporation (Utah)<sup>11</sup> and the Western Systems Power Pool application (WSPP).<sup>12</sup> In the first proceeding, a merger subject to approval under section 203 of the FPA, the article's analysis is founded on the type of competitive impact analysis economists may undertake when two rivals seek to merge.<sup>13</sup> The second proceeding involves a horizontal pooling arrangement, and requires a somewhat different analytical framework. Obviously, neither of these proceedings consists solely of a request for transmission service.

In both instances, the analysis is strongly affected by the fact that QFs are the source of the power to be wheeled. The central role of QFs makes the specific analysis relevant to future proceedings in which QFs are the parties requesting transmission service. However, the analysis illustrates several general facets of the economic and public interest determinations that may be necessary in future wheeling proceedings involving other utility entities.

Both proceedings created extensive and detailed records. It is not the purpose of this article to construct analyses based on each and every fact in the record, but rather to examine a stylized situation similar to that presented in *Utah* and *WSPP*. Where necessary, it attempts to make explicit the

---

8. *Id.* § 722(1).

9. *Id.*

10. 16 U.S.C. §§ 2601-2645 (1992). PURPA created a class of private nonutility power generating facilities known as Qualifying Facilities, or QFs. In brief, QFs are electric power plants that use cogeneration or certain renewable fuels to generate electricity. Cogeneration is a generating process wherein the heat ordinarily wasted by power plants is put to use, thus saving energy. Renewable fuels are fuels that are ultimately derived from solar energy, such as wind, solar, and biomass energy sources.

11. 47 F.E.R.C. ¶ 61,209 (1989). See procedural history in section III *infra*.

12. 55 F.E.R.C. ¶ 61,154 (1991). See procedural history in section IV *infra*.

13. This analysis typically derives from U.S. Department of Justice and Federal Trade Commission Horizontal Merger Guidelines 1992, reprinted in 4 (CCH) TRADE REG. REP. ¶13,104 (1992). A summary treatment of the subject can be found in Steven C. Salop and Joseph J. Simons, *A Practical Guide to Merger Analysis*, 29 THE ANTITRUST BULLETIN 663 (Winter 1984).

author's factual, legal, and economic assumptions as it proceeds. Subsection C contains additional discussion concerning the author's assumptions.

Due to the involvement of QFs in these matters, the following section of this article examines the regulatory policies and economic circumstances surrounding QFs in some detail. This section examines the price and "nonprice" aspects of QF power, nonprice competition among QFs for limited capacity payments, and the practical difficulties of measuring full avoided costs and the quality of QF power.

Sections III and IV analyze the *Utah* and *WSPP* situations respectively. In brief, section III analysis compares the welfare of consumers with and without QF wheeling under various sets of assumptions, while section IV examines the welfare implications of QF membership in WSPP. Section V is a summary and conclusion.

### C. *Assumptions Concerning the Efficiency Implications of Transmission Rate Policies*

In markets for private goods, consumer welfare is maximized when price reflects supply cost. The parallel condition in markets for public goods is that the sum of the demands of all consumers equals the cost of the marginal seller. In either case, the allocation of economic resources is efficient only when price equals the marginal cost of supply.<sup>14</sup> If transmission prices do not equal the marginal costs of providing service, too much or too little transmission will be supplied. This condition remains the basis of welfare maximization no matter how the electric power industry is owned, organized, or regulated.

The methods and standards of determining the marginal cost and price of transmission are the subject of significant current debate in the United States.<sup>15</sup> Until recently, the basis for firm transmission prices almost always was the actual embedded-cost of the facilities used to provide service.<sup>16</sup> Recently, the FERC adopted a transmission pricing precedent that attempts to reflect more closely the true cost of wheeling.<sup>17</sup> Under the new standard, transmission prices may be based either on embedded-costs or opportunity costs, but not both.<sup>18</sup> This new standard is arousing as much criticism as did

---

14. See A. ATKINSON & J. STIGLITZ, LECTURES ON PUBLIC ECONOMICS (1980).

15. See Michael C. Caramanis, Roger E. Bohn, and Fred C. Schweppe, *The Costs of Wheeling and Optimal Wheeling Rates*, IEEE TRANSACTIONS ON POWER SYSTEMS, Vol. PWRS1, No. 1, (February 1986); Susan F. Tierney, *Transmission Proposal for New England*, THE COMMONWEALTH OF MASSACHUSETTS DEPARTMENT OF PUBLIC UTILITIES DRAFT (September 28, 1989); Mark B. Lively, *Tie-riding Freeloaders — The True Impediment to Transmission Access*, PUBLIC UTILITIES FORTNIGHTLY, December 21, 1989 at 14; Charles G. Stalon, *The Significance of the FERC's Transmission Task Force Report in the Evolution of the Electric Industry*, Presented to the Electric Policy Symposium, The Center for Law and Economic Studies, Columbia University School of Law, New York (April 7, 1990); Joe D. Pace, *Summary and Critique of the FERC Transmission Task Force Report*, NATIONAL ECONOMIC RESEARCH ASSOCIATES, INC. (n.d.); Dariush Shirmohammadi, et al., *Cost of Transmission Transactions: An Introduction*, Pacific Gas and Electric Company, San Francisco, CA. IEEE, 91 WM 1842 PWRS, 1991.

16. The common basis for nonfirm wheeling is the cost of providing such service on a nonfirm basis. Usually, this excluded the capital costs of the system and included incremental power production costs, additional operating and maintenance costs, and other cost components.

17. Pennsylvania Electric Company, 58 F.E.R.C. ¶ 61,278 (1992).

18. *Id.*

its predecessor.<sup>19</sup>

As noted above, section 722 of the Act would appear to prohibit wheeling under circumstances in which the transmitting utility could not recover, via its transmission rates, the cost of providing service. If this is the case, then one can safely assume that the transmission itself is correctly priced, and the provision of transmission service does not automatically violate the principles of welfare maximization. This assumption is maintained throughout this article, unless otherwise noted.

## II. A CONSUMER WELFARE ANALYSIS OF THE "MARKET" FOR QF GENERATION

### A. *The Intent and Operation of the QF Sales Mechanism*

The Ninety-Fifth Congress enacted PURPA at a time of great concern over the nation's dependence on imported oil. Although other factors may have motivated Congress, it is evident that sections 201 and 210 of the legislation were created to encourage the production of electricity by generators that were highly efficient in their overall use of energy or used renewable fuels.

Congress chose to encourage these kinds of generators by creating a class of electric generating facilities known as QFs. PURPA created (i.e., defined) these facilities and gave them certain entitlements to interconnect with, and sell to, electric utilities. For example:

- a. A QF was exempted from wholesale rate regulation under all federal and state public utility statutes.<sup>20</sup>
- b. A QF was granted the right to interconnect with the electric utilities in whose service territory it was located, provided that the interconnection was established in a way that did not interfere with the safe, reliable operation of the electric power system.<sup>21</sup>
- c. A QF was permitted to sell some or all power produced to the interconnected utility at a price no higher than the purchasing utility's full avoided cost (FAC), that is, "the cost to an electric utility of energy or capacity or both which, but for the purchase from the Qualifying facility or Qualifying facilities, such utility would generate or purchase from another source."<sup>22</sup> This language notwithstanding, section 210(b) of PURPA also required that the rates for purchases from QFs:
  - (i) shall be just and reasonable to the electric consumers of the electric utility and in the public interest; and
  - (ii) shall not discriminate against qualifying cogenerators or qualifying small power producers.

In addition to setting these standards, PURPA stated that purchase rates and other provisions implementing the law were to be set such that utility

---

19. See, e.g., Charles E. Bayless, *Transmission Pricing: Striking a Balance*, PUBLIC UTILITIES FORTNIGHTLY, Oct. 15, 1992 at 13.

20. 18 C.F.R. § 292.602 (1992).

21. 18 C.F.R. §§ 292.303, 292.308 (1992).

22. 18 C.F.R. § 292.101(6) (1992). The legislation states that the rate for purchases from QFs shall not "exceed the incremental cost to the electric utility or alternative electric energy." PURPA § 210(b).

consumers did not “subsidize” cogenerators.<sup>23</sup>

- d. Finally, if the local utility and the QF agreed, the QF’s electricity could be wheeled to another interconnected utility. In this case, the latter utility was obligated to purchase from the QF at its FAC, as if it were the utility physically interconnected to the QF.<sup>24</sup>

It is evident from the construction of these provisions that Congress intended to provide an economic encouragement to QFs, while leaving utility customers indifferent to obtaining electricity from a QF and from the utility’s alternative source. The encouragement comes about through the QF’s entitlement to receive FAC regardless of its own cost of production. Any QF able to produce power at an average cost lower than its utility’s FAC is entitled to keep the difference as profit.<sup>25</sup>

The FERC discussed the condition of consumer indifference in its order promulgating the use of FACs. It noted that the use of FAC “will not produce any rate savings to the utility’s customers.” FERC held that sharing the gains with all utility consumers would result in “insignificant” savings for any one consumer, but would have a large adverse impact on QF development. Furthermore, the FERC stated that “ratepayers and the nation as a whole will benefit from the decreased reliance on scarce fossil fuels, such as oil and gas, and the more efficient use of energy.” The FERC therefore concluded that all of the savings from QF production should be allocated to QFs rather than being split between ratepayers and QFs.<sup>26</sup>

There may be some imperfections in the implementation of the law. Assuming error-free (or at least unbiased) implementation, the condition of consumer indifference inherent in the PURPA QF sales scheme can be seen to be rather narrowly constructed. Payment of accurately-computed FAC means that no positive transfers of wealth from utility consumers to QFs will arise from PURPA as a result of Congress’s prohibition of ratepayer “subsidies” to cogenerators. However, payment of FAC means that QFs are to be paid precisely as much as consumers would otherwise pay. Under this scheme, the only benefits consumers would enjoy are the diffuse, unpriced energy security benefits to which the FERC alluded.

The operation of this unique QF power “market” does not have the same welfare implications as competitive markets. In a competitive market, buyers

---

23. According to the FERC Staff Memorandum discussing FERC’s PURPA implementation responsibilities, “[T]he Conference Report on Section 210 states that customers of utilities are not to be compelled to subsidize QFs, and this question would seem to bear on the question of who pays the costs of interconnection as well as on the per-unit price to be paid for energy.” 44 Fed. Reg. 38,863 at 38,866 (1979). In the same memorandum, while discussing its implementation responsibilities under PURPA, FERC states that “. . . the proscription against compelling the utility’s customers to subsidize QFs is dispositive.” *Id.* at 38,871 (1979).

24. The identical requirement may not lead to identical outcomes from the standpoint of the QF. For example, the utility to whom the QF power was wheeled is not required to pay for transmission charges. As some energy is likely to be lost in transmission, the full output of the QF cannot be sold to the more distant utility. See 18 C.F.R. § 292.303(d) (1992).

25. In textbook competitive markets, the seller receives the market price. The seller’s profit is the difference between its costs and market price. If a utility’s FAC can be interpreted as the market-clearing price level, the PURPA mechanism leads to the same result as a competitive market.

26. 45 Fed. Reg. 12,214 at 12,222 (1980) (codified at 18 C.F.R. § 292).

as well as sellers make voluntary trades. They do so when they perceive a transaction to be better than the closest alternative. When such trades take place, buyers and sellers share the economic benefits.

In perfectly functioning PURPA markets, all of the gains to trade accrue to the QF sellers. People enjoy energy security benefits equally, as citizens, not as buyers and sellers of energy. In economic terms, these benefits are public goods that arise out of QF transactions.

Given a transfer of almost all economic benefits to the QF under full FAC pricing, PURPA's public-interest objective is to increase energy efficiency, which may be viewed as a public good.<sup>27</sup> The mechanism for creating these public goods is a particular mandated purchase at a mandated price so as to create an incentive for private parties to provide the public good as part of a mandated transaction.

The conditions for the optimal provision of public goods differ markedly from the conditions for the optimal provision of private goods. The amount of public goods that will maximize aggregate consumer welfare can be determined by aggregating the demands of all consumers receiving the public good and equating this with the marginal cost of the public good. Legislation that perfectly weighs the preferences of consumer-voters against the costs of public goods in theory will produce the proper amount of public good. However, Congress did not specify exact amounts of the public goods to be provided under PURPA. Instead, it enacted a mechanism whereby the amount of public good to be provided was to be decided by the amount of private activity that occurred subject to the narrow private indifference condition. Had Congress intended that public goods be provided in larger amounts than the payment of FAC would engender, they could have required ratepayers or taxpayers to subsidize QFs.<sup>28</sup>

The creation of public goods associated with private PURPA transactions is not a basis for altering the economic framework used to measure changes in consumer welfare. The economic analysis of consumer welfare from private transactions must be employed as it would in the analysis of any other transaction requiring FERC scrutiny. There is no conflict between the use of a private market welfare test and PURPA's narrow indifference criterion, particularly in view of the prohibition against consumer subsidy of QFs. The level of public benefits derived from QF sales is an endogenous feature of the proper implementation of PURPA. If PURPA has been implemented so as to meet the narrow indifference criterion, the level of public goods can be presumed to be consistent with optimal public welfare.

---

27. 16 U.S.C. § 2601 (1988). The energy economics literature has not reached a consensus on this point.

28. This is consistent with the Supreme Court's interpretation of PURPA. *American Paper Institute, Inc. v. American Electric Power Service Corp.*, 461 U.S. 402 (1983). The Court found that the public benefits created by PURPA were consistent with Congress' intent, and that there was no justification for paying QFs a maximum of less than FAC. It follows that there is no basis for paying more than FAC to provide greater benefits than are created by PURPA.

### B. *Unpriced Aspects of QF Purchases and their Welfare Implications*

The narrow indifference condition takes effect by making the utility's cost of service for ratemaking purposes identical under PURPA purchase or the avoided alternative. In order for this to be the case, however, avoided costs must be computed correctly. This analysis has assumed that avoided costs are indeed computed correctly.

A second condition necessary for strict indifference involves possible differences between the QF purchase and its alternative in respects that are not reflected in the price paid for QF power. This could happen because markets are incomplete, or because certain elements of value are difficult or impossible to quantify.

Examination of these unpriced differences shows that they are a potential source of value or cost for electricity consumers. Under the narrow indifference condition and errorless avoided costs, this is the only benefit ratepayers realize. The level of these benefits is maximized when a utility chooses the highest-value QF seller from among a number of different QF sellers, all at the same FAC purchase price. The only basis for finding private welfare improvements under PURPA is the selection process under which utilities choose the QF with greatest unpriced value.

#### 1. Complexities in the Calculation of FAC

From the outset, Congress and the FERC have recognized the complexities of quantifying the value of avoiding an alternative. The first context in which this issue arose was the value of reliability, which is one of the many dimensions by which the nature or quality of a source of power must be evaluated. PURPA permits but does not require the FERC to establish reliability standards for QF power. Rather than establish such standards, the FERC ruled that the FAC price paid to QFs should be adjusted up or down to reflect the value of reliability.<sup>29</sup>

The issue arose again when FERC considered whether full avoided cost should include payments for avoided capacity investments as well as avoided energy costs. When proposing PURPA section 210(b), the FERC staff wrote:

Utilities make capacity payments to each other where firm commitments to make and hold capacity available are involved. A cogenerator or small power producer which is unwilling or unable to make such a commitment and to achieve a high degree of reliability, is not enabling the purchasing utility to avoid the costs of construction or a capacity purchase, and thus these costs do not serve to increase the ceiling on the rates the QF can demand.<sup>30</sup>

In short, the statute provides an upper limit on the price for a capacity purchase (including an energy rate component) at the alternative capacity and energy costs avoided due to such a purchase. Among other things, the duration of the purchase, the planning horizon of the utility, and the capacity and

---

29. See the comments of the FERC staff concerning proposed section 210 regulations, 44 Fed. Reg. 38,863 at 38,867 (1979) (codified at 18 C.F.R. § 292). For a recent compendium of research on the value of reliability, see *Special Electricity Reliability Issue*, 9 ENERGY JOURNAL 1 (1988).

30. 44 Fed. Reg. 38,863 at 38,870 (1979).

load situation of the utility will affect such alternative costs. Generation expansion models (which discount the future costs of alternatives to a common present value) may be used to quantify such costs once the magnitude and duration of capacity purchases are known. The composition of such studies would vary depending on the answers to certain questions: Will utilities be required to pay now on a discounted basis for capacity not yet needed? Will capacity sales have priority over dump energy? How far into the future must utilities commit to buying (both initiation and duration of the sale)?

Beyond these broad conceptual difficulties lie a number of complex qualitative aspects of a power supply that should be reflected in the price of the avoided alternative. The final rules recognize a number of these factors and state that they are to be used in the determination of FACs. Computation of FAC for the purposes of paying for a cogenerator should account for:

- a. The data provided pursuant to § 292.302(b), (c), or (d), including State review of any such data;
- b. The availability of capacity or energy from a qualifying facility during the system daily and seasonal peak periods, including:
  - (i) The ability of the utility to dispatch the qualifying facility;
  - (ii) The expected or demonstrated reliability of the qualifying facility;
  - (iii) The terms of any contract or other legally enforceable obligation, including the duration of the obligation, termination notice requirement and sanctions for non-compliance;
  - (iv) The extent to which scheduled outages of the qualifying facility can be usefully coordinated with scheduled outages of the utility's facilities;
  - (v) The usefulness of energy and capacity supplied from a qualifying facility during system emergencies, including its ability to separate its load from its generation;
  - (vi) The individual and aggregate value of energy and capacity from qualifying facilities on the electric utility's system; and
  - (vii) The smaller capacity increments and the shorter lead times available with the additions of capacity from qualifying facilities; and
- c. The relationship of the availability of energy or capacity from the qualifying facility as derived in paragraph (e)(2) of this section, to the ability of the electric utility to avoid costs, including the deferral of capacity additions and the reduction of fossil fuel use; and
- d. The costs or savings resulting from variations in line losses from those that would have existed in the absence of purchases from a qualifying facility, if the purchasing electric utility generated an equivalent amount of energy itself or purchased an equivalent amount of electric energy or capacity.<sup>31</sup>

In practice, it has proven difficult and sometimes impossible to factor these complex considerations into a calculation and comparison of avoided costs. Calculation of avoided costs requires comparison of the overall value of a set of hypothetical or actual alternative proposals to supply energy and capacity. Because typical electric capacity purchase decisions (including QF purchase contracts) have durations exceeding ten years, all calculations must use a set of forecast variables. It is extremely difficult to place a value on differences in the likelihood that forecast costs or other dimensions of the transaction are biased or have different degrees of uncertainty and

---

31. 18 C.F.R. § 292.304(e) (1992).



variability.<sup>32</sup>

Consider, as an example of the economic complexities involved, the case of a utility attempting to compare the costs of its own coal-burning plant to a gas-fired QF. The QF utility contract allows a complete, zero-profit pass through of all actual QF fuel costs with adequate fuel purchase monitoring provisions. The cost of the energy generated from the coal, which is purchased under a ten year contract, is two cents per kilowatt-hour (kWh) increased by the rate of inflation. After ten years, the utility has no firm contract, so it must forecast the price of coal for years ten through twenty.

In contrast, the QF proposes to purchase natural gas on the spot market for twenty years. Assuming an inflation rate of four percent per year over twenty years, and no change in coal pricing during the second ten years, there is a fifty percent chance that gas spot prices will be one cent/kWh less than coal prices and a fifty percent chance that they will be one cent/kWh more. Under these assumptions, the expected value of the coal and gas-fired electricity is the same. However, suppose there is much more variation in gas spot prices, and that the value of price stability to consumers is not known.<sup>33</sup> Further, suppose that the impact of particularly wide swings in prices, or the likelihood that gas spot price or inflation is estimated in a biased manner, also are unknown. Under these circumstances, it is difficult to complete an objective, quantifiable measurement of the superiority of one alternative over another.

Many states determined FAC in administrative proceedings using formulaic or even brute force methods. Florida proposed a statewide "standard offer" with a statewide FAC in spite of easily demonstrable differences in costs across the state.<sup>34</sup> New York passed a law setting a 6 cent floor on avoided cost prices.<sup>35</sup> These approaches make a marked departure from an attempt to calculate an accurate FAC for a single utility.

## 2. Qualitative Differences in the Value of QF Offers

The difficulties in computing an avoided cost that accurately reflects customer value go beyond the quantitative issues raised by the FERC-mandated factors to be included in avoided costs. Two additional kinds of problems hamper the comparison of long-run electric utility capacity alternatives.

The first difficulty arises out of the qualitative features of electric power supply alternatives. There are any number of qualitative reasons why a purchaser may legitimately prefer one product over another, even when the two products cost the same amount of money and have the same measurements, however measurements of such products are taken. In the present context, a utility may believe that one QF operator is a better power plant operator, or

---

32. For one of the most exhaustive catalogs of these practical difficulties, see *Proposed Order of Hearing Examiner*, Baltimore Gas and Electric, Case No. 8241, Phase II, Jan. 22, 1992.

33. See K. Palmer, P. Fox-Penner, D. Simpson, and M. Toman, *Contracting Incentives in Electricity Generation Markets*, PUBLIC UTILITY REPORTS (1993).

34. FLA. ADMIN. CODE ANN. r. 2517.080-17.089 (1983).

35. Robert E. Burns, William Pollard, Timothy Pryor, and Lynne M. Pike, *The Appropriateness and Feasibility of Various Methods of Calculating Avoided Costs*, THE NATIONAL REGULATORY RESEARCH INSTITUTE (June 1982).

has better management. It may perceive that the fuel supply to one QF is more secure than the supply to another otherwise equivalent QF. If the utility's perception has a basis in fact, the utility has a legitimate interest for preferring one QF over another.

The second reason stems from the differences between integrated and nonintegrated generators. When a utility computes the cost of building its own power plant, it is examining a power supply option in which it owns and controls the generator throughout the construction and operation period. The value of doing this, as opposed to purchasing capacity from an independent firm, depends on the costs and benefits of deintegration for a specific utility.<sup>36</sup> Research indicates that these costs and benefits are a complex function of:

- a. Technical interdependencies between the operation of generators and transmission systems in the interconnected utility network;<sup>37</sup>
- b. Managerial and information efficiencies, such as the ability to manage large utility construction projects, monitor and forecast the market, and understand local conditions affecting demand and supply;
- c. The value of planning flexibility in power system design and operation;
- d. The degree to which the contract between the QF and the utility permits operational integration, provides performance assurances, and so on;
- e. Financial aspects of the treatment of purchase power expenses and capacity additions for regulatory or accounting purposes; and
- f. The possibility of opportunistic behavior on the part of buyers or sellers. For example, a QF facility may be physically identical to the avoided alternative facility in every way but may be owned and operated by a party other than the utility. When the utility experiences an unplanned outage, it could alter the operation of an avoided alternative plant that it owns to suit its system's needs. The ability to compel changes in the operation of the QF is limited to a) the willingness of the QF owner, b) the utility's rights under the contract, and c) the utility's ability to interpret and enforce its rights in a timely manner.

### *C. Consumer Welfare Enhancement under PURPA, With and Without Other Wholesale Competitors*

To review, this section has thus far argued that there are two kinds of reasons why the calculation of FAC is difficult. First, some aspects of the costs avoided by the utility are difficult to compute due to a lack of data and calibrated models. Second, some aspects of the costs avoided by utilities are inherently qualitative, i.e. extremely difficult to value at the margin given our present state of knowledge.

Assuming a world in which there are only utilities and QFs, these "unpriced" differences among QF sellers are the only basis for consumer welfare improvements under PURPA. One important feature of private markets is that they permit buyers and sellers to match themselves so as to maximize

---

36. See P. FOX-PENNER, *IS DEINTEGRATED GENERATION EFFICIENT? A PROPOSAL FOR A PROGRAM OF RESEARCH*, Charles River Associates (1990).

37. See P. FOX-PENNER, *ELECTRIC POWER TRANSMISSION AND WHEELING: A TECHNICAL PRIMER*, Edison Electric Institute (1990).

the utility of buyers and the surplus of sellers. Utilities can maximize the welfare of their customers subject to the constraints imposed by PURPA only if they are permitted to evaluate the total value of all QF offers and pay the required price to the QFs that offer the best aggregation of unpriced features. Thus, the welfare benefits conveyed by QFs are subtle and possibly slight, and to a first approximation QFs leave utilities welfare-neutral.

The presence of a large number of QF offers is one of two links between consumer welfare and the operation of PURPA. Under PURPA, consumers are better off only if the unpriced quality of the power purchased at FAC exceeds the quality of the avoided alternative. If a utility is offered only as much QF capacity as it buys, then consumers will be indifferent insofar as the price paid reflects all of the attributes of the power purchased. To the extent that the purchase represents a greater or lesser value to the utility than the quantified FAC, the price will be too low or too high, and consumers will be better or worse off, respectively.

The preceding applies when the only two sources of power are QFs and conventional integrated utilities. When additional sources are introduced, such as independent power producers<sup>38</sup> or Exempt Wholesale Generators (EWGs),<sup>39</sup> and the utility uses proper competitive methods to determine its lowest-cost alternative, a second link is established between QF purchases and utility welfare. If the utility uses a competitive process (i.e., a “bidding competition”) to set FAC,<sup>40</sup> then QF-on-QF competition is less important for creating benefits for utilities and their customers. The unpriced benefits discussed above are the basis for welfare changes relative to pursuing the avoided alternative, but not the basis of improvements in the avoided alternative itself. I return to this point following the analyses in the next two sections.

### III. QF TRANSMISSION AND THE MITIGATION OF MARKET POWER CREATED OR ENHANCED BY MERGERS

#### A. Procedural Background

In *Utah*, the FERC conditioned approval of the merger of UPL and PPL on the provision by applicants of a specific set of transmission services to certain identified groups of utilities.<sup>41</sup> The FERC ruled that PURPA QF's should *not* be considered as utilities eligible for obtaining the transmission services the applicants were ordered to provide the transmission system.<sup>42</sup> In

---

38. The FERC defined independent power producers as “nontraditional” wholesale power producers that are not QFs. Notice of Proposed Rulemaking, Regulations Governing Independent Power Producers, 53 Fed. Reg. 9,327 (1988) [hereinafter Notice]. This rulemaking was never concluded, but the description of IPPs contained in the NOPR remains in common use.

39. Like QFs, EWGs are a class of wholesale generators exempt from wholesale rate regulation. The restrictions on EWGs are somewhat less than the restrictions on QFs. For example, an EWG need not utilize cogeneration or renewable fuels.

40. See Notice, *supra* note 38; Daniel J. Duann, Competitive Bidding for Electric Generating Capacity: Applications and Implementation, National Regulatory Research Institute, Columbus, Ohio, Nov. 1988; P.S. Fox-Penner, P. O'Rourke, and P. Spinney, Competitive Procurement of Electric Utility Resources, Electric Power Research Institute, Palo Alto, CA, July 1990, Report CU-6898.

41. *Utah Power & Light Co.*, 45 F.E.R.C. ¶ 61,095 at 61,290 n. 158 (1988).

42. *Id.*

short, the FERC ruled that QFs were not to be treated any differently after the merger than before the merger, while some other utilities were. In *Environmental Action, Inc. v. F.E.R.C.*,<sup>43</sup> the U.S. Court of Appeals for the D.C. Circuit remanded this issue to the FERC for reconsideration. The court held that the FERC had failed to find that its exclusion of QFs from the transmission conditions was consistent with PURPA or its obligations under the FPA. In particular, the court criticized the FERC for failing to analyze the impact of the QF exclusion on consumer welfare reflected in the antitrust laws.<sup>44</sup>

In the midst of these activities, Congress enacted the Energy Policy Act. In response to the new law, the FERC recently petitioned the D.C. Circuit Court of Appeals for a "voluntary remand to issue a new order including QFs in the *Utah* merger access conditions."<sup>45</sup> It appears as of this writing that the FERC has reversed its original position in *Utah*. Meanwhile, the analysis contained in this section examines a situation analogous to that found in *Utah*.

### *B. The Basis for Evaluating the Competitive Effects of Mergers in Regulated Industries*

The task of examining the economic effects of a merger in a regulated industry stems from the antitrust laws. The Clayton Act, which prohibits combinations that substantially lessen competition, or tend to create a monopoly, is the basis of the analysis.<sup>46</sup> In utility mergers, economic impacts are also examined under the FPA, which requires the FERC to permit a merger of jurisdictional utilities only if it is "consistent with the public interest."<sup>47</sup> When two regulated utilities seek permission to merge, one of the issues the FERC examines is the impact of the merger on competition.<sup>48</sup> This examination is conducted with the same objectives that are embodied in the antitrust statutes; i.e., the determination of whether the merger is "likely to result in a lessening of competition in the relevant product and geographic markets."<sup>49</sup>

Economists test for the possibility of adverse impacts on competition in these instances by examining the potential for the exercise of market power. Market power is the ability of a firm to raise prices above the level a competitive market would provide for services of comparable quality.<sup>50</sup> The impact of a merger on competition is therefore studied by examining, as directly as pos-

---

43. 939 F.2d 1057 (D.C. Cir. 1991).

44. *Id.* at 1062. The court noted that it understood that the basis for the FERC's determination should be "the maximization of consumer wants."

45. Motion of the FERC before the D.C. Circuit Court of Appeals, 92-1165, Nov. 30, 1992, reported in *INSIDE FERC*, Dec. 7, 1992, at 3.

46. 15 U.S.C. §§ 12-27 (1988).

47. *Pacific Power & Light Co. v. Federal Power Comm'n.*, 111 F.2d 1014, 1015 (9th Cir. 1940).

48. In the case of FERC approval under the FPA, the FERC examines a number of other aspects of the merger, including the effect of the merger on costs and rates, whether the acquired utility was coerced, whether the consolidation will affect the FERC's ability to regulate effectively, and other factors. *Commonwealth Edison Co. v. Federal Power Comm'n.*, 36 F.P.C. 927 (1966). In determining the merger's consistency with the public interest, the FERC weighs all of these factors.

49. 45 F.E.R.C. ¶ 61,095 at 61,284.

50. U.S. Dept. of Justice, 1984 Revised Merger Guidelines, at 2,3 (hereinafter 1984 Merger Guidelines). By extension, the ability to reduce quality below that provided by a competitive market while maintaining prices that were competitive at the earlier level of quality is an exercise of market power.

sible, the ability of firms in the relevant market to alter the prices and/or terms of service in ways that firms in competitive markets could not.<sup>51</sup>

An analysis of market power is the sole economic determination called for under section 7 of the Clayton Act.<sup>52</sup> In the case of utility mergers, other economic determinations may be called for in order to examine all factors relevant to the FERC's public interest standard. This analysis addresses only the portion of the FERC's overall determination that involves assessing the impact of the merger on competition.

The economic logic underlying a prohibition of mergers that increase market power is that mergers that do not increase market power are beneficial to consumers and to the economy as a whole. If a merger does not increase market power, consumers are no worse off than they were prior to the merger, and may benefit through the creation of a more efficient firm and/or a more efficient industry. The FERC does not require demonstration of a public benefit, but rather a demonstration that consumers will be, at worst, indifferent.<sup>53</sup>

This standard is not inconsistent with the narrow indifference condition called for by PURPA, but the area of consistency is not large. PURPA functions so as to make consumers indifferent, abstracting from nonprice considerations and inaccuracies, while the FERC's public interest standard suggests that consumers should be indifferent at worst.

### C. *The Analysis Under Efficient Transmission Pricing*

The analysis of the consumer welfare implications of the FERC's ruling that QFs are not entitled to transmission conditions of the kind created in the *Utah* proceeding, begins with an example. Two contiguous utilities known as *A* and *B* are planning to merge. Utility *C* is adjacent to both utilities (Figure 1) and generator *D* is inside the service territory of *A*. All four utilities are regulated by state commissions or the FERC, and *A*, *B*, and *C* purchase QF power at a full avoided cost that is correct, but does not include unquantifiable elements of value. The FAC prices paid by these utilities are  $P_a$ ,  $P_b$ , and  $P_c$ , respectively. These prices are based on long-term contracts with QFs and the long-run avoided cost for each utility.

The three utilities are interconnected. Regulators have determined that the price of firm, long-term transmission between utilities *i* and *j* is  $T_{ij}$ . An assumption is made that this transmission price meets the cost recovery set forth in section 212 of the revised FPA.

In its examination of the merger of *A* and *B*, the FERC requires the merged utility company (denoted *AB*) to offer firm transmission from generator *D* to utility *C*. Consistent with the FERC's pricing rules, the price for this transmission is  $T_{abc}$ . Under these assumptions, the question is, would granting the same rights to QFs inside *AB* increase or diminish consumer welfare?

We first consider the welfare effect of the merger in a hypothetical situa-

---

51. Evidence of the actual possession of market power is also relevant, although it is less commonly found and more difficult to isolate. 1984 Merger Guidelines, § 3.44.

52. 15 U.S.C. § 18.

53. 45 F.E.R.C. ¶ 61,095.

tion wherein transmission of QF power is not possible. Prior to the merger, consumers pay  $P_a$  to all QFs inside  $A$  that the utility  $A$  chooses as suppliers. They gain or lose whatever utility they can via unpriced factors and are otherwise indifferent. Consumers inside  $B$  and  $C$  are in similar situations. They pay  $P_b$  and  $P_c$ , respectively, and receive whatever value the selection of QFs allows.

After the merger,  $AB$  computes its avoided cost ( $P_{ab}$ ). This value becomes the benchmark offer to all QFs in the former areas of  $A$  and  $B$ . Consumers that would have paid  $P_a$  to new QFs in  $A$  pay  $P_{ab}$ , as do consumers in  $B$  that would have paid  $P_b$ .

If one knows the levels of  $P_a$ ,  $P_b$ , and  $P_{ab}$  and the approximate amounts of QF power, it is trivial to compute whether consumers are better off with respect to the priced aspect of QF purchases. In *Utah*, the FERC found that the effect of the merger would be to reduce the costs of service for the combined entity relative to the two premerger systems. The FERC found that

in the area of power supply costs the Applicants project that considerable savings are possible due to the diversity in peak demands on the two systems. Because the UPL system peaks in summer and the PPL system peaks in the winter, the combined system can be dispatched more efficiently and reserve requirements for the combined entity will be reduced. The Applicants estimate that the reduced capacity requirements will enable PacifiCorp Oregon to defer construction of new capacity until approximately 1997 or 1998.<sup>54</sup>

Under these circumstances it is likely that present value avoided costs of the merged entity (the equivalent of  $P_{ab}$  in the above example) is lower than the present value of the individual costs (i.e.,  $P_a$  and  $P_b$ ). As a result, in the absence of QF wheeling the combination of the approval of the merger and the routine application of PURPA procedures to the new utility results in a welfare increase for consumers. There may also be changes in welfare related to the unpriced aspect of QF sales. Here the implications are not quite so clear-cut, but the likelihood is that this aspect of the merger also increases public welfare.

Before the merger, utilities  $A$  and  $B$  each select the best facilities from the available choices. After the merger, they select from a larger pool of aspiring sellers. If the merged utility's demands for QF power are less than the sum of the premerger demands, as the above findings indicate, the merged utility is able to select fewer, and therefore better, sellers. Consumers are likely to benefit from the merger qualitatively as well as quantitatively.

A second example is, along with perfectly set FACs, transmission prices are determined correctly and QF transmission is allowed. If, under these circumstances, no QFs choose to transmit their power to utility  $C$ , then the above conclusion applies; consumer welfare has increased. If the QF chooses to transmit to  $C$ , then the following changes occur:

- a. Consumers in  $AB$  no longer buy some QF power from inside their area. Instead, they transmit it to  $C$ .
- b. With respect to quantifiable costs,  $AB$  customers are indifferent. They continue to pay full avoided cost either to QFs or to the alternative for

---

54. 45 F.E.R.C. ¶ 61,095 at 61,299.

their own power. All costs incurred by the *AB* system transmitting power to *C* are earned in transmission revenue received from the transmitting QF.

- c. Consumers in *C* are also quantitatively indifferent. Instead of purchasing from avoided alternatives, they now purchase from the wheeling QF.
- d. The effect of changes in the unpriced value of QF purchases is uncertain. Utility *C* has one more seller to choose from, but utility *AB* has one fewer to choose from. Consumer welfare under these conditions is unchanged relative to the circumstances under which no transmission is allowed, except for possible changes in the unpriced value, which are difficult to gauge.<sup>55</sup> Consumers in the *AB* area continue to pay  $P_{ab}$  for their new power and consumers in *C* continue to pay  $P_c$ .

It is reasonable to infer that there could be a slight welfare benefit to allowing QFs to wheel on the basis of the observation that, if such wheeling occurs,  $P_c$  must be greater than  $P_{ab}$  plus the cost of transmission,  $T_{abc}$ . Avoided costs must be significantly higher in the adjacent utility in order to make it worthwhile for the QF to pay a wheeling charge. If so, then it is probably advantageous for the system with the more voracious power needs to have its pick of a larger number of facilities.<sup>56</sup>

#### *D. Public Good Implications of Mandated QF Wheeling*

As section II discussed, PURPA's intent is to create a mechanism for the private creation of a public good. The mechanism is based primarily on purchases from the utility to whom the QF is connected. In utility areas where avoided costs are relatively high, more QFs would be expected to come forward, and vice-versa.

The comparison of the two theoretical cases in section IIIB demonstrates that consumers are largely indifferent with respect to the provision of electric power, but for the nonprice considerations discussed above. While one might speculate that the public benefits of PURPA could be used for this purpose, the more logical reading of PURPA indicates that the converse is true. Congress must have envisioned instances in which utilities would find ways to reduce their future capacity costs. There is no apparent prohibition on a utility's acting to reduce the cost of serving its customers, and no limitation on reflecting these cost reductions in avoided costs.<sup>57</sup> Indeed, to do so would be to subvert the proscription against the ratepayer subsidy of QFs and the utility's obligation to operate at minimum cost. Since PURPA's framers did not provide for QF wheeling in the event that a utility suddenly found a way to

55. It is also difficult to gauge whether differences in the amount of public goods associated with PURPA occur under either case, and whether these differences are significant.

56. However, system AB may be much larger in absolute size, so it may purchase much more QF power and therefore benefit from a larger selection. Nonetheless, it is reasonable to believe that the system with higher avoided costs benefits most.

57. As noted in section II *supra*, competitive resource procurement "bidding" is one means of achieving possible reductions in FAC. The widespread acceptance of competitive procurement programs (and, more generally, integrated resource and least-cost planning methods) by state regulatory commissions suggests that these methods do not, in the opinion of policymakers, violate the spirit of PURPA.

reduce costs (PURPA specifically forbade such wheeling), then there is no reason to believe the public interests motivation of PURPA call for wheeling in this hypothetical situation.

The amount of the energy efficiency and security provided under PURPA is probably a direct function of the level of utility FACs around the United States. An absence of mandated QF wheeling might diminish the amount of this public good, but any such reductions appear consistent with the determination mechanism contained in PURPA. Hence the level of public good in the absence of mandated QF wheeling would not appear to be below the appropriate level from the public interest standard suggested by the construction of the law itself.

#### IV. QF WHEELING IN THE WESTERN SYSTEMS POWER POOL

##### A. *The Western Systems Power Pool*

The Western Systems Power Pool (WSPP) is an agreement among members<sup>58</sup> to exchange certain prespecified electric utility wholesale products under general, prespecified terms and conditions.<sup>59</sup> The products exchanged via the pool are defined in Service Schedules A through D attached to the pool agreement. In brief, these products consist of a) generating capacity sold with associated energy (firm capacity and unit commitment service);<sup>60</sup> b) units of electric energy sold on an as-available basis (economy energy); and c) firm, nonfirm, and standby transmission service.<sup>61</sup> All services provided by the pool have a maximum term of one year.

The pool agreement provides for the exchange of the defined products among members at prices determined exclusively through bilateral negotiation.<sup>62</sup> In addition, the FERC ordered that the price of each service would be capped at a composite pool average cost for that service, as computed by the FERC.<sup>63</sup> In short, the WSPP is a large marketplace for short-term generation

---

58. The number of members has varied over the years; as of June 27, 1991, FERC reported 39 members. *Western Systems Power Pool*, 55 F.E.R.C. ¶ 61,495 at 62,708 (1991). Under the most recent FERC decision, pool membership is open to electric utilities, IPPs, and power marketers. Membership is open to QFs if they agree to relinquish their rights to receive full avoided costs for all sales made under the terms of the pool. *Western Systems Power Pool*, 55 F.E.R.C. ¶ 61,099 (1991), *stay granted* 55 F.E.R.C. ¶ 61,154 (1991).

59. As the FERC noted in its Order granting permanent status to the WSPP, the pool is not a traditional utility power pool. Traditional utility power pools provide for the efficient use of generating capacity via mechanisms such as reserve sharing, joint planning, and centralized dispatch. The WSPP does not incorporate any of these features.

60. The primary difference between these two forms of capacity is that system capacity is sold with a stronger guarantee of availability. Unit commitment capacity is generally available only when the specific generating unit from which the capacity is purchased is operable, and may be interrupted for various reasons. When firm capacity is purchased, the seller agrees to make capacity available to the buyer on demand irrespective of the operability of any one of the seller's generators.

61. Standby transmission service is similar to firm transmission service, but the supplier of transmission may use the transmission capacity if the buyer is not using it during any one specific period. WSPP Agreement, January 1991, Schedule D.

62. The pool also provides for the computerized posting of daily prices and available quantities in a central location accessible to all members.

63. Details of the ceiling prices are in Appendix 1 of the Commission's April 23, 1991, Order. 55



and transmission services sold at negotiated prices lower than fully allocated average costs.

The WSPP agreement was approved on an interim basis as modified by the FERC on April 27, 1991.<sup>64</sup> Under the modified agreement, QFs could become members of the pool only if they voluntarily renounce their right to sell all of their output at FAC.<sup>65</sup> In its subsequent denial of a request for reconsideration, the FERC again held that the terms of the WSPP with respect to QFs were reasonable.<sup>66</sup> Hence, QFs could participate in the WSPP only if they no longer lay claim to their automatic sales entitlement conveyed by PURPA. Therefore, the question to examine in this analysis is whether the FERC's position is consistent with the principles of economic efficiency.

### *B. The Basis for Welfare Improvement via the WSPP*

The WSPP was permitted to become permanent on the basis of the FERC's conclusion that operation of the pool subject to the FERC's modification would produce consumer benefits. In approving an experimental precursor to the WSPP, the FERC stated that its objective was "to bring about the lowest cost to consumers in the long run and to ensure efficiency in the electric power industry."<sup>67</sup> The FERC believed that this would occur if the pool reduced transaction costs and brought a large number of buyers and sellers together to bargain, thus reducing prices and increasing consumer surplus.

The FERC's objectives in this instance appear to be nothing more complicated than the customary benefits that stem from increased competition in private markets. In these markets, larger numbers of buyers and sellers, increased information, and reduced impediments to market exchange commonly result in increased consumer welfare due to reduced prices and/or better products.

The short-duration wholesale services traded in the WSPP pool are all homogeneous goods. It is difficult or impossible to distinguish quality differences between units of short-term generation or transmission. Indeed, the technology of the electric power grid is such that it is usually difficult or impossible to identify the precise source of the generation or transmission, so that the actual supplier of the good may not be the party from whom the good is purchased. For this reason, the electric utility industry has organized itself so that short-run products are quite standardized.<sup>68</sup>

Homogeneity in short-run bulk power products implies that the measurement of economic efficiency and welfare benefits in markets for these products

---

F.E.R.C. ¶ 61,099. The Order further indicates that FERC would entertain other approaches to calculating cost-based maximum prices.

64. 55 F.E.R.C. ¶ 61,099.

65. *Id.* at 61,322.

66. 55 F.E.R.C. ¶ 61,154.

67. *Pacific Gas & Electric Co.*, 38 F.E.R.C. ¶ 61,242 at 61,789 (1987) (quoting *NAACP v. F.P.C.*, 425 U.S. 662 (1976)).

68. Several analysts have concluded that the degree of homogeneity in short-run bulk power product markets is very large. *See, e.g.*, *Southern California Edison and San Diego Gas and Electric*, 47 F.E.R.C. ¶ 61,196 (1989) (Direct Testimony of Sarah J. Goodfriend and Prof. Paul Joskow).

is much easier than in the market for QF power. Unlike QF markets, where consumer benefits could be gauged largely by assessing nonprice features,<sup>69</sup> consumer well-being in WSPP markets is largely a function of price. Lower prices for the equivalent product immediately translate into higher levels of consumer surplus, an immediately recognizable measure of consumer well-being.

The FERC has directly endorsed this means of gauging the benefits of the WSPP in its own evaluation of the pool during its experimental phase. In 1987, the FERC directed an independent consultant to evaluate, *inter alia*, the effect of the pool on the prices paid by buyers. This report found that the pool reduced buyers' outlays by an estimated \$71 million during the two-year period beginning May 1987.<sup>70</sup> While the FERC found fault with certain aspects of the consultant's assessment, it agreed that the pool had produced short-term efficiency gains reflected by the reduction in members' operating costs.

### C. *Measurement of WSPP Efficiency Gains in the Presence of QFs*

Section II argued that the services provided by QFs are not homogeneous, nor are they identical to services provided by the buying utility. This section notes that these qualitative differences lead to a difference in the value of various sources of power, even in the event that the price of electricity from all sources is set equal to the buyer's own costs of supply. Section II also noted that the computation of long-run avoided cost is difficult, as it requires the construction of hypothetical alternative long-run price scenarios.

These problems of comparative valuation are significantly reduced if the generation services do not last longer than a year. Often they last no longer than a few hours. The computation of short-run avoided cost (SRAC) is much less challenging than the calculation of its long-run sibling. By definition, short-run cost calculations accept the existing stock of generation and transmission assets as given. Utilities ordinarily have accurate information about the marginal (variable) costs of operating their existing plants over very short periods. If a utility purchases from an outside source on an hourly basis, rather than generating equivalent amounts of energy each hour, then there are accurate, accepted means for measuring the utility's variable costs in the absence of a purchase.

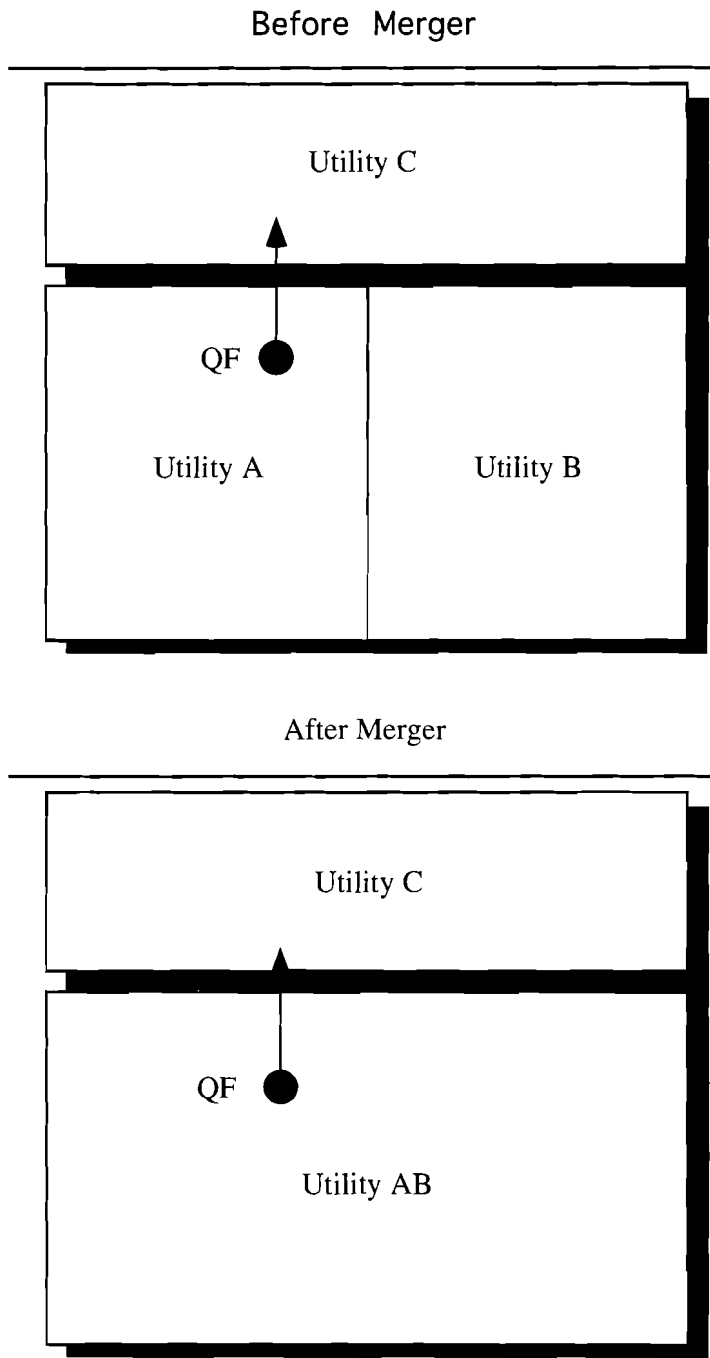
The unpriced aspects of QF power (discussed at length in section II) are also likely to be substantially less important in the short run. Not only are the generation products traded within the WSPP homogeneous, but also virtually none of the qualitative aspects of QF power set forth in § 292.304(e) of the FERC's rules (reproduced in section IIB) are meaningful short-run concepts. The same is true of a number of additional qualitative differences not mentioned in these rules, such as differences in the planning flexibility accorded by different QF contracts.

---

69. Differences between true avoided costs and the price paid to QFs is also a basis for welfare differences. *See supra* section II.

70. WESTERN SYSTEMS POWER POOL ASSESSMENT, STRATEGIC DECISIONS GROUP, January 1991.

**Figure 1**  
**QF WHEELING EXAMPLE**



Two specific examples illustrate this point. First, consider the ability of the utility to dispatch the QF, or "dispatchability." A utility's decision to purchase hourly is effectively a dispatch decision; any QF able to sell electricity accordingly must be as dispatchable as the utility needs it to be in order to offer the WSPP product economy energy in a form attractive to buyers.

A second example is reliability differences. In the long run, the fact that interruptions have a cost imparts a positive value to reliability. However, short-run economy sales are made from existing, operable units that are probably producing energy at the time the transaction is arranged. In this case, the reliability concerns of the buyer are a function of the probability that a properly operating unit will suddenly cease to function. While these sorts of events do occur, it is far easier to plan for this possibility than it is to assess the probability that an unplanned, unbuilt QF plant will function as guaranteed several years after it first contracts with a utility buyer.

In short, most of the features that permit utilities to differentiate among potential QF purchases, indeed, any purchases whatsoever, are largely absent from the commodity market created by the WSPP. This large degree of homogeneity forces precisely the opposite conclusion as that of section II. In contrast to QF markets, wherein prices do not differ and benefits are measured with nonprice features, price is the primary measure of benefit in WSPP transactions whether or not they include QFs.

#### *D. Welfare Implications of QF Wheeling Within the WSPP*

Examination of the welfare implications of QF wheeling begins with a hypothetical example involving pool member utilities *A*, *B*, and *C*. A QF is located inside utility *A*'s territory. Under one set of rules, the QF can sell economy energy at full avoided cost only to utility *A*, with whom it is interconnected, at *A*'s FAC. Under the alternative rules, the QF can obtain wheeling and sell to utility *C* at utility *C*'s FAC.<sup>71</sup> The first regime provides the QF all of the rights to which it is entitled under PURPA in the absence of the pool.

The welfare analysis under the first set of rules is quite similar to the analysis in section IIA. Both cases examined the welfare benefits that PURPA creates on its own among a utility, a QF, and the utility's customers. Consumers are narrowly indifferent between increased economy sales by the QF and increased generation or purchase on the part of utility *A*. The homogeneity of the product in question reinforces this conclusion.

There is one notable difference between this analysis and the analysis in section IIA, though it is not a difference attributable to the QF. As a member of the pool, utility *A* may be able to purchase economy energy from other pool members at less than its decremental cost. Indeed, this is precisely the source of the pool's consumer benefits. If so, this raises the question of whether util-

---

71. As in the earlier welfare analysis, this example assumes that transmission prices are efficient. As transmission prices are largely market-determined within the pool (subject to a cap), this is a somewhat reasonable assumption. (However, the FERC has expressed its concern that transmission prices within the pool may reflect the exercise of market power. See *Western Systems Power Pool*, 55 F.E.R.C. ¶ 61,099 at 61,331 (1991).

ity  $A$ 's WSPP-determined cost of economy energy is its FAC. If so, that is all the QF is entitled. Market-based determination of the price of short-term energy has replaced the utility's own decremental cost as a basis for setting short-term FAC.

What are the welfare implications of a rule that permits the wheeling of QF economy energy to utility  $C$ ? Prior to the rule, utility  $C$  purchases economy energy on the WSPP market. The data indicates that these purchases are at negotiated prices that, in many instances, are less than the buyer's decremental (i.e., short-run avoided) costs. If a QF were able to wheel to utility  $C$  and sell at 100 percent of utility  $C$ 's decremental costs, utility  $C$ 's consumers would be worse off. Utility  $C$  would be paying more for certain QF purchases than it would have paid for WSPP purchases of an equivalent product at a lower, negotiated price. If utility  $C$  used WSPP "market quotes" as the basis of its short-run FAC, then it would be indifferent between a true WSPP purchase and purchases from QFs at WSPP prices. Utility  $C$  would take quotes from  $N$  prospective WSPP sellers and offer the same price to the QF.

QF wheeling inside the WSPP at FAC is not welfare-enhancing. It is at best welfare-neutral, and only if the purchasing utility takes bids from the WSPP market and pays the lowest suitable bid price to the QF. However, the latter arrangement is administratively cumbersome and may or may not be permitted by the utility's regulators. The transaction costs involved are therefore larger than in an ordinary WSPP transaction. Even in the presence of administrative success and regulatory approval, the increase in transaction costs suggests a (perhaps slight) diminution of welfare.

In the present example, the present WSPP QF policy means that a QF that relinquishes its right to obtain FAC could become a member of the pool and thereby transmit energy to utility  $C$ . This arrangement has all of the welfare advantages of the pool absent QF and is preferable to QF wheeling without renouncing FAC rights. There are three reasons. First, there is no chance that utility  $C$  will be forced to pay a higher price for economy energy from a QF than it would pay for purchases via the pool. Second, there is no need to increase transaction costs by obtaining quotes from one group of sellers and making offers based on those quotes to a second group of sellers, all under the surveillance of state regulators. Finally, the WSPP market is improved by the addition of more prospective sellers. Rather than taking quotes from  $N$  sellers, utility  $C$  can purchase from  $N+1$  equal competitors. The liquidity and competitiveness of the market is improved by the addition of QFs everywhere in the pool as additional, equal sources of pool products, rather than as a special class that, at a minimum, refuses to participate in pool competition.

## V. SUMMARY AND CONCLUSION

The two analyses in this article have examined the economic efficiency implications of QF wheeling in two particular, stylized instances. In the first case, the analysis finds that according QFs the same wheeling rights as have been given to non-QFs in merger proceedings appears to be welfare-neutral with respect to the electric power market. If QF power is correctly priced,

consumers are indifferent whether QFs are permitted to wheel when a merger is imminent.

The second part of the analysis concerns QF wheeling policies in the WSPP. Here the analysis finds that QF membership without renouncing rights to full avoided costs is likely to diminish consumer welfare relative to a membership in which FAC rights are renounced. The reason is the straightforward phenomenon of a greater likelihood of lower prices for consumers, even if FAC prices for QFs are set using the WSPP market as the measure of FAC. Requiring QFs to compete with other WSPP sellers as equals would create a larger playing field, reduce transaction costs, and ensure that consumers obtained the lowest feasible price for WSPP products.

PURPA also provides for the creation of energy efficiency and energy security, which are, perhaps arguably, public goods. A reasonable interpretation of PURPA is that Congress did not intend to accord automatic wheeling rights to QFs. If this interpretation is correct, and if Congress properly understood the nation's preferences for public goods, then it appears that QF wheeling rights in the stylized examples do not provide improvements in the level of public goods provision.<sup>72</sup>

If a single theme emerges from all portions of this analysis, it is that the clearest economic efficiency gains occur when QFs receive a FAC payment via a mechanism that provides an incentive to minimize the cost of wholesale service to all parties, probably by incorporating competition at the wholesale level (*i.e.*, bidding). If this occurs, and transmission prices are properly set, then QFs may continue to claim to be the sellers of first resort, but at terms set by the marketplace. They are stand-ins for the low-cost provider, which is essentially what PURPA mandated in the first place.<sup>73</sup>

It is possible to interpret this conclusion as a tension between the public benefits of additional QF power, which is aided by higher FACs, and the private-good efficiency benefits of competition, which contributes to a low FAC. While there is no disputing the fact that high and low FACs have opposite effects on QF development,<sup>74</sup> this is only a tension if one maintains that public interest considerations require that the clever mechanism used by PURPA to automatically determine the amount of conservation be countermanded at the expense of electricity market efficiency.<sup>75</sup>

The Energy Policy Act of 1992 will present many challenges to utilities,

---

72. QFs can petition for wheeling on equal terms with all other parties seeking service. This clearly indicates that Congress envisioned circumstances under which transmission service from QFs to other buyers meets the tests of the Act. Energy Policy Act § 722.

73. Conversely, my findings suggest that if properly priced transmission services are provided to QFs, then FAC should be set on an accurate (relative to the true lowest avoided cost alternative) basis.

74. See Peter Fox-Penner, *Regulating Independent Power Producers: Lessons of the PURPA Approach*, 12 RESOURCES AND ENERGY 117, 134 (1990).

75. This is not to say that conservation and renewables are not entitled to public support on the grounds that they contribute public goods (or reduce public bids). This reasoning underlies new "externality" policies that many state public service commissions are adopting within their integrated resource planning rules. See Burtraw, et al, *The Analytics of Social Costing in A Regulated Industry*, RESOURCES FOR THE FUTURE, Discussion Paper QE93-01, Washington DC, 1992; Paul Joskow, *Weighing Environmental Externalities: Let's Do It Right!*, THE ELECTRICITY JOURNAL, May 1992, at 53-67.

consumers, and regulatory authorities. One burden of the Act certain to fall on the FERC is to untangle the efficiency and public interest implications of requests for involuntary transmission services. Hopefully, analyses of this nature will provide practical guidance that is well-rooted in economic theory, the realities of the electric power industry, and sound public policy.