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FROM MONOPOLY TO MARKETS: MILESTONES ALONG THE ROAD

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EXECUTIVE SUMMARY

This report analyzes developments in the electric utility industry using the tools of transaction cost economics. During the last thirty years, the tools of economic analysis have been substantially expanded — notably, Oliver Williamson, building on the insights of Coase and others, has made significant contributions through his work in developing the new institutional economics, of which transaction cost economics reasoning plays a major role.

Because of the relevance of the new institutional economics to public utilities and public utility regulation, the theoretical insights of the new institutional economics have been applied to many aspects of public utility industry structure, governance, and regulation. The contributions of Joskow and Schmalensee are most notable, but many other economists have made theoretical and empirical contributions. These insights are very applicable to the issues that policymakers and regulators are likely to address as electric restructuring progresses.

The goal of this report is to synthesize the theoretical work on the new institutional economics with the recent developments in the electric utility industry — most notably, the rapid trend toward competition in electric generation, both in the U.S. and abroad. This report:

- Describes the differential attributes of markets, hybrids and firms (vertical integration), emphasizing the tradeoffs between these alternatives in terms of incentive intensity, administrative control, adaptability, coordination, and contracting characteristics.
- Summarizes the characteristics of electric utilities and electric utility regulation that led to the widespread (but not universal) vertical integration of generation, transmission, distribution, and sale of electricity.

- Provides a detailed case study of the Public Utility Regulatory Policies Act of 1978, which facilitated increased competition in electric generation — but which featured substantial contract maladaption because of rapid changes in avoided cost during the 1980s.
- Describes how increased wholesale competition can reduce the contracting difficulties associated with electric generation by reducing the asset specificity and bilateral dependence associated with "dedicated" generating assets.
- Explains the important role that wholesale competition plays in increasing the competitiveness of the generation market. While wholesale competition has an important role to play, this report explains why wholesale competition may not be politically or economically sustainable.
- Discusses why retail competition is likely to emerge. This report sets forth the potential benefits that retail competition can provide and describes a "hybrid" retail competition model.
- Describes how transaction cost economics reasoning can make important contributions in designing an effective and efficient retail competition model. Transaction cost insights can contribute to horizontal market power issues, vertical control issues (notably, the design of an independent system operator governance structure), and stranded cost and securitization issues.

Transaction-cost-economics reasoning provides an analytical structure for understanding the implications of asset specificity, asymmetric and imperfect information, reputation effects, *ex ante* contracting costs, *ex post* contract maladaption issues, and issues that arise because contracts are incomplete. The insights that transaction cost economics can provide are very timely to the debates currently going on with respect to electric restructuring issues.

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PREFACE

The NRRI Occasional Paper series allows us to make available to our readers different perspectives on issues facing public utility commissions. This report, written by a staff member at the Maine PUC, provides a primer on the theory underlying transaction cost economics. This report describes Williamson's theory of the differential attributes of markets, hybrids, and firms and then applies that theory to the electric utility industry. Because many of the issues addressed in transaction cost economics — e.g., asset specificity, asymmetric and imperfect information, incomplete contracts, *ex post* contract maladaption, reputation effects — also have important implications in the electric restructuring debate, it is hoped that this report will provide useful background and guidance when state and federal authorities consider restructuring of the electric utility industry.

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SECTION 1

INTRODUCTION

The structure of the electric services industry is rapidly changing. The generating sector is rapidly becoming competitive — and perhaps even "hypercompetitive."[1] While many transmission and distribution services may retain a monopoly element for the foreseeable future,[2] these sectors will also experience rapid changes as incumbents expand or exit and as new entrants explore market opportunities.

In the current turbulent environment, firms are actively maneuvering to gain temporary competitive advantages.[3] Utility incumbents and new entrants will seek to position themselves to be competitive in terms of the price-quality continuum, will exit businesses that require deep pockets (if they do not have them), will seek to protect,

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[1] According to Richard D'Aveni, hypercompetition is "an environment characterized by intense and rapid competitive moves, in which competitors must move quickly to build advantages and erode the advantages of their rivals. This speeds up the dynamic strategic interactions among competitors." Richard A. D'Aveni, *HYPERCOMPETITION: MANAGING THE DYNAMICS OF STRATEGIC MANEUVERING* (New York: The Free Press, 1994), at 217-218.

[2] Some services provided by transmission and distribution utilities, such as metering and billing, may have the potential to be viable as competitive businesses.

[3] D'Aveni, *supra* note 1, at 215, argues that in a hypercompetitive environment, a series of short-lived, temporary actions can provide a competitive advantage. D'Aveni argues that strategies aimed at sustaining a firm's competitive advantages without disrupting the *status quo* are infeasible. In a hypercompetitive environment, the goal should be to disrupt the *status quo* by creating temporary advantages and destroying rivals' competitive advantages.

enhance and retain first-mover advantages in their established geographic and product markets (if they have them), and will seek to disrupt the strategies of their rivals.[4] Because the traditional boundaries between energy (e.g., coal, gas, oil), electric services (e.g., generation, transmission, aggregation,[5] and distribution), and telecommunications (e.g., telephone, cable, and the Internet)[6] are blurring, outsiders will enter new markets and incumbents will be forced to redefine themselves. The stakes are high for incumbents, new entrants, and the public.

Electric restructuring is both a political and an economic process and takes place in a discontinuous, turbulent and unpredictable environment — before Congress, state legislatures, and federal and state regulators.[7] Electric restructuring requires the invention of empowering legislation, new models and systems, and difficult multiparty negotiations.

As this important work progresses, it is useful to step back and consider some basic questions: What are the relative advantages of markets, firms, and hybrid contracts? Why did vertical integration emerge in the electric services industry? Why is generation now becoming competitive? When are contracts an appropriate alternative to firms or markets? This report uses the tools of transaction cost economics, which

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[4] *Id.* at *xiii.* See also Thomas G. Krattenmaker and Steven C. Salop, "Anticompetitive Exclusion: Raising Rivals' Cost to Achieve Power Over Price," 96 *YALE LAW JOURNAL* 209 (1986); Bruce M. Owen and Ronald Braeutigam, *THE REGULATION GAME: STRATEGIC USE OF THE ADMINISTRATIVE PROCESS* (Cambridge, MA: Ballinger Publishing, 1978).

[5] The aggregation, or retailing, function includes arranging supplies of power from generators, metering, billing, and various demand management services, which have traditionally been integral to the distribution function. In a restructured environment, some of these aggregation functions may be potentially competitive. See Paul L. Joskow, "Restructuring, Competition and Regulatory Reform in the U.S. Electricity Sector," 11 *JOURNAL OF ECONOMIC PERSPECTIVES*, Summer 1997, at 121.

[6] Peter Huber identified the importance of "convergence" in telecommunications and notes that "disparate services are now converging into a single, sprawling 'information services' market." Peter W. Huber, Michael K. Kellogg, and John Thorne, *THE GEODESIC II: 1993 REPORT ON COMPETITION IN THE TELEPHONE INDUSTRY* (Washington, DC: The Geodesic Company, 1992), at 5.5.

[7] Wayne P. Olson, "Lessons from the New Institutional Economics," *ELECTRICITY JOURNAL*, June 1997, at 49-50.

Coase[8] developed and Williamson[9] substantially expanded, to explore these and other issues.

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[8] Coase summarizes his classic 1937 article, "The Nature of the Firm," by stating that a firm "had therefore a role to play in the economic system if it were possible for transactions to be organized within the firm at less cost than would be incurred if the same transactions were carried out through the market. The limit to the size of the firm would be set when the scope of its operations had expanded to the point at which the costs of organizing additional transactions within the firm exceeded the costs of carrying out the same transactions through the market or in another firm. Ronald H. Coase, "The Nature of the Firm: Meaning," *THE NATURE OF THE FIRM: ORIGINS, EVOLUTION AND DEVELOPMENT,* edited by Oliver E. Williamson and Sidney G. Winter (New York: Oxford Univ. Press, 1993), at 48. This book (pages 18-33) also reprints Coase's classic article "The Nature of the Firm," 4 *Economica* N.S., at 386-405. See also Steven G. Medema, ed., *COASEAN ECONOMICS: LAW AND ECONOMICS AND THE NEW INSTITUTIONAL ECONOMICS* (Boston: Kluwer, 1998).

[9] Three books summarize Williamson's contributions. Oliver E. Williamson, *MARKETS AND HIERARCHIES: ANALYSIS AND ANTITRUST IMPLICATIONS: A STUDY IN THE ECONOMICS OF INTERNAL ORGANIZATION* (New York: The Free Press, 1975). Oliver E. Williamson, *THE ECONOMIC INSTITUTIONS OF CAPITALISM: FIRMS, MARKETS, RELATIONAL CONTRACTING* (New York: Free Press, 1985). Oliver E. Williamson, *THE MECHANISMS OF GOVERNANCE* (New York: Free Press, 1996).

SECTION 2

MARKETS, HYBRIDS, AND FIRMS

Following Coase,[10] Williamson argues that "market contracting gives way to bilateral contracting, which in turn is supplanted by unified contracting (internal organization) as asset specificity progressively deepens."[11] Transaction cost economics holds that the central problem of economic organization is to "align transactions, which differ in their attributes, with governance structures, which differ in their costs and competence, in a discriminating (mainly transaction cost-economizing) way."[12] Williamson argues that "only as market-mediated contracts break down are the transactions in question removed from markets and organized internally."[13] This

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[10] "Whereas markets were ordinarily regarded as the principal means by which coordination is realized, Coase observed that firms often supplanted markets in performing these very same functions. Rather than regard the boundaries of firms as technologically determined, Coase proposed that firms and markets be considered alternative means of economic organization. Whether transactions were organized within a firm (hierarchically) or between autonomous firms (across a market) was thus a decision variable. Which mode was adopted depended on the transaction costs that attended each." Oliver E. Williamson, *THE ECONOMIC INSTITUTIONS OF CAPITALISM: FIRMS, MARKETS, RELATIONAL CONTRACTING* (New York: Free Press, 1985), at 4.

[11] *Id.* at 78.

[12] Oliver E. Williamson, *THE MECHANISMS OF GOVERNANCE* (New York: Free Press, 1996), at 356.

[13] Williamson, *supra* note 10, at 87.

section discusses the differential attributes (including transaction costs)[14] of markets, hybrids and vertically-integrated firms.

<u>MARKETS</u>

Markets are a common alternative to vertical integration or contractual exchange and can provide stronger efficiency incentives and lower transaction costs.[15] Williamson argues that "the market is a marvel, therefore, not merely because of its remarkable signaling properties (under the requisite preconditions), but also because of its remarkable capacity to present and preserve high-powered incentives."[16] Characteristics of an efficient market include price transparency, price continuity, price responsiveness, marketability, liquidity, and low transaction costs.[17]

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[14] Goldberg notes that the term "transaction costs" can be misleading; he argues that, in a broad sense, transaction costs are those costs that are most likely to differ under alternative institutional arrangements. Thus, transaction costs can refer to the comparative economics of markets, firms, and hybrid contracts. A narrower, and more familiar, definition of transaction costs "focuses on identifiable activities involved in transacting" and "include the costs associated with bargaining, negotiating, and monitoring performance." While this report will emphasize the former meaning of transaction costs, both definitions are relevant to the restructuring debate in the electric utility industry. Victor P. Goldberg, "Production Functions, Transactions Costs, and the New Institutionalism," *READINGS IN THE ECONOMICS OF CONTRACT LAW*, edited by Victor P. Goldberg (Cambridge: Cambridge Univ. Press, 1989), at 22. For an alternative definition of transaction costs, which emphasizes that transaction costs are the costs of establishing and maintaining property rights, see Douglas W. Allen, "Property Rights, Transaction Costs, and Coase: One More Time," in Medema, ed., *supra* note 8, at 108.

[15] Williamson argues that the "the transfer of a transaction out of the market into the firm is regularly attended by an impairment of incentives. It is especially severe in circumstances where innovation (and rewards for innovation) are important." Williamson, *supra* note 10, at 161. In part, markets have lower transaction costs because they avoid the bureaucratic costs that are associated with firms and the haggling and maladaption costs of long-term contracts.

[16] *Id.*

[17] The efficacy of a market can be evaluated by examining the general characteristics of an efficient market. Characteristics of an efficient market include: (1) price transparency (the availability of timely and accurate information on the price and volume of past transactions and current market conditions); (2) price continuity (prices do not vary much from transaction to transaction); (3) price responsiveness (prices rapidly adjust to new information); (4) marketability (it is possible to convert the asset quickly into cash); (5) liquidity (the market is "thick" enough to allow transactions to take place close to the price of the last transaction, assuming no new information); and (6) low transaction costs. Frank K. Reilly, *INVESTMENT ANALYSIS AND PORTFOLIO MANAGEMENT, 2ND ED.* (Chicago: Dryden Press, 1985), at 62-63.

The central purpose of a market is to economize on transaction costs.[18] Thus, Carlton argues that "the purpose of a market is not merely to create transactions but rather to create transactions at the lowest cost."[19] Transaction cost economics emphasizes the importance of two factors when evaluating the relative efficacy of markets. First, the transaction costs of creating markets should be considered. While markets have "high-powered" incentive and price signaling properties that make market exchange the preferred option in many cases, there are transaction costs associated with "creating" markets and therefore "it is costly to create a market that clears by price alone."[20] Further, the creation of markets is "itself a productive activity that consumes resources," and because the "making of successful markets is a risky activity,. . .it is hard to predict which markets will succeed and which will fail."[21] Markets will emerge only if a market governance structure has the effect of economizing on transaction costs.

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[18] "Most people have been exposed to numerous markets in their lives without really being aware of what they do and why they exist. Basically, we take markets for granted. *A market is the means through which buyers and sellers are brought together to aid in the transfer of goods and/or services*. . . . the basic criterion is the smooth, cheap transfer of goods and services." *Id.* at 61-62.

[19] Carlton notes that "the markets that probably come closest to the textbook model of competitive markets are financial markets, such as the futures markets. A moment's thought will reveal that it is costly to run such markets. Aside from the actual physical space that is required, there is the time cost of all the participants who are necessary to run the market. . . .Another important cost of making markets is the time cost of the actual customers." Dennis W. Carlton, "The Theory and the Facts of How Markets Clear: Is Industrial Organization Valuable for Understanding Macroeconomics?" *HANDBOOK OF INDUSTRIAL ORGANIZATION: VOLUME 1*, edited by Schmalensee and Willig (Amsterdam: North-Holland, 1989), at 936.

[20] "Organized spot and futures markets exist for only a handful of commodities. Since we know that there are definitely social benefits to the creating of markets and since at least some of these benefits can probably be privately appropriated, the paucity of organized markets emphasizes that it must be costly to create them." *Id.* at 937.

[21] *Id.*

Second, the transaction costs of creating markets means that markets will be incomplete.[22] If markets were complete, an agent would be able to exchange every good either directly or indirectly with every other agent.[23] It is impossible, however, to set up a market for each possible contingency and therefore there are no perfectly complete markets.[24] For example, while the existence of a spot market is important, market participants also need forward markets — but it would be costly to create formal, long-term forward markets. Missing or incomplete markets are an important source of market failure.[25]

Auction markets and search markets are two broad categories of market organization that have different transaction costs, information transmission properties, and adaptability characteristics.[26] Williamson suggests that there are four reasons why formal, auction-like spot and forward markets are relatively rare.

- If production of a product requires highly specialized investments, a contract or vertical integration is likely to emerge to support the transaction.[27] If this is

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[22] Charles Wilson notes that "when markets are not complete, two fundamental properties of a competitive equilibrium with complete markets may no longer be satisfied. First, stockholders may not agree on the optimal production plan for the firm. Secondly, even in a model of pure exchange, a competitive allocation may not be Pareto optimal even when we restrict attention to allocations which are 'consistent' with the market structure." Charles Wilson, "Incomplete Markets," *THE NEW PALGRAVE: ALLOCATION, INFORMATION, AND MARKETS* (New York: Norton, 1989), at 180.

[23] *Id.*

[24] Wilson notes that "a realistic analysis of competitive markets under uncertainty must allow for markets which are incomplete." *Id.* at 181.

[25] Ledyard points out that welfare economics suggests that: "(1) if there are enough markets, (2) if all consumers and producers behave competitively, and (3) if an equilibrium exists, then the allocation of resources in that equilibrium will be Pareto optimal." John O. Ledyard, "Market Failure," *THE NEW PALGRAVE: ALLOCATION, INFORMATION, AND MARKETS* (New York: Norton, 1989), at 185.

[26] *Id.* at 911.

[27] Williamson notes that "although the high-powered incentives of markets favor tighter production cost control, they impede the ease of adaptation as the bilateral dependency of the relation between the parties builds up. The latter effect is a consequence of the fundamental transformation that occurs as a condition of asset specificity deepens." Williamson, *supra* note 12, at 66-67.

the case, efforts to create an auction market are likely to fail.[28]

- If there is no standardized, fungible product, it is not possible to rely solely on price to clear transactions;[29] in this case, other factors (e.g., quality, service, reputation, frequent-flyer programs,[30] and so on) become important.[31]

- For markets to succeed, economies of scale must be significant because, otherwise, "every firm would presumably supply everywhere to its own long-term needs. Where scale economies are significant, however, each market will support only a limited number of plants of minimum efficient size."[32]

- Finally, markets will emerge only if market participants realize gains from trade as a result of market transactions.[33] If buyers prefer to make purchases from local sellers because of reputation effects (e.g., the firm's reputation for customer service, product knowledge, and so on), a formal spot or futures market is not likely to emerge.[34]

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[28] Williamson notes that "internal organization is favored where asset specificity is great, because the high-powered incentives of markets impair the comparative ease with which adaptive, sequential adjustments to disturbances are accomplished." *Id.* at 67.

[29] Carlton argues that "the heterogeneity of the product is perhaps the most critical characteristic in determining whether a market will clear by price alone." Carlton, *supra* note 19, at 939.

[30] Borenstein discusses the marketing advantages that multiproduct firms can gain in network industries and emphasizes how "frequent-flyer" programs can be used to "tie together" consumption of a number of related products in a way that induces customer loyalty to the entire product line. Borenstein discusses how frequent-flyer programs can: (1) exploit principal-agent dichotomies — a traveler can receive frequent-flyer miles (in essence, a "kickback" to the purchasing agent) for trips paid by an employer; (2) exploit consumer myopia/misestimation — firms have better information on the true probabilities of achieving a bonus; and (3) increase "switching costs" — if, because of switching, frequent-flyer miles that had been accumulated would not be usable. See Severin Borenstein, "Repeat-Buyer Programs in Network Industries," *NETWORKS, INFRASTRUCTURE, AND THE NEW TASK FOR REGULATION*, edited by Werner Sichel and Donald L. Alexander (Ann Arbor, MI: Univ. of Michigan Press, 1996), at 137-162.

[31] Carlton, *supra* note 19, at 939.

[32] Williamson, *supra* note 10, at 194.

[33] *Id.* at 194.

[34] *Id.* at 194.

Formal auction markets are rare because of the transaction costs of organizing and operating an auction market. Where there is no organized market where price equates supply and demand, the market would have the characteristics of a search market. Stigler notes that in search markets, "a buyer (or seller) who wishes to ascertain the most favorable price must canvass various sellers (or buyers)" because "unless a market is completely centralized, no one will know all the prices which various sellers (or buyers) quote at any given time."[35] Where price alone does not clear markets, relationships become important,[36] and market power concerns are likely. In this case, search markets (e.g., bid markets, bilateral contract markets, and so on) will emerge to clear transactions. Search markets could present considerable transaction costs (e.g., search costs, information costs).

Auction markets have stronger efficiency incentives than search markets. Search markets, however, have adaptability advantages that allow them to operate in circumstances where a formal auction market is infeasible. For example, in a search market, a seller can be more flexible because a particular transaction may be less important than maintaining a mutually-agreeable long-term relationship.[37] Thus, the seller can take into account idiosyncratic circumstances (e.g., differences in product quality) with the expectation that the buyer will reciprocate.[38] Table 1 summarizes the differences between formal auction-like markets and search markets.

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[35] George J. Stigler, "The Economics of Information," *Journal of Political Economy*, June 1961, at 213-225; collected in *The Essence of Stigler* 47 (Kurt R. Leube and Thomas Gale Moore, eds., Hoover Institution Press, 1985), at 46-66.

[36] Carlton notes that "a seller's knowledge of a buyer's needs can be a substitute for an impersonal (auction) market that clears by price alone." Carlton, *supra* note 19, at 939.

[37] *Id.* at 939.

[38] The parties to a transaction may choose to expand the trading relation to equalize trading hazards. Williamson, *supra* note 10, at 34.

TABLE 1: Comparison of Auction and Search Markets		
	AUCTION MARKETS	**SEARCH MARKETS**
Definition	In a classic auction market, faceless buyers and sellers meet "for an instant to exchange standardized goods at equilibrium prices."[1]	Where price does not clear markets, nonprice factors (e.g., relationships) become important and exchanges are "neither faceless nor instantaneous."[2] Where formal spot and futures markets are lacking, search markets or other mechanisms (e.g., firms or contracts) may emerge to clear transactions.
Asset Specificity[3]	Works well where there is a standardized, fungible product, that lacks a high level of asset specificity.	Works well where an asset has some level of asset specificity, but where a long-term contract is not needed to make the transaction feasible. Works well if transactions are recurrent.[4]
Bilateral Dependence[5]	Low level of interdependence between buyers and sellers.	As asset specificity deepens, interdependence increases, identity matters, reciprocity becomes important, and adaptability declines.[6]
Contracts[7]	Unilateral contracts where A sells X to B.[8] These are "take-it-or-leave-it" exchanges in which the market sets the price and other dimensions of the good.[9] The buyer accepts or rejects the price and determines the quantity to purchase.	Bilateral contracts where A agrees to buy Y from B as a condition for making the sale of X and both parties understand that the transaction will continue only if the parties observe reciprocity.[10]
Time horizon	Short time horizons.	Can accommodate longer time horizons and recurrent transactions.
Transaction Costs[11]	Very low transaction costs as a result of the presence of economies of scale and low governance costs.[12] Formal, auction-like spot and forward markets are relatively rare.	Higher transaction costs result from asset specificity, the absence of a standardized product, increased governance costs, limited scale economies, and the presence of reputation effects.[13]
Reputation Effects[14]	In auction markets, the identity and reputation of the other party is less important.[15] Auction markets will not emerge if buyers prefer to make purchases from local sellers because of reputation effects.[16]	Where investments in specific assets support exchanges, the transaction is neither faceless nor instantaneous, the identity of the other party is important, and price will not be the only factor in determining whether a transaction will clear.[17]

	AUCTION MARKETS	SEARCH MARKETS
Opportunism[18]	Market alternatives reduce opportunism.[19]	More opportunities for opportunism but parties can mitigate by developing safeguards.
Incentive Intensity[20]	High-powered incentives.[21]	Incentives less strong as bilateral dependence increases.[22]

Table Notes: 1. "Whereas markets were ordinarily regarded as the principal means by which coordination is realized, Coase observed that firms often supplanted markets in performing these very same functions. Rather than regard the boundaries of firms as technologically determined, Coase proposed that firms and markets be considered alternative means of economic organization. Whether transactions were organized within a firm (hierarchically) or between autonomous firms (across a market) was thus a decision variable. Which mode was adopted depended on the transaction costs that attended each." Oliver E. Williamson, *THE ECONOMIC INSTITUTIONS OF CAPITALISM: FIRMS, MARKETS, RELATIONAL CONTRACTING* (New York: Free Press, 1985), at 55-56 citing Yoram Ben-Porath, "The F-Connection: Families, Friends, and Firms and the Organization of Exchange," 6 *POPULATION AND DEVELOPMENT REVIEW,* March 1980, at 1-30.

2. *Id.* at 56.

3. Asset specificity refers to a situation where a firm that has made a specialized investment cannot redeploy the asset to alternative uses except at a loss of productive value. Asset specificity includes human, physical, site and dedicated asset specificity, to which branded capital and temporal specificity have been added. Oliver E. Williamson, *THE MECHANISMS OF GOVERNANCE* (New York: Free Press, 1996), at 105, 106, 377.

4. Williamson, *supra* note 1, at 72-73.

5. There is bilateral dependence between a buyer and a seller when one or both have made durable specialized investments in support of the other. When contracts are incomplete and parties behave opportunistically, bilateral dependence leads parties to develop contractual safeguards. Williamson, *supra* note 1, at 75-77.

6. Williamson, *supra* note 3, at 106-107, 134-135.

7. Williamson defines a contract as an agreement between a buyer and a supplier where price, asset specificity, and safeguards define the terms of the exchange. Williamson, *supra* note 3, at 377.

8. Williamson, *supra* note 1, at 191.

9. Martin K. Perry, "Vertical Integration: Determinants and Effects," *HANDBOOK OF INDUSTRIAL ORGANIZATION: VOLUME 1*, edited by Schmalensee and Willig (Amsterdam: North-Holland, 1989), at 188.

10. Reciprocity can "serve to equalize the exposure of the parties, thereby reducing the incentive of the buyer to defect from the exchange — leaving the supplier to redeploy specialized assets at greatly reduced alternative value. . . .The buyer's commitment to the exchange is more assuredly signaled by his willingness to accept reciprocal exposure of specialized assets. Defection hazards are thereby mitigated." Williamson, *supra* note 3, at 135. See also Williamson, *supra* note 1, at 191.

11. Williamson defines transaction costs as the *ex ante* and *ex post* costs of contracting. *Ex ante* transaction costs include the costs of drafting, negotiating and safeguarding an agreement. *Ex post* transaction costs include the maladaption, haggling, governance, and other costs that arise when contract execution is misaligned as a result of gaps, errors, omissions, and unanticipated disturbances. Williamson, *supra* note 3, at 5 and 379.

Table Notes — continued

12. Williamson, *supra* note 1, at 93.

13. Carlton notes that "the markets that probably come closest to the textbook model of competitive markets are financial markets, such as the futures markets. A moment's thought will reveal that it is costly to run such markets. Aside from the actual physical space that is required, there is the time cost of all the participants who are necessary to run the market. . . .Another important cost of making markets is the time cost of the actual customers." Dennis W. Carlton, "The Theory and the Facts of How Markets Clear: Is Industrial Organization Valuable for Understanding Macroeconomics?" *HANDBOOK OF INDUSTRIAL ORGANIZATION: VOLUME 1*, edited by Schmalensee and Willig (Amsterdam: North-Holland, 1989), at 937-938; Williamson, *supra* note 3, at 66-70, 135-137.

14. Reputation effect mechanisms develop in response to uncertainties about quality — firms produce high-quality products because they fear that a reputation for poor quality will harm their profitability. Markets where reputation effects are important may feature price rigidities. Joseph E. Stiglitz, "Imperfect Information in the Product Market,"*HANDBOOK OF INDUSTRIAL ORGANIZATION: VOLUME 1*, edited by Schmalensee and Willig (Amsterdam: North-Holland, 1989), at 823, 825.

15. In an "ideal" auction market the participants will be faceless, transactions will be instantaneous, and the reputation of the parties will be irrelevant. Williamson, *supra* note 1, at 55-56.

16. Williamson, *supra* note 1, at 194.

17. Carlton, *supra* note 13, at 938-940; Williamson *supra* note 1, at 55-56.

18. Transaction cost economics defines opportunism as "self-interest seeking with guile" and assumes that "*some* individuals are opportunistic *some* of the time and that it is costly to ascertain differential trustworthiness ex ante." Williamson, *supra* note 3, at 6 and 48.

19. In an "ideal" auction market there is no opportunity for a participant to make "calculated efforts to mislead, deceive, obfuscate, and otherwise confuse." Williamson, *supra* note 3, at 378.

20. Williamson defines incentive intensity as "the degree to which a party reliably appropriates the net receipts (which could be negative) associated with its efforts and decisions." *Id.*

21. Markets feature high-powered incentives. Firms in a market have strong incentives to reduce costs and adapt effectively because of their ability to "appropriate the net receipts" that result from their activities. Williamson, *supra* note 3, at 103, 378.

22. If, for "relationship" or other considerations, a firm is unable or unwilling to "appropriate the net receipts" from their activities, weaker incentive intensity would obtain. *Id.*

HYBRIDS

Williamson argues that "markets and hierarchies [firms] are polar modes" and that it is "difficult to stabilize transactions in the middle range."[39] Hybrid transactions, which are in that middle range, include "various forms of long-term contracting,

[39] Williamson, *supra* note 12, at 90 and 104.

reciprocal trading, regulation, franchising, and the like."[40] While it is often useful, and convenient, to analyze the polar modes, it is important to recognize that many of the practical problems of economic organization are in the middle range.[41]

If the relevant assets are not highly specific, bilateral contractual exchange can be considered to be a type of search market exchange, with the "high-powered" incentives of markets. As a bilateral contract becomes more transaction- and asset-specific, the bilateral contract becomes a "hybrid" governance mechanism, with access to weaker incentives and higher transaction costs.[42]

Hybrid transactions are not unilateral, like a market, but require mutual consent to a "contract," which may be an explicit (formal) contract or an implicit (informal) agreement. In order to preserve autonomy, hybrids provide more fully developed transaction-specific safeguards than does the market.[43] Williamson argues that safeguards "can take the form of penalties, a reduction in *incentive intensity*, and/or more fully developed *private-ordering apparatus*[44] to deal with contingencies."[45] While hybrid mechanisms preserve autonomy for transactions in the middle range, as asset specificity deepens and bilateral dependence increases, vertical integration is likely to emerge.

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[40] *Id.* at 104.

[41] Hybrids are "semistrong" with respect to adaptability to disturbances, coordinative adaptation, administrative controls, and incentive intensity issues. *Id.* at 105.

[42] As a transaction becomes more asset specific, bilaterally dependence emerges. As a result, the transaction will lose the production cost-minimizing characteristics of markets and contracting costs will increase. *Id.* at 108.

[43] *Id.* at 378.

[44] Williamson defines private-ordering apparatus as the information disclosure, dispute settlement, and distributional mechanisms that the parties to a contract develop to deal with gaps, errors, omissions, and inequities. Williamson, *supra* note 12, at 378-379.

[45] *Id.* at 379.

VERTICAL INTEGRATION

Firms emerge when a transaction can be completed most economically through unified ownership (i.e., the buyer and supplier are in the same enterprise).[46] If vertical integration is chosen over a market exchange relationship, Williamson argues that it must be "because the contract between collocated stages is mediated more effectively by hierarchy than by market."[47] Examining a simplified case study can best explore these issues — the "paradigm problem" of transaction cost economics.[48]

Williamson argues that the primary rationale for vertical integration is to economize on transaction costs and he rejects the argument that vertical integration occurs for technological[49] or anticompetitive[50] reasons. Regarding the decision to integrate the operations of a blast furnace and a rolling mill, for example, Williamson suggests that:

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[46] According to Martin Perry, "inherent in the notion of vertical integration is the elimination of contractual or market exchanges, and the substitution of internal exchanges within the boundaries of the firm." Martin K. Perry, "Vertical Integration: Determinants and Effects," *HANDBOOK OF INDUSTRIAL ORGANIZATION: VOLUME 1*, edited by Schmalensee and Willig (Amsterdam: North-Holland, 1989), at 185.

[47] Williamson, *supra* note 12, at 16.

[48] Williamson argues that an understanding of vertical integration serves to "unpack the puzzles of complex economic organization more generally." Williamson, *supra* note 12, at 54.

[49] Williamson rejects the argument that vertical integration is the result of a "natural technological order" and argues that "separability is the rule rather than the exception." Williamson argues that "technology is fully determinative of economic organization only if (1) there is a single technology that is decisively superior to all others and (2) that technology implies a unique organizational form. Rarely, I submit is there only a single feasible technology, and even more rarely is the choice among alternative organization forms determined by technology." Williamson, *supra* note 10, at 87-88.

[50] Williamson argues that "until very recently the primary economic explanation for nonstandard or unfamiliar business practices was monopoly." Williamson, *supra* note 10, at 17. This recalls Coase's comment that "if an economist finds something — a business practice of one sort or another — that he does not understand, he looks for a monopoly explanation. And as we are ignorant in this field, the number of ununderstandable practices tends to be rather large, and the reliance on a monopoly explanation is frequent." Ronald H. Coase, *The Firm, the Market, and the Law* (Chicago: University of Chicago Press, 1988), at 67; reprinted from "Industrial Organization: A Proposal for Research," *POLICY ISSUES AND RESEARCH OPPORTUNITIES IN INDUSTRIAL ORGANIZATION*, Victor R. Fuchs, ed., Vol. 3 of *ECONOMIC RESEARCH: RETROSPECTIVE AND PROSPECT*, NBER General Series, no. 96 (Cambridge: National Bureau of Economic Research, 1972), at 59-73.

> (1) Although large numbers of parties may compete (say, to deliver molten ingot) at the outset, transactions that are supported by significant investments in durable transaction-specific assets undergo a Fundamental Transformation, in that what was a large numbers-supply condition at the outset is transformed into a small numbers-exchange relation thereafter, as a consequence of which the parties become bilaterally dependent; (2) because all complex contracts are unavoidably incomplete and because adaptation is the central problem of economic organization, autonomous contracts in bilaterally dependent circumstances are fraught with maladaption hazard; and (3) although the unified ownership of both stages incurs bureaucratic costs of its own, hierarchy (vertical integration) becomes the cost-effective governance structure as asset specificity progressively deepens.[51]

Williamson's points will be considered in turn.

- *Asset specificity.* The assets needed to operate the successive stages in a capital-intensive production process: (1) are highly specialized; (2) are difficult to relocate to a different site; (3) need a stable and consistent supply of raw materials, which serves to encourage collocating these activities with closely related processes on one site; and (4) require expert and experienced operators (i.e., human asset specificity).[52] In this case, a high level of asset specificity is present and bilateral dependence is likely to emerge.[53]

- *Bilateral dependence.* Investments in assets that are highly specific to a particular transaction, while not necessarily requiring vertical integration, can

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[51] Williamson, *supra* note 12, at 16.

[52] Asset specificity refers to a situation where a firm that has made a specialized investment cannot redeploy the asset to alternative uses except at a loss of productive value. Asset specificity includes human, physical, site and dedicated asset specificity, to which branded capital and temporal specificity have been added. Williamson, *supra* note 12, at 105, 106, 377.

[53] Williamson notes that vertical integration has "the purpose and effect of economizing on transaction costs." Williamson, *supra* note 12, at 85.

lead to a situation where market or contract transactions are costly and risky because bilateral dependence between the two parties to a transaction has emerged.[54] Bilateral dependence emerges when one or both of the parties to a transaction invests in specialized assets in support of a transaction.[55] For example, a blast furnace and a rolling mill could maintain separate ownership. In order to realize thermal and transportation economies between the two facilities, however, transactions between the two facilities would be advantageous. In order to achieve these economies, an interdependent relationship between the blast furnace and the rolling mill is likely to emerge.

- *INCOMPLETE CONTRACTING IN ITS ENTIRETY.* The parties could write a contract to mediate the transaction between a blast furnace and a rolling mill. Contract exchange between successive stages of a productive process, where the assets in question have a high degree of asset specificity, presents severe contractual hazards when incomplete contracting,[56] bounded rationality,[57] and opportunism[58] are present. This contract would necessarily be incomplete because negotiators are unable to anticipate all potential

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[54] There is bilateral dependence between a buyer and a seller when one or both have made durable specialized investments in support of the other. When contracts are incomplete and parties behave opportunistically, bilateral dependence leads parties to develop contractual safeguards. Williamson, *supra* note 10, at 75-77.

[55] Williamson, *supra* note 12, at 377.

[56] Williamson argues that complex contacts are always incomplete and many are maladaptive because the parties to a contract cannot foresee many contingencies and the private-ordering apparatus that the parties develop to deal with contingencies that arise are ineffective in addressing the contingency. Filling the gaps that arise is an important part of contract execution. Williamson, *supra* note 12, at 131.

[57] Bounded rationality relates to the concept that "mind is a scarce resource" and can be defined as "behavior that is intendedly rational but only limitedly so; it is a condition of limited cognitive competence to receive, store, retrieve, and process information." *Id.* at 253 and 377.

[58] Transaction cost economics defines opportunism as "self-interest seeking with guile" and assumes that "*some* individuals are opportunistic *some* of the time and that it is costly to ascertain differential trustworthiness ex ante." Williamson, *supra* note 12, at 6 and 48. Also note, in an "ideal" auction market there is no opportunity for a participant to make "calculated efforts to mislead, deceive, obfuscate, and otherwise confuse." Williamson, *supra* note 12, at 378.

outcomes *ex ante*. After all, the capacity of contract negotiators to process and use information is limited.[59] Further, opportunistic behavior by the parties could result in contract maladaption *ex post*. Developing a contract *ex ante* that provides the essential framework of a transaction, including contractual safeguards and a governance structure for resolving the disputes that may emerge *ex post,* can mitigate the risk of potential problems.[60] Where asset specificity and bilateral dependence are very high, however, a vertically-integrated structure is likely to emerge to economize on the transaction costs associated with incomplete contracting.[61]

- *MALADAPTION HAZARDS*. An alternative to vertical integration is to sign a long-term contract with a supplier. Thus, a rolling mill could sign a long-term contract with a blast furnace. Because of the impossibility of complete contracting, the parties to a long-term contract cannot anticipate *ex ante* all possible *ex post* outcomes. The long-term contract could become maladapted over time because of this inability to anticipate the future. *Ex post* contract maladaption can present significant transaction costs. In comparison to a contract between two independent parties, unified governance of a transaction through vertical integration can more effectively respond to *ex post* contract maladaption. Williamson notes that "in effect, hierarchy becomes its own court of ultimate appeal" because "firms are able

[59] Williamson, *supra* note 57.

[60] Williamson defines a contract as an agreement between a buyer and a supplier where price, asset specificity, and safeguards define the terms of the exchange. Williamson, *supra* note 12, at 377.

[61] Through vertical integration, an internal contract can replace an external contract. Williamson notes that "the advantage of vertical integration is that adaptations can be made in a sequential way without the need to consult, complete, or revise interfirm agreements. Where a single ownership entity spans both sides of the transaction, a presumption of joint profit maximization is warranted. Thus price adjustments in vertically integrated enterprises will be more complete than in interfirm trading. And, assuming that internal incentives are not misaligned, quantity adjustments will be implemented at whatever frequency serves to maximize the joint gain to the transaction." Williamson, *supra* note 10, at 78.

to exercise fiat, whereas markets cannot, to manage transactions. That has pervasive comparative institutional ramifications."[62] While parties to a contract may not be able to anticipate the specific sources of possible *ex post* contract maladaption, they are often far-sighted enough to anticipate and mitigate contract maladaption risks. Unifying ownership of successive stages of production is a commonly used means of mitigating the cost and risk of *ex post* contract maladaption.

- *ADAPTATION IS THE CENTRAL PROBLEM OF ECONOMIC ORGANIZATION.* Vertical integration works well in cases where a production process requires cooperative adaptation between successive stages.[63] A blast furnace and a rolling mill can vertically integrate to coordinate the operations of the successive stages. The coordination benefits of hierarchy, however, come at a bureaucratic cost. Notably, firms can be slow to adapt to disturbances relative to markets.[64]

- *BUREAUCRATIC COSTS.* A rolling mill could acquire raw materials through the market or a contract with a collocated blast furnace. Acquiring raw materials from a collocated blast furnace offers obvious economies. Vertical integration can provide these economies but can also increase bureaucratic costs.[65] Three broad categories of bureaucratic costs are noteworthy. First, when

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[62] Williamson, *supra* note 12, at 27.

[63] Williamson notes that "as compared with the market, the use of formal organization to orchestrate coordinated adaptation to unanticipated disturbances enjoys adaptive advantages as the condition of bilateral dependency progressively builds up. But these adaptation gains come at a cost. . . . The upshot is that internal organization degrades incentive intensity, and added bureaucratic costs result." *Id.* at 103.

[64] Williamson cites Hayek's argument that "the price system, as compared with central planning, is an extraordinarily efficient mechanism for communicating information and inducing change." *Id.* at 101.

[65] Vertical integration has access to administrative tools that increase the adaptability of a firm relative to a market but that also have administrative and other costs. Williamson notes that "as compared with internal transactions, market mediated transactions rely more on high-powered incentives and less on the administrative process (including auditing) to accomplish the same result." Williamson, *supra* note 10, at 162.

transactions move from market to hierarchy, efficiency incentives can weaken.[66] Second, a unit of a firm might pursue its own subgoals at the expense of the goals of the vertically-integrated firm.[67] Finally, there are the costs of management or bureaucratic interventions that fail to provide net benefits (e.g., a vertically-integrated firm may intervene in the operations of the rolling mill in a costly way).[68]

Williamson argues that because "the firm is everywhere at a disadvantage to the market in production cost respects," the firm will not vertically integrate for production cost reasons alone and that "only when contracting difficulties intrude does the firm and market comparison support vertical integration."[69]

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[66] Williamson notes that "weaker incentive intensity (greater bureaucratic costs) attend the move from hybrid to hierarchy, ceteris paribus." Williamson, *supra* note 12, at 104.

[67] Managers may pursue "subgoals" rather than the goals of shareholders. Williamson notes that subgoals can "include growth, easy-life preferences, perquisites, and the like. Logrolling and internal politicking among members are commonly involved." *Id.* at 186.

[68] Williamson argues that "because promises to intervene selectively lack credibility, selective intervention is impossible. If it were otherwise, everything would be organized in one large firm. Because, however, selective intervention is impossible, hierarchies are unable to replicate market incentives." *Id.* at 379.

[69] *Id.* at 69.

SECTION 3

MILESTONES ALONG THE ROAD

Vertical integration in the electric services industry emerged because it economized on transaction costs and facilitated effective coordination and cooperation in operating an interconnected system.[70] By the 1970s, however, a debate about competition, which had begun in the 1930s,[71] had begun to "pick up steam." Academics,[72] practitioners,[73] and Wall Street analysts[74] began to recognize that a competitive generation sector was both feasible and desirable.

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[70] Joskow notes that "uncertainty, relationship-specific investment, asymmetric information, the complexities of coordinating an integrated electric power system reliably and economically, and incomplete contracting may favor vertical integration, *assuming that the integrated firms minimize costs*." Paul L. Joskow, "Regulatory Failure, Regulatory Reform, and Structural Change in the Electrical Power Industry," *BROOKINGS PAPERS: MICROECONOMICS*, at 125-199.

[71] Philip Cabot, "Public Utility Rate Regulation," 7 *HARVARD BUSINESS REVIEW*, at 257-266 and 413-422 (1929); Burton N. Behling, *COMPETITION AND MONOPOLY IN PUBLIC UTILITY INDUSTRIES* (Urbana, IL: Univ. of Illinois Press, 1938); Horace M. Gray, "The Passing of the Public Utility Concept," *THE JOURNAL OF LAND & PUBLIC UTILITY ECONOMICS*, Vol. XVI, No. 1, February 1940, at 8-20, this article was reprinted in Edgar M. Hoover, Jr. and Joel Dean, ed., *READINGS IN THE SOCIAL CONTROL OF INDUSTRY* (Philadelphia: Blakiston, 1949), at 280-303; Walter Adams and Horace M. Gray, *MONOPOLY IN AMERICA* (New York: Macmillan, 1955.

[72] The best early and eloquent summary of this "new thinking" is found in Paul L. Joskow and Richard Schmalensee, *MARKETS FOR POWER: AN ANALYSIS OF ELECTRIC UTILITY DEREGULATION* (Cambridge, MA: MIT Press, 1983). See also Fred C. Schweppe, Michael C. Caramanis, Richard D. Tabors and Roger E. Bohn, *SPOT PRICING OF ELECTRICITY* (Boston: Kluwer, 1988); George J. Stigler and Claire Friedland, "What Can Regulators Regulate? The Case of Electricity" 5 *J. LAW & ECON.* 1 (1962); Harold Demsetz, "Why Regulate Utilities?" *J. OF LAW & ECON.* 11 (April 1968), at 55-65; Almarin Phillips, ed., *PROMOTING COMPETITION IN REGULATED MARKETS* (Washington, DC: Brookings Institution, 1975); Walter J. Primeaux, Jr., *DIRECT ELECTRIC UTILITY COMPETITION: THE NATURAL MONOPOLY MYTH* (New York: Praeger, 1986).

[73] See Joskow and Schmalensee, *supra* note 72, at 179-190. See also Leonard W. Weiss, "Antitrust in the Electric Power Industry," in Phillips, ed., *supra* note 72, at 135-200.

[74] Edward J. Tirello, Jr. and Stephen Fedun, *THE ELECTRIC UTILITY INDUSTRY: RETHINKING REGULATION*, Lehman Brothers Kuhn Loeb Research Industry Review, February 1983.

The Public Utility Regulatory Policies Act of 1978 (PURPA)[75] played a critical role in developing a competitive generation sector because it provided a "gateway to entry"[76] into the wholesale power markets. The experience with PURPA helped to build a broad-based recognition that the generation sector is potentially competitive.[77] PURPA, however, also provides an important case study of the challenges and risks involved in restructuring the electric generation market. The PURPA experiment failed because important market and industry structure issues were not addressed up-front. This resulted in serious contractual difficulties.

The Energy Policy Act of 1992 (EPAct),[78] which gave new tasks to federal and state regulators,[79] broadened the gateway to entry into the electric market. EPAct did not treat nonutility exempt wholesale generators (EWGs) as favorably as PURPA Qualifying Facilities (QFs) because a more competitive generation market had begun to

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[75] PURPA encouraged renewable power and cogeneration and thereby facilitated the emergence of independent power producers. Pub. L. No. 95-617, 92 Stat. 3117 (codified as amended at 16 U.S.C. §§ 2601-2645 (1978)).

[76] George Yip argues that "in some situations barriers can be turned into 'gateways' for entrants, that is, that instead of entrants facing disadvantages relative to incumbents, there are advantages to being entrants." See George S. Yip, *BARRIERS TO ENTRY: A CORPORATE-STRATEGY PERSPECTIVE* (Lexington, MA: Lexington Books, 1982), at 8. See also George S. Yip, "Gateways to Entry," *HARVARD BUSINESS REVIEW*, September/October 1982, at 85-92.

[77] Watkiss and Smith note (at 454) that increased nonutility generation, state experiments in competitive bidding, and problems with rate regulation of generation supported the perception that competition could replace regulation of wholesale power markets. For a survey of EPAct see Jeffrey D. Watkiss and Douglas W. Smith, "The Energy Policy Act of 1992 — A Watershed for Competition in the Wholesale Power Market," 10 *THE YALE JOURNAL ON REGULATION*, Summer 1993, at 447-492.

[78] Pub. L. No. 102-486, 106 Stat. 2776 (1992).

[79] Watkiss and Smith, *supra* note 77, at 450, note that EPAct: (1) gives new authority to FERC to order utilities to provide transmission service at fair rates; (2) exempts wholesale power generators from PUHCA; (3) eases PUHCA regulation of foreign utilities; and (4) directs the states to consider wholesale power market issues under PURPA. See also Kenneth W. Costello, Robert E. Burns, Daniel J. Duann, Robert J. Graniere, Mohammad Harunuzzaman, Kenneth J. Rose, *A SYNOPSIS OF THE ENERGY POLICY ACT OF 1992: NEW TASKS FOR STATE PUBLIC UTILITY COMMISSIONS* (Columbus, OH: National Regulatory Research Institute, June 1993).

develop.[80] Recent Federal Energy Regulatory Commission (FERC) and state initiatives have further increased the effectiveness of competition at the wholesale level.[81]

Increased wholesale competition has made retail competition feasible. Effective wholesale competition, while important and necessary, will not be sufficient — retail competition is the critical next step.

Vertical Integration of the Electric Utility Industry Emerged to Economize on Transaction Costs

Vertical integration is likely to emerge where there is a high level of bilateral dependence between successive stages of production. To perform under a contract, the supplier and, in some cases, the buyer, must make significant investments in highly specific assets.[82] Vertical integration occurs when it is more economical to contract within a vertically-integrated firm than to rely on external contracts or markets.[83] While markets have lower production costs, vertical integration can be a means of economizing on transaction costs where transactions are infrequent, uncertain, and highly asset specific.[84]

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[80] Thus, while electric utilities had an "obligation to buy" from QFs at "avoided cost" under PURPA, electric utilities are not obligated to buy from EWGs. Watkiss and Smith, *supra* note 77, at 453.

[81] See a recent issue of this EEI publication for a survey of federal and state electric restructuring activities. Norman Jenks, ed., *RETAIL WHEELING & RESTRUCTURING REPORT* (Edison Electric Institute), December 1997.

[82] Williamson, *supra* note 12, at 66-67.

[83] Williamson notes that "transaction cost economics is an exercise in comparative institutional analysis, in which the efficacy of alternative modes of organization — markets, hybrids, hierarchies, public bureaus — are examined in relation to and aligned with the attributes of transactions." Williamson, *supra* note 12, at 327.

[84] Williamson notes that "the principal dimensions with respect to which transactions differ are asset specificity, uncertainty, and frequency. The first is the most important and most distinguishes transaction cost economics from other treatments of economic organization, but the other two play significant roles." Williamson, *supra* note 10, at 52.

In the electric services industry, vertical integration emerged because of the high transaction costs associated with market or contract exchange.[85] While the structure of the electric utility industry has begun to change, incumbents in the electric services industry have typically chosen to integrate vertically in order to:

- *REDUCE THE CONTRACTUAL HAZARDS THAT RESULT FROM INVESTMENTS IN HIGHLY SPECIFIC ASSETS*. Common ownership of the generation, transmission, aggregation and distribution stages of production reduces contractual hazards. For example, utilities could make long-term investments in generation (which would be risky absent a regulatory commitment that the utility could recover the costs of prudent investments from ratepayers) because there was a reasonable assurance that regulators would allow the recovery of those costs, including the opportunity to earn a fair rate of return on its investment.[86] While generation has weak "natural monopoly"[87]

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[85] The transaction costs that a firm avoids by vertically integrating include information, search, maladaption, haggling, and holdup costs. These transaction costs would likely be higher where information is imperfect and asymmetric between the principal and the agent. Olson, *supra* note 7, at 57 (notes 16 and 17).

[86] See Charles F. Phillips, Jr., *THE REGULATION OF PUBLIC UTILITIES: THEORY AND PRACTICE* (Arlington, VA: Public Utilities Reports, 1988), at 357-408.

[87] According to Baumol, Panzar and Willig, "An industry is a *natural monopoly* for industry output vector y^I if single-firm production is the least costly way of supplying y^I " and "an industry is said to be a natural monopoly if, over the entire relevant range of outputs, the firms' cost function is subadditive." William J. Baumol, John C. Panzar, and Robert D. Willig, *CONTESTABLE MARKETS AND THEORY OF INDUSTRY STRUCTURE* (San Diego, CA: Harcourt Brace, 1988), at 8 and 17. An NRRI summary of a study by Keith Gilsdorf notes that "the results of the study provide no evidence of subadditivity for vertically-integrated electric utilities over the admissible region." See Herbert G. Thompson, David Alan Hovde, Louis Irwin, Mufakharul Islam, Kenneth Rose, *ECONOMIES OF SCALE AND VERTICAL INTEGRATION IN THE INVESTOR-OWNED ELECTRIC UTILITY INDUSTRY* (Columbus, OH: National Regulatory Research Institute, January 1996), at 158 citing Keith Gilsdorf, "Testing for Subadditivity of Vertically-Integrated Electric Utilities," *Southern Economic Journal*, Vol. 18, No. 12 (1995), at 126-138.

characteristics,[88] vertical integration, in conjunction with regulation,[89] allowed the utility to make highly capital-intensive and asset-specific investments in generation, transmission and distribution plant.[90]

- *PROVIDE A HIERARCHICAL STRUCTURE THAT HELPS TO ASSURE CONTINUITY OF THE RELATIONSHIP BETWEEN SUCCESSIVE STAGES OF PRODUCTION OVER TIME.* The electric utility industry is unique in terms of the extent to which it must operate in real time.[91] Vertically-integrated utilities have been very effective in coordinating the physical operation of their generation, transmission and distribution assets within a firm.[92]

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[88] Joskow (at 122) notes that "generation per se has not really been a strong natural monopoly requiring very large generating companies spanning a large fraction of regional wholesale power markets for many years. . . .Just look at the United States, where hundreds of utilities own and operate generating plants, with little evidence that huge generating companies are necessary to exploit economies of scale." Joskow, *supra* note 5, at 119-138. See also, Joskow and Schmalensee, *supra* note 72, at 45-58.

[89] While generation may have never had strong "natural monopoly" characteristics, extending regulation to include transmission, distribution, aggregation, *and* generation provided significant benefits. In this situation, where contracts and markets were prone to break down as a result of the significant asset specificity of the generation assets, extending regulation to generation provided a reasonable assurance to electric utility investors that the cost of generation assets, including a fair rate of return, would be recovered from ratepayers, which made it feasible and economical to finance and construct large-scale generation units.

[90] While vertical integration appears to have provided economies, competition in generation and horizontal mergers in the generation sector may offset any lost economies from vertical disaggregation. Kaserman and Mayo (at 499) suggest that "costs of vertically disintegrated production are 11.96 percent higher than for vertically integrated production," but they also note that "competition at the generation stage may lead to efficiency gains that offset the efficiency losses from vertical divestiture." David L. Kaserman and John W. Mayo, "The Measurement of Vertical Economies and the Efficient Structure of the Electric Utility Industry," XXXIX *JOURNAL OF INDUSTRIAL ECONOMICS*, September 1991, at 483-502.

[91] Joskow notes that "the transmission system is not simply a transportation network that moves power from individual generating stations to demand centers, but a complex 'coordination' system that integrates a large number of generating facilities dispersed over wide geographic areas to provide a reliable flow of electricity to dispersed demand nodes while adhering to tight physical requirements to maintain network frequency, voltage and stability." Joskow, *supra* note 5, at 121-122.

[92] Joskow notes that "the primary economic rationale for vertical integration between generation and transmission is that it internalizes within an organization the operating and investment complementarities between these supply functions, with their associated potential public goods and externality problems." *Id.* at 122.

- *PROVIDE SAFEGUARDS THAT PROTECT AGAINST OPPORTUNISTIC BEHAVIOR AT ANY GIVEN STAGE OF PRODUCTION.* Joint ownership provides a strong check on subgoal pursuit or holdup by one stage of production at the cost of another.[93]

- *REDUCE THE INFORMATION AND TRANSACTION COSTS ASSOCIATED WITH OPERATING THE ELECTRIC SYSTEM RELIABLY IN REAL TIME.* Information flows within a firm are less prone to strategic behavior aimed at gaining a competitive advantage through differential access to competitive information, which reduces information and transaction costs.[94] Thus, for example, many of the asymmetric information and reputation-effect issues that present significant questions in an unbundled market structure that features a competitive generation sector are simply not relevant in the traditional vertically-integrated market structure.[95]

- *INCREASE THE COORDINATION AND ADAPTABILITY OF THE INTEGRATED SYSTEM IN RESPONSE TO CHANGES IN TECHNOLOGY, CUSTOMER DEMAND AND COSTS.* Firms generally do not adapt as quickly to disturbances as do markets (e.g., the

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[93] Klein, Crawford, and Alchian argue that vertical integration emerges in order to reduce the "holdup" potential that emerges when firm-specific investments are made by transactors, which they refer to as the "appropriation of quasi-rents." Benjamin Klein, R.A. Crawford, and A.A. Alchian, "Vertical Integration, Appropriable Rents, and the Competitive Contracting Process," 21 *JOURNAL OF LAW AND ECONOMICS*, October 1978, at 297-326. Klein (at 166) argues that "vertical integration, by shifting ownership of the firm's organizational asset, creates a degree of flexibility and avoids this contractually created hold-up potential, thereby resulting in significant transaction cost savings." Benjamin Klein, "Vertical Integration as Organizational Ownership: The Fisher Body-General Motors Relationship Revisited," reprinted in Scott E. Masten, ed., *CASE STUDIES IN CONTRACTING AND ORGANIZATION* (New York: Oxford Univ. Press, 1996), at 165-178); first published in 4 *JOURNAL OF LAW, ECONOMICS, AND ORGANIZATION*, 1988, at 199-213.

[94] A good overview of the regulatory problems that asymmetric information can present is found in Mark Armstrong, Simon Cowan, and John Vickers, *REGULATORY REFORM: ECONOMIC ANALYSIS AND BRITISH EXPERIENCE* (Cambridge, MA: MIT Press, 1994), at 26-45.

[95] Currently, the "aggregation" or generation marketing functions, for example, are coordinated within a vertically-integrated firm. In a restructured electric industry, these functions could become competitive, which would raise concerns if an affiliate of the T&D utility, which competed in that market, had informational or reputational advantages over other firms. For a discussion of these issues, see Olson, *supra* note 7, at 53-54.

"market" responded more quickly to the emerging importance of the Internet than did Microsoft).[96] But firms are better able to coordinate adaptation within the boundaries of a firm because firms have access to administrative tools (which include hiring, firing, and so on).[97]

While vertical integration has provided many benefits in the electric utility industry, it is difficult to establish an efficient boundary between the potentially competitive generation sector and the "natural monopoly" transmission and distribution sectors.[98] This has resulted in reduced productive efficiency and higher bureaucratic costs in generation because vertically-integrated firms do not have access to the high-powered incentives of markets.[99]

Vertical integration, which has been beneficial in many respects, is not inevitable.[100] While vertical integration in the electric services industry is currently

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[96] Williamson, *supra* note 12, at 101-105. For a discussion of Microsoft's response to the internet see Don Tapscott, *THE DIGITAL ECONOMY: PROMISE AND PERIL IN THE AGE OF NETWORKED INTELLIGENCE* (New York: McGraw-Hill, 1996), at 20-23.

[97] Williamson, *supra* note 12, at 101-105.

[98] Two types of boundary problems are notable. First, what is the appropriate boundary of the firm (e.g., should generation be integrated with transmission and distribution)? Second, what is the appropriate boundary of regulation (e.g., should generation be regulated)? For a discussion see Olson, *supra* note 7, at 50-54.

[99] Joskow argues that the *status quo* regulated generation sector suffers from "inefficiencies associated with construction cost overruns in new generating projects, inefficient choices of generating technologies, excessive operating costs and poor plant maintenance, failures to close inefficient plant, excess employment at generating plants, and so on These inefficiencies should be constrained by promoting more real competition in the supply of generation services." Paul L. Joskow, "Restructuring to Promote Competition in Electricity: In General and Regarding the POOLCO vs. Bilateral Contracts Debate," at 48-49 (Dec. 21, 1995) (Discussion Draft).

[100] Kwoka notes that "the merits of competition at the generation stage of electric power are well understood, but the role of competition at other stages has generally been thought to be limited by the cost disadvantages of reduced scale and/or facilities duplication. . . .Yet the role of competition should not be underestimated. Even if *potential* costs are lower under monopoly provision, *realized* monopoly costs may be greater as a result of inefficiencies tolerated under regulation or public ownership." John E. Kwoka, Jr., *POWER STRUCTURE: OWNERSHIP, INTEGRATION, AND COMPETITION IN THE U.S. ELECTRICITY INDUSTRY* (Boston: Kluwer, 1996), at 144.

pervasive, "separability is the rule rather than the exception."[101] Determining whether vertical disaggregation is feasible and, if so, whether it is economical, requires a comparative assessment of markets, hybrids and firms.[102]

THE PURPA QF EXPERIMENT, WHILE IMPORTANT, FAILED TO ACCOUNT FOR THE HIGH LEVEL OF BILATERAL DEPENDENCE THAT RESULTS FROM DEDICATED ASSETS

PURPA provided nonutility QFs with the opportunity to enter the generation capacity and energy market — a market that previously had significant barriers to entry[103] — by exempting QFs from the definition of an electric utility under the Public Utility Holding Company Act of 1935 (PUHCA).[104] As a result of PURPA, independently owned and operated generating plants became a viable alternative to utility-owned and -operated generation.[105]

PURPA had the effect of reducing the extent of vertical integration in the electric services industry. Under PURPA, an independent firm could build a generating plant within a utility's service territory, supported by a long-term contract with the utility for the capacity and energy of the generating plant.[106] The generator's asset, then, became contractually dedicated to serving the needs of the utility.

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[101] Williamson, *supra* note 49, at 87-88.

[102] Williamson, *supra* note 83.

[103] Yip recognizes the important role that changes in public policies, such as "intervening to alter market structure," can play in raising or lowering "gateways to entry." Yip (1982), *supra* note 76, at 136.

[104] 15 U.S.C. §§ 79 to 79z-6 (1988).

[105] While nonutility generation has comprised over 50 percent of new generating capacity additions in recent years, nonutility generating capacity comprises less than 10 percent of total installed generation. Fox-Penner notes, for example, that nonutility generators provided about 78 percent of net generation additions in 1994 and that nonutility installed capacity has grown from about 18,000 megawatts in 1978 to about 48,000 megawatts in 1994. See Peter Fox-Penner, *ELECTRIC UTILITY RESTRUCTURING: A GUIDE TO THE COMPETITIVE ERA* (Vienna, VA: Public Utilities Reports, 1997), at 138-139.

[106] A comprehensive treatment of QF and independent power law can be found in Steven Ferrey, *LAW OF INDEPENDENT POWER: DEVELOPMENT/COGENERATION/UTILITY REGULATION, VOL. 1 AND 2* (Deerfield, IL: Clark, Boardman Callaghan, March 1996).

Dedicated Assets

Dedicated assets are "discrete additions to generalized capacity that would not be put in place but for the prospect of selling a large amount of a product to a particular customer"[107] and that would "lose value if employed in alternative uses (or by or to service alternative users)."[108] A firm puts a dedicated asset into place based on a particular contractual transaction with a customer. If the customer prematurely terminates a contract, a significant overhang of excess capacity would result. According to Williamson, "trading hazards. . .are often mitigated by *expanding* the contractual relation to effect symmetrical exposure. Paradoxically, greater aggregate hazard exposure can be mutually preferred to less if, as a consequence, hazard 'equilibration' is thereby realized."[109]

QF plants have a high level of asset specificity, give rise to ongoing, long-term transactions with a utility buyer, and face considerable uncertainty and risk. Regarding asset specificity, a QF generating plant: (1) has a very specialized site-specific use; (2) is long-lived and highly capital intensive; (3) has physical features that result in high relocation costs; (4) is designed to use a narrowly-delimited type and grade of fuel; (5) has been dedicated to the use of a particular utility buyer by contract; and (6) if the contract with the dedicated utility buyer was, for whatever reason, terminated, the QF

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[107] Williamson, *supra* note 10, at 194.

[108] Williamson, *supra* note 12, at 129.

[109] Williamson, *supra* note 10, at 96. Williamson further argues that "bilateral exchanges offer prospective advantages over unilateral trade *if* the resulting exposure of transaction-specific assets effects a credible commitment without simultaneously posing expropriation hazards. . . .Where dedicated assets are exposed, however, *the identity of the parties clearly matters.* Trades of that kind will not go through an auction market but will be carefully negotiated between the parties. Reciprocity in those circumstances is thus a device by which the continuity of a specific trading relation is promoted with risk attenuation effects." *Id.* at 194-195.

did not (until recently)[110] have access to other buyers because of pervasive transmission barriers.[111] These characteristics made QF contracting a difficult process *ex ante* and increased the risk of contract maladaption *ex post*.

Dedicated assets, such as a QF plant, have a very high level of asset specificity, which results in bilateral dependence.[112] Bilateral dependence presents significant contractual hazards. The parties to a QF/utility power purchase contract were able to achieve hazard equilibration, of sorts, by expanding the contractual relations through symmetrical exposure.[113] The power purchase contract between the utility and the QF project developer (which was typically for a term of twenty to thirty years)[114] provided the primary credit support for the project financing and made it possible for the QF plant's developers to finance, build, and operate the plant.[115]

Project Finance

Because dedicated generating plants have a high level of asset specificity, QF plants would not have been financeable absent a long-term power purchase contract

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[110] EPAct gave FERC the authority to order utilities to provide transmission wheeling service to any wholesale electric generator. PURPA had entitled QFs to interconnection, but not wheeling service. Watkiss and Smith, *supra* note 77, at 457-459.

[111] EPAct eliminated the requirement that transmission access not interfere with existing competitive relationships. Richard J. Gilbert, Edward Kahn, and Matthew White, "The Efficiency of Market Coordination: Evidence from Wholesale Electric Power Pools," *NETWORKS, INFRASTRUCTURE, AND THE NEW TASK FOR REGULATION*, edited by Werner Sichel and Donald L. Alexander (Ann Arbor, MI: Univ. of Michigan, 1996), at 39.

[112] Williamson, *supra* note 12, at 377.

[113] *Id.* at 132.

[114] G. Alan Comnes, Edward P. Kahn and Tim N. Belden, "The Performance of the U.S. Market for Independent Electricity Generation," 17 *THE ENERGY JOURNAL*, 1996, at 26-27.

[115] Ferrey, *supra* note 106, at 3-55 and 3-60.22.

with the host utility.[116] With a strong fixed-price power purchase contract, however, QF plants were eminently financeable – indeed, project developers could use project finance techniques, which use a high proportion of debt capital, to finance their projects.[117] The utility's creditworthiness, then, became a source of credit support for the QF.[118]

Project finance provides a contractual framework for financing highly specific assets on a "stand alone," nonrecourse basis.[119] Thus, a lender looks initially to the cash flows, earnings, and assets (including the power purchase contract) of the QF unit.[120] Project financiers carefully analyze risks *ex ante* during the negotiation of the contract.[121] Project finance lenders differentiate risks, develop mechanisms to minimize those risks (e.g., overcollateralization), and allocate risks to the party that can bear and

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[116] Because PURPA did not obligate electric utilities to wheel power on their transmission systems for QFs, a long-term contract between the QF and the host utility was used to manage the risks associated with dedicated assets. These contracts had the effect of shifting most of the power supply and demand risks to the utility, which was better positioned to manage those risks. Supply risk refers to the risk that generating supply would increase leading to excess capacity. Demand risk is the risk that demand for electricity would decrease, resulting in excess capacity. The utility managed the supply/demand risk of its QF contracts as part of its management of its generation portfolio. *Id.*

[117] Nevitt defines a project financing as "a financing of a particular economic unit in which a lender is satisfied to look initially to the cash flows and earnings of that economic unit as the source of funds from which a loan will be repaid and to the assets of the economic unit as collateral for the loan." Peter K. Nevitt, *PROJECT FINANCING*, fourth ed. (London: Euromoney Pub., 1983), at 3.

[118] For differing views see Lewis J. Perl and Mark D. Luftig, "Financial Implications to Utilities of Third Party Power Purchases," *ELECTRICITY JOURNAL*, November 1990, at 24-31. Roger F. Naill and Barry J. Sharp, "Risky Business? The Case for Independents," *ELECTRICITY JOURNAL*, April 1991, at 54-63.

[119] Nevitt notes that "the ultimate goal in project financing is to arrange a borrowing for a project which will benefit the sponsor and at the same time be completely nonrecourse to the sponsor, in no way affecting its credit standing or balance sheet." Nevitt, *supra* note 117, at 3.

[120] "In a project financing, the project, its assets, its contracts, its inherent economics and its cash flows are segregated from its promoters or sponsors in order to permit a credit appraisal and loan to the project, independent of its credit sponsors." *Id.* at 1.

[121] In addition to power supply and demand risk, relevant risks include construction risk, operating risk, and regulatory risk. Ferrey, *supra* note 106, at 3-60.22. These risks can be readily subcategorized and contractual arrangements can be developed to deal with the various subcategories of risk.

manage that risk most efficiently.[122] Not surprisingly, the *ex ante* costs of a project finance transaction, which include the costs of drafting, negotiating and safeguarding an agreement, are substantial.

Transaction cost economics suggests that assets with a low to moderate level of asset specificity are easy to finance by debt and that debt-financing is appropriate for these types of assets.[123] Because more effective governance mechanisms are available, it is best to finance assets that have a high level of asset specificity with equity.[124] Because project developers preferred to use a "high-leverage"[125] project finance contracting approach instead of equity ownership,[126] credit support for the project came primarily from the fixed-price power purchase contract.[127]

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[122] The project lenders scrutinize all aspects of the project, including technology, fuel supply, performance history of constructors, need for capacity, financial integrity of the utility purchaser, economic forecasts of inflation, fuel prices, and so on in determining whether to finance a project. Mechanisms, such as overcollateralization, are developed to provide a financial cushion if a project has cash flow problems. Risks are assigned, by contract, to the party that is best able to bear that risk.

[123] Williamson, *supra* note 12, at 193.

[124] Equity investors typically participate on a firm's board of directors, while debt investors typically only do this in workout or highly leveraged situations. Williamson notes that while governance through equity is "is much more intrusive and is akin to administration," debt has "market-like" characteristics. *Id.* at 185, 193-194.

[125] During the mid-1980s, the debt/total capital ratio at the time of commercial operation was often 80 percent to 90 percent debt.

[126] Williamson notes that "debt is a governance structure that works out of rules and is well-suited to projects where the assets are highly redeployable. Equity is a governance structure that allows discretion and is used for projects where assets are less redeployable." Williamson, *supra* note 12, at 185-186.

[127] A highly leveraged project financing structure can be viewed as moving a transaction from the "market-like" governance of "debt" to a "hybrid" contractual governance structure of "highly-leveraged debt." The difference here is one of degree: a highly-leveraged capital structure requires a markedly higher degree of contact and information exchange between the project developers and the project financiers. Because transactions in the hybrid range are difficult to stabilize, hybrid transactions are fraught with maladaption hazards. The QF's power purchase contract with the utility helped to stabilize the hybrid transaction. *Id.* at 90 and 104-105.

Long-Term Contracts

A "web" of separate but interrelated, serially- or concurrently-struck, long-term contracts support the relationship between a vertically-integrated electric utility and a QF.[128] Contracts include: (1) a power purchase contract between the utility and the QF; and (2) contracts between the QF and investment bankers, equity and debt investors, the plant designer, equippers and constructors, fuel suppliers, and so on.[129] There is also an important, but implicit, "contract" between the utility and its regulators.[130]

The contracts that support a project finance transaction are both complex and incomplete. QF contracts are complex because the negotiating parties sought to anticipate future circumstances *ex ante* and sought to develop contractual safeguards that would maintain the integrity of the contract over the economic life of the plant.[131] QF/utility power purchase contracts, for example, typically addressed pricing, monitoring of quality and reliability, a governance structure to resolve disputes, and mechanisms to reward (punish) good (bad) performance. These contracts were incomplete, however, because the parties to a contract could not anticipate all possible future contingencies and account for them in the contracts.

QF/utility power purchase contracts were relatively effective in developing contractual incentives to achieve safe, adequate and reliable QF operating

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[128] Instead of internal contracts within a firm, QF contracting requires a complex set of contracts between independent economic actors, which results in higher contracting costs.

[129] Ferrey, *supra* note 106, at 3-60.23.

[130] See generally Victor Goldberg, "Regulation and Administered Contracts," 7 *BELL JOURNAL OF ECONOMICS* & MGT. SCIENCE (Autumn 1976), at 426-452; Oliver E. Williamson, "Franchise Bidding for Natural Monopolies — In General and with Respect to CATV," 7 *BELL JOURNAL OF ECONOMICS* & MGT. SCIENCE (Spring 1976), at 73-104; reprinted in a somewhat different form in Williamson, *supra* note 10, at 326-364.

[131] As a result of bounded rationality, uncertainty and complexity, the parties to QF transactions may have written contracts that were as detailed as feasible but that necessarily left many of the issues of contract execution unspecified. Instead, the QF/utility power purchase contract could establish a process for governing the ongoing relationship to deal with the issues that arise during contract execution.

performance.[132] Second-generation QF/utility power purchase contracts, for example, were of the "take-and-pay" type where the utility pays a capacity payment only if the QF plant is available to provide capacity and energy to the utility.[133] Thereafter, project developers, lenders and equity investors began to finance only proven fuels and technologies in order to limit the risk that the utility would not have to pay a capacity payment.[134] As a result, the preferred fuel became natural gas and the preferred technology became combined-cycle combustion turbines.[135] While there have been disputes about some issues,[136] such as dispatchability,[137] there have been few instances of inadequate availability or reliability with respect to second-generation QF operations.[138] Serious disputes, however, did arise with respect to the pricing of QF/utility power purchase contracts.

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[132] Contractual techniques to incent reliability include audits (e.g., testing a QF plant's ability to achieve its capacity rating), incentives/penalties for meeting performance criteria, and information disclosure requirements.

[133] First-generation contracts were of the "take-or-pay" form where the utility bears the risk that the plant would be unavailable to generate capacity and energy. This generation of plants included QFs that used alternative fuels (e.g., culm in Pennsylvania, nut shells/hulls in Hawaii) and "unproven" technology (e.g., at that time circulating fluidized-bed combustion plants were considered unproven in the U.S.). By the mid-1980s, take-and-pay contracting (with availability provisions) had emerged for QF contracting.

[134] In these contracts, capacity payments are only paid if the plant is available to produce electricity. As a result, the QF operator has a strong incentive to have a high availability rating.

[135] These are fuel types and technologies that have high availability factors.

[136] Marron, et al. argue that renegotiating nondispatchable power purchase contracts to make them dispatchable can yield substantial gains that "can be shared by the utility and the nonutility generator." Stephen T. Marron, Eugene N. Tyurin, John H. Wile, and George Trader, "Everyone Wins: Renegotiating Purchase Power Agreements," *ELECTRICITY JOURNAL*, April 1997, at 76-83.

[137] Dispatchability refers to efforts to change the way in which the QF's energy is placed in the economic dispatch order. Many QF plants are "must-run" plants that are dispatched even if lower incremental cost capacity is available elsewhere. Reduced dispatch would reduce the cash flows of a QF project. Ferrey, *supra* note 106, at 3-60.57. Comnes et. al define dispatchability as the ability of the buyer to increase or decrease purchases unilaterally. Comnes et. al *supra* note 114, at 26.

[138] For a discussion of QF reliability issues see Ferrey, *supra* note 106, at 3-60.51.

Avoided Cost Pricing

QF/utility power purchase contracts included three noteworthy features. First, the utility received capacity and energy in exchange for payment of cash to the QF. Second, the long-term power purchase contract with the utility provided the primary credit support for the QF project. Third, the parties to a contract identified the pricing of power *ex ante* and set the pricing at a level that was equal to or below the utility's then-current avoided cost.[139]

Significant execution issues emerged with respect to QF/utility power purchase contracts. The most notable execution problems emerged because of the use of fixed (or fixed by formula) avoided cost pricing. QF/utility power purchase contracts generally used point-in-time estimates of the cost avoided by the regulated utility[140] and did not provide the flexibility to reset avoided costs, based on changing economic conditions, over the life of the contract.[141] To qualify for project financing, the "avoided cost" pricing was typically fixed for the life of the contract.

Many QF contracts became maladapted relative to economic conditions and the relations between the parties became attenuated. There are three reasons for this. First, avoided costs decreased rapidly in the mid- to late-1980s.[142] Second, avoided

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[139] Avoided cost is the cost that the utility purchaser would bear to generate or purchase the same amount of electricity, a cost that is avoided by purchasing from a QF project. Watkiss and Smith, *supra* note 77, at 453.

[140] Ferrey notes that "because QF developers do not face the same regulatory maze, environmental requirements, overhead burden, and financial structure as do regulated utility monopolies, they generally can generate power at or below the equivalent cost to electric utilities." Ferrey, *supra* note 106, at 9-2.

[141] "In an era of falling oil and other fossil fuel prices, these contractually guaranteed prices have overestimated actually experienced avoided costs. As oil prices plummeted, so did experienced avoided costs." *Id.* at 9-2 to 9-3.

[142] Generally, avoided cost trends followed the generally declining trend of inflation, interest rates, and fuel costs during that period." *Id.*

costs are inherently difficult to measure.[143] Finally, the parties to a QF contract usually sign the contract three or more years before the plant is to achieve commercial operation.[144] Contractual mechanisms to share the risk of changes in market conditions were underdeveloped or missing.

A spot market can play a very important role when price maladaption emerges in a long-term contract. Goldberg notes that if good substitutes are available, the cost-minimizing adjustment is for the victim of the breach to cover in the market.[145] Even where a spot electricity market is unavailable, the parties to a contract can use replacement power costs to estimate the cost if a QF plant fails to perform under a contract. So long as a QF performs under its contract, however, the QF is entitled to the revenues set by its fixed price contract and changes in the avoided cost of generation are irrelevant.

As a result, these contracts often resulted in high *ex post* transaction costs, which includes maladaption costs (resulting from the misalignment of the contract's avoided cost with the current avoided cost of generation) and haggling costs (as the parties to a contract sought to correct contract maladaption). Instead of merely renegotiating a contract, many QF/utility power purchase contracts have been "bought out," often at a considerable cost.[146]

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[143] Paul L. Joskow, "The Evolution of an Independent Power Sector and Competitive Procurement of New Generating Capacity," 13 *RESEARCH IN LAW AND ECONOMICS*, 1991, at 71-72.

[144] Joskow, *supra* note 70, at 173.

[145] Victor P. Goldberg, *READINGS IN THE ECONOMICS OF CONTRACT LAW* (Cambridge, England: Cambridge Univ. Press, 1989), at 51-52.

[146] For example, Niagara Mohawk Power Corp. raised about $3.2 billion in junk bond debt to buy out contracts with many of its independent power suppliers and enter into cheaper arrangements. Charlene Lee and Tom Sullivan, "Details Emerge for Big Niagara Junk-Bond Deal," *THE WALL STREET JOURNAL*, May 29, 1998, at C18.

Least-Cost Planning, Competitive Bidding, and Small-Numbers Bargaining

Because of the economic maladaption that occurred with QF/utility power purchase contracts in the mid-1980s, regulators began to implement two innovations, which focused on improving the *ex ante* review of a utility's QF contracting activities and increasing the credibility of the avoided cost estimate. First, regulators began to use least-cost, integrated resource planning to increase regulatory involvement in the utility's decision to contract with a QF.[147] This review typically focused on reviewing the need for power based on supply and demand conditions and estimation of the appropriate avoided cost,[148] although some states went beyond this to include review and approval of the QF/utility power purchase contract.[149] These least-cost planning efforts were effective in reducing the information asymmetry between the utility and regulators; previously, the utility had extensive knowledge of its power planning and contracting efforts but regulators had access to significantly less information. While least-cost planning required time-consuming regulatory proceedings and did not necessarily reduce the risk of *ex post* contract maladaption, the process may have provided some benefits by more closely scrutinizing whether there was a need for new generating capacity in a region.

Second, utilities began to use "competitive bidding" to determine the appropriate avoided cost.[150] Previously, avoided cost had been set administratively by state

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[147] Least-cost planning is a planning process that can be used by utilities and regulators in forecasting needs, assessing uncertainties, and hedging risks. Integrated resource planning emphasizes considering both demand- and supply-side resources in a symmetrical way. National Association of Regulatory Utility Commissioners, *LEAST-COST PLANNING HANDBOOK FOR PUBLIC UTILITY COMMISSIONERS, VOLUMES 1 AND 2* (Washington, DC: National Association of Regulatory Utility Commissioners, October 1988).

[148] Ferrey, *supra* note 106, at 3-37 to 3-38.

[149] *Id.* at 4-48.3.

[150] Ferrey notes that "a bidding or auction process injects dynamic market forces in the price determination." *Id.* at 9-3.

regulators.[151] Because avoided cost is inherently volatile, and the parties to a contract would fix the avoided cost by contract for an extended period, it became increasingly important to have a credible estimate of avoided cost at the time that the parties were negotiating the contract.[152] By setting up a competitive bid for new generating capacity, and using the lowest bid as the avoided cost, utilities (and their regulators) were able to use a "market-based" avoided cost estimate rather than an administratively-determined estimate.[153] While the criteria for selecting a winning bid could be somewhat unclear,[154] competitive bidding was effective in providing regulators with market-based information on avoided cost and made the criteria under which bidders were selected more transparent and understandable.[155] While beneficial for setting the avoided cost, competitive bidding may have had the effect of decreasing the utility's negotiating flexibility during the final stages of the contracting process.[156]

Both of these innovations increased regulatory involvement in the QF/utility power purchase contracting process *ex ante*. These innovations were beneficial in increasing the credibility of the *ex ante* contracting process and reducing information asymmetries between the utility and its regulators. Because of the impossibility of "complete" *ex ante* contracting,[157] however, these innovations were not able to prevent the contract maladaption that can arise during contract execution.

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[151] Ferrey notes that "the conventional form of administrative pricing for Qualifying Facility (QF) energy is oblivious to certain market forces." *Id.* at 9-2.

[152] *Id.* at 9-2 to 9-3.

[153] Ferrey notes that "as of 1990, twenty-seven states mandated or allowed utility bidding schemes." *Id.* at 9-3. See also National Independent Energy Producers, "Bidding for Power: The Emergence of Competitive Bidding in Electric Generation," March 1990; Edison Electric Institute, "Competitive Bidding in the Investor-Owned Electric Utility Industry," Volume 3, 1992 Update.

[154] Williamson identified three concerns regarding franchise bidding models: (1) the criteria for selecting a winning bid is likely to be artificial or obscure; (2) execution problems (price/cost, nonprice factors, and political issues) are likely to emerge over the life of the contract; and (3) bidding parity at the contract renewal interval is unlikely. Williamson, *supra* note 10, at 334-338.

[155] Ferrey, *supra* note 106, at 9-3.

[156] Joskow, *supra* note 143, at 80-83.

[157] Williamson notes that a "complete" contingent claims contract "entails comprehensive contracting whereby all relevant future contingencies pertaining to the supply of a good or service are described and discounted with respect to both likelihood and futurity." Williamson, *supra* note 10, at 69. Williamson notes that a complete contingent claims contract is "impossibly complex to write, negotiate and enforce." *Id.* at 333.

Because of the severe economic maladaption that arose with respect to many QF/utility power purchase contracts, the parties will not renew many of these contracts. As a result, the parties were able to avoid many of the difficult and troublesome issues that could otherwise arise at the contract renewal interval. For example, while a utility could successfully select a QF contract at the initial contracting stage, problems would be likely to emerge if the competitiveness of the bidding process at the contract renewal interval is not robust.[158] This is a familiar issue, for example, when cable television franchises are up for renewal.[159] Williamson notes that:

> [I]f original winners of the bidding competition realize nontrivial advantages in informational and informal organizational respects during contract execution, bidding parity at the contract renewal interval can no longer be presumed. Rather, what was once a large numbers bidding situation, at the time the original franchise was awarded *is converted into what is tantamount to a small numbers bargaining situation* when the franchise comes up for renewal. A fundamental transformation thus obtains.[160]

As a result, a generation company (which could have significant market power in a region) would sell electricity to a monopsonist distribution utility. Regulation is not likely to be effective in addressing this shortcoming of the QF contracting model.[161]

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[158] Williamson, *supra* note 10, at 338.

[159] See Mark A. Zupan, "Cable Franchise Renewals: Do Incumbent Firms Behave Opportunistically?," 20 *RAND JOURNAL OF ECONOMICS*, 1989, at 473-482; Robin A. Prager, "Franchise Bidding for Natural Monopoly: The Case of Cable Television in Massachusetts," 1 *JOURNAL OF REGULATORY ECONOMICS*, June 1989, at 115-132; Robin A. Prager, "Firm Behavior in Franchise Monopoly Markets," 21 *RAND JOURNAL OF ECONOMICS*, Summer 1990, at 211-225.

[160] Williamson, *supra* note 10, at 345.

[161] *Id.* at 338.

Comparison with Vertical Integration Model

While the QF/utility power purchase contracting model functioned adequately in terms of reliability and operational performance, this model did not work well from an economic standpoint. Separating ownership and substituting a long-term contract reduces the incentive to cooperate and coordinate and increases the risk of contract maladaption. That was the case here.

With a vertically-integrated firm, the generation, transmission, and distribution functions have strong incentives to cooperate and coordinate and can develop effective internal administrative controls. While higher bureaucratic costs and weakened efficiency incentives may counterbalance these benefits, it does serve to highlight the limitations of the QF/utility power purchase contract model.

QF/utility power purchase contracts were not readily adaptable to disturbances, such as changes in the marginal cost of generation. Because of the autonomy between the contracting parties, and the absence of incentives for reciprocity, it was difficult to modify the contract's pricing to reflect a declining trend in avoided costs. Incentive intensity contributed to the difficulty of adapting the contract to *ex post* changes in avoided costs — the QF had strong incentives to maintain its attractive pricing under the contract while the utility had strong incentives to seek lower pricing.[162] As a result, it was difficult to rectify the economic maladaption of these contracts.

QF/utility power purchase contracts had limited contractual mechanisms to share the risk of significant changes in the contract's economics and relatively underdeveloped administrative controls (e.g., information disclosure, audits, and so on).

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[162] Langlois argues that "in today's economics of organization, transacting is fraught with hazards, and the problem of organization is one of creating governance structures to constrain unproductive rent-seeking behavior." Richard N. Langlois, "Transaction Costs, Production Costs, and the Passage of Time," in Medema, ed., *supra* note 8, at 2.

Within a firm, cost-plus contracting offers a workable mechanism to adapt an internal contract to current economic conditions. It is far more difficult to modify maladapted pricing, incentive, and governance structures in a contract between autonomous parties.[163] QF/utility power purchase contracting failed because the parties did not provide adequate contractual mechanisms to adapt the contract if economic maladaption occurred.[164] As a result of the severe economic maladaption that many of these contracts experienced, renewal of many of these QF/utility power purchase contracts was not seriously considered.

QF Contracting: Precursor to Wholesale Competition

The perception that utilities would not renew many QF contracts because of economic maladaption helped to create a constituency for increased competition in generation — it is not a coincidence that the states that have substantial QF generation resources are leading the way to retail competition.[165] This constituency may be

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[163] One option would be to introduce price flexibility by formula, although Williamson notes that this is a "relatively crude correction" and might not be satisfactory where there is rapid technical change or where local conditions deviate significantly from the index population." Williamson, *supra* note 10, at 336.

[164] For a review of the literature on price adjustment in long-term contracts see Howard A. Shelanski and Peter G. Klein, "Empirical Research in Transaction Cost Economics: A Review and Assessment," 11 *JOURNAL OF LAW, ECONOMICS & ORGANIZATION*, No. 2, at 354; Keith J. Crocker and Scott E. Masten, "Regulation and Administered Contracts Revisited: Lessons from Transaction-Cost Economics for Public Utility Regulation," *JOURNAL OF REGULATORY ECONOMICS*, 9:5-39 (1996), at 21-23.

[165] States with a large amount of QF capacity include California, Maine, Massachusetts, Michigan, New Jersey, New York, Oklahoma, Pennsylvania, Texas, and Virginia. See Energy Information Administration, *FINANCIAL IMPACTS OF NONUTILITY POWER PURCHASES ON INVESTOR-OWNED ELECTRIC UTILITIES* (Washington, DC: EIA, June 1994), at 57. Except for Texas, each of these states has begun to implement retail competition (Texas regulators are developing "transition plans," to prepare for possible retail competition in Texas). For a summary of electric restructuring activities in the states, see Jenks, *supra* note 81.

seeking, through regulatory and legislative channels, to reduce the asset specificity of these dedicated generating plants by gaining access to broader electricity markets.[166] By reducing asset specificity and bilateral dependence, so that independent power plants would no longer have to be dedicated to a utility customer, wholesale or retail competition could create an environment where some independent power plants are financeable without the credit support provided by a long-term contract with a utility.

WHOLESALE COMPETITION MAY BE INSUFFICIENT EVEN IF EFFECTIVE OPEN-ACCESS, AN ISO, AND POWER EXCHANGES EMERGE

EPAct provides an exemption to the definition of an electric utility, under PUHCA, for a broader class of nonutility independent power producers and authorizes the FERC to provide transmission access to competing generators of power.[167] While EPAct prohibits the FERC from mandating retail wheeling,[168] the rapid development of wholesale competition under EPAct has made retail competition feasible.

Reduce Asset Specificity and Bilateral Dependence

Many of the regulatory issues that are currently being considered on the state and federal levels have the purpose and effect of reducing the asset specificity and

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[166] Joskow notes that "much of the pressure for reform in the United States reflects rent-seeking behavior by various interest groups pursuing private agendas that may not be consistent with efficiency goals." Joskow, *supra* note 5, at 120. For a discussion of the concept of rent-seeking, see Gordon Tullock, "The Welfare Cost of Tariffs, Monopolies and Theft," *WESTERN ECONOMIC JOURNAL* 5, No. 3, at 224-232.

[167] Watkiss and Smith, *supra* note 77.

[168] EPAct § 722(3), which added § 212(h) to the Federal Power Act (codified at 16 U.S.C. 824(h). See Watkiss and Smith, *supra* note 77, at 460. See also Sidney Mannheim Jubien, "The Regulatory Divide: Federal and State Jurisdiction in a Restructured Electricity Industry," *ELECTRICITY JOURNAL*, November 1996, at 71.

bilateral dependence of the generation sector.[169] These initiatives include FERC's efforts[170] to: (1) assure that an open-access, nondiscriminatory transmission grid is available (i.e., FERC Order No. 888);[171] (2) develop Open Access Same-time Information Systems (OASIS)[172] and prescribe standards of conduct and communication protocols for transactions conducted through OASIS (i.e., FERC Order No. 889);[173] (3) implement the independent system operator (ISO) model;[174] and (4) establish power exchanges.[175] In addition, state and federal policymakers and regulators are engaged in a variety of discussions and activities that relate to reducing the extent of vertical integration in the electric services industry,[176] which could increase market opportunities for independent generators.

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[169] Williamson, *supra* note 10, at 194-195.

[170] For a summary of FERC activities see Kenneth Rose, Robert E. Burns, et al., *SUMMARY OF KEY STATE ISSUES OF FERC ORDERS 888 AND 889* (Columbus, OH: The National Regulatory Research Institute, January 1997), at 1.

[171] FERC has issued three Orders, which are referred to as Orders No. 888, 888-A, and 888-B. FERC Order No. 888, Promoting Wholesale Competition Through Open Access Non-discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities, Docket Nos. RM95-8-000 and RM94-7-001, April 24, 1996. 61 Fed. Reg. 21,540 (1996). Order No. 888-A was issued on March 4, 1997. Order No. 888-B was issued on November 25, 1997.

[172] According to NRRI, "OASIS is best visualized as an electronic mall or marketplace where a seller of transmission capacity can display the availability and the prices of its products, where a buyer can request chosen products, and finally, where both parties can close the transaction at agreed prices, terms and conditions." Rose et al., *supra* note 170, at 52.

[173] Federal Energy Regulatory Commission, Capacity Reservation Open Access Transmission Tariffs, at 1 (Order 889) (Notice of Proposed Rulemaking, RM96-11-000), April 24, 1996.

[174] See Fox-Penner, *supra* note 105, at 184-223. See also William H. Dunn, Jr. and Mark A. Rossi, "Practical Aspects of Electricity Restructuring," *ELECTRICITY JOURNAL*, October 1996, at 44-57.

[175] See Fox-Penner, *supra* note 105, at 208.

[176] This relates to two major issues. The first issue is whether vertically-integrated utilities should be required to divest generation. The second issue is whether an affiliate of a T&D utility should be able to compete to provide generation marketing services to the T&D's customers. See Olson, *supra* note 7, at 51-54. For a summary of state activities see Jenks, *supra* note 81.

FERC's Order No. 888, for example, was an important step in ensuring that nonutility generating capacity has access to markets well beyond the boundaries of its host utility.[177] By providing nondiscriminatory open access to the transmission grid, Order No. 888 increases the redeployability of formerly dedicated nonutility generation assets.

While these regulatory efforts will help to reduce asset specificity and bilateral dependence, generating plant construction, ownership, and operation will continue to present significant financial, operating and contractual hazards. Generating units will continue to have high levels of physical asset specificity, site specificity, and human asset specificity.[178] As a result, while wholesale competition will be increasingly feasible and effective, there will continue to be significant transaction costs associated with competing in the power generation market.

Wholesale Competition Model

In the wholesale competition model, distribution utilities would contract with generators for the energy needed to serve the distribution utility's customers. For convenience, this discussion assumes that distribution utilities do not own generation and do not provide generation aggregation/marketing services unless noted.[179]

In the wholesale competition model that has begun to emerge in the U.S. over the past several years, an ISO and, possibly, a power exchange, would intermediate

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[177] For a summary of FERC Order No. 888 see Fox-Penner, *supra* note 105, at 170-171.

[178] Asset specificity refers to a situation where a firm that has made a specialized investment cannot redeploy the asset to alternative uses except at a loss of productive value. Asset specificity includes human, physical, site and dedicated asset specificity, to which branded capital and temporal specificity have been added. Williamson, *supra* note 12, at 105, 106, 377.

[179] This is a major simplification. Because wholesale competition can continue to develop without the need for major state or federal legislation, wholesale competition could evolve incrementally from the *status quo* vertically-integrated industry structure in the U.S. In this case, the industry could retain a high level of vertical integration for a considerable period of time.

power transactions.[180] The ISO would operate the transmission system over which the physical transmission of electricity would move.[181] A power exchange (whether mandatory or voluntary)[182] would provide a clearinghouse for spot market transactions. The design of the ISO and power exchange will determine, in large part, the robustness, price transparency, and completeness of spot and forward markets.[183] The precise design of the wholesale competition model in a region will be the subject of fierce debate because the design will have a significant impact on transaction costs and the competitiveness of various industry players.[184]

The Distribution Utility Would Act as a Purchasing Agent for its Customers

In the wholesale competition model, the distribution utility would act as purchasing agent for customers.[185] For example, a generator could developing a portfolio of contracts with distribution companies, which could provide credit support for the construction of new generating capacity. Generators would seek long-term contracts to provide credit support because a spot market would not fully "price out" the high level of asset specificity in the electric generation business in all cases and forward markets are likely to be incomplete.[186] Thus, while energy from some "merchant"

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[180] Fox-Penner notes that "California opted for a model that combines an ISO with a poolco for the formerly regulated IOUs and a bilateral marketplace for independent generators and public power." Fox-Penner, *supra* note 105, at 208.

[181] *Id.* at 185.

[182] Olson, *supra* note 7, at 50.

[183] For an overview of the issues, see Sally Hunt and Graham Shuttleworth, *COMPETITION AND CHOICE IN ELECTRICITY* (Chichester, England: John Wiley & Sons, 1996), at 77-87.

[184] Olson, *supra* note 7, at 49-50.

[185] Joskow, *supra* note 5, at 127-129. See also Hunt and Shuttleworth, *supra* note 183, at 53-63.

[186] Forward markets could be used as a substitute for long-term contracts. To the extent that the forward market is incomplete, however, project developers would likely seek long-term contracts with distribution utilities to support the project.

generating plants might be available on a spot market basis, this model assumes that long-term contracts between distribution utilities and a generator will be an important source of credit support for many generators.[187] The wholesale spot market, forward and futures markets, and long-term contracts will provide the credit support for the generation plant.[188] These merchant contracts will not be as prone to contract maladaption as were the 1980s-era QF contracts because: (1) a long-term contract with one utility will not typically support these merchant plants; (2) the parties will generally not fix the price for a long-term (but rather will index prices against the spot market price); and (3) the parties will provide for termination of the contract on relatively short notice.

In the wholesale competition model, financial instruments would emerge, which would allow customers of a distribution utility to manage their electricity price risk.[189] The wholesale competition model assumes that the distribution utility's customers would have no choice but to accept the distribution utility's role as agent — although this assumption may not be sustainable in the long-term.

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[187] Crocker and Masten point out that the development of well-functioning spot markets in the natural gas industry has altered the economics of the long-term contracts that are still used. The contracts generally index price to spot price and typically allow either party to terminate the contract on short notice. Crocker and Masten, *supra* note 164, at 32.

[188] In contrast to QF contracts, in the wholesale market model a single contract with a distribution utility is not likely to provide the primary credit support for a "merchant" generation plant. In the wholesale competition model, project finance lenders would be likely to require a higher equity ratio (say 20 percent to 30 percent of total capitalization), medium-term (five to ten years or more) contracts with several distribution utilities, and are likely to closely scrutinize forecasts of supply and demand for electricity in a region before providing credit to a merchant plant. Depending on how the wholesale competition market develops, contracts with distribution utilities could be less important. In the natural gas industry, a robust spot market has resulted in less reliance on contracts.

[189] Hunt and Shuttleworth, *supra* note 183, at 62-63.

Regulation and the Wholesale Competition Model

Regulation is a form of hybrid or relational contracting that arises to deal with agent-principal, asymmetric information, and governance issues.[190] Agent-principal issues arise when one party to a transaction acts as agent for another.[191] Asymmetric information issues are often present in these cases because the agent in a transaction typically has access to more information than does the principal, and might use that information opportunistically.[192]

Regulation is a "highly incomplete form of long-term contracting"[193] in which the terms of the contract adapt to changing circumstances to meet the needs of customers while also ensuring that the utility has the opportunity to earn a fair rate of return.[194] Regulation, a type of relational or regulatory contract (or "compact"), is the concatenation of the U.S. Constitution, franchise agreements, federal and state statutes, Commission Rules and Orders, policy statements, and so on. An appropriate

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[190] The discussion in this section is based in part on Olson, *supra* note 7, at 47-48.

[191] Stiglitz notes that "the principal-agent literature is concerned with how one individual, the principal (say an employer), can design a compensation system (a contract) which motivates another individual, his agent (say the employee), to act in the principal's interests." Joseph E. Stiglitz, "Principal and Agent," *THE NEW PALGRAVE: ALLOCATION, INFORMATION, AND MARKETS* (New York: Norton, 1989), at 241.

[192] Stiglitz notes that "a principal-agent problem arises when there is imperfect information, either concerning what action the agent has undertaken or what he should undertake. In many situations, the actions of an individual are not easily observable." *Id.*

[193] Williamson notes that "at the risk of oversimplification, regulation may be described contractually as a highly incomplete form of long-term contracting in which (1) the regulatee is assured an overall fair rate of return, in exchange for which (2) adaptations to changing circumstances are successively introduced without the costly haggling that attends such changes when parties to the contract enjoy greater autonomy. Whether net gains are thereby realized turns on the extent to which the disincentive effects of the former (which may be checked in some degree by performance audits and by mobilizing competition in the capital market forces) are more than offset by the gains from the latter. This is apt to vary with the degree to which the industry is subject to uncertainties of market and technological kinds." Williamson, *supra* note 10, at 347.

[194] J. Gregory Sidak and Daniel F. Spulber, *DEREGULATORY TAKINGS AND THE REGULATORY CONTRACT: THE COMPETITIVE TRANSFORMATION OF NETWORK INDUSTRIES IN THE UNITED STATES* (Cambridge, England: Cambridge Univ. Press, 1997), at 104-105.

regulatory contract is adaptable and flexible but also gives the utility appropriate efficiency and investment incentives.[195]

In the wholesale competition model, regulators would seek to ensure that the distribution utility acts prudently and efficiently when contracting to provide generation services to its customers.[196] As a result, this model would have high regulatory transaction costs. These costs would include the search, information, monitoring, maladaption, haggling and other costs associated with the regulation of the distribution utility's activities as generation purchasing agent for customers.[197] These costs would include weakened efficiency incentives, the bureaucratic costs of regulation, and increased financing costs due to the risk of "regulatory holdup" or "recontracting."[198]

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[195] Because the regulatory contract is a highly incomplete implicit contract, the regulatory compact provides considerable discretion to policymakers and regulators. To make regulation credible, however, policymakers and regulators will be evaluated with respect to their willingness and ability to effect credible commitments. Thus, for example, the financial community will evaluate the risks of regulatory holdup and opportunism when investing in a utility's securities. Sidak and Spulber extend the basic economic theory of the regulatory contract by, among other things, arguing that: (1) introducing electric competition can be interpreted as breaching the regulatory contract; (2) the utility's remedy for the regulator's breach of the regulatory contract is the "standard remedy for breach of any contract: damages for lost expectations;" (3) the appropriate measure of damages for a deregulatory taking — the abnegation of the regulatory contract by way of a taking for public use without just compensation — is the "public utility's expectation of its forgone net benefit if the state were to abide by the regulatory contract;" and (4) just compensation for a deregulatory taking equals "the difference between the firm's expected net revenues under regulation and the firm's expected net revenues under competition." Sidak and Spulber's analysis is a provocative extension of the notion of a regulatory contract and as such is very relevant to the electric restructuring debate. *Id.* at 10-13.

[196] Bohi and Palmer note that "in the wholesale model, the pressure of regulation replaces the pressure of the market as the mechanism for encouraging efficiency on the part of distribution companies. The implications for efficiency will therefore vary with the effectiveness of regulation." Douglas R. Bohi and Karen L. Palmer, "The Efficiency of Wholesale vs. Retail Competition in Electricity," *ELECTRICITY JOURNAL*, October 1996, at 16.

[197] Olson, *supra* note 7, at 51.

[198] Armstrong, Cowan and Vickers note that "the risk is that the regulator, unable to commit his actions fully in advance, may alter price control or environmental policy ex post after the regulated firm has sunk costs in industry-specific investments. In short, the regulator might hold up producers. Unless this risk is overcome by credible commitments ex ante, efficient investment may be deterred." Armstrong, Cowan and Vickers, *supra* note 94, at 139.

The actual performance of spot and forward markets are dependent on the design of the market institutions, the size and scope of the market in a region, and numerous other factors. While retail competition can succeed, policymakers must design the market in a way that minimizes transaction costs.

Design Issues

Retail competition raises important issues about the structure and design of the institutional infrastructure of the electric market. These issues include asset specificity, asymmetric and imperfect information, reputation effects, search, information, contracting and monitoring costs, the structure and design of bilateral contracts, and *ex post* contract maladaption issues that arise because contracts are incomplete. Transaction cost economics reasoning can play an important role in determining the cost-minimizing industry structure and organizational arrangements in the electric utility industry.

Retail competition constitutes a major restructuring of the electric utility industry and would entail numerous changes in many aspects of the design and operation of the electricity business. To implement retail competition, it will be important to ensure that the necessary institutions, transmission pricing, billing systems, and so on are in place before retail competition begins. Transaction cost economics reasoning will play a role in evaluating many of these issues: the following sections survey several of the major categories of electric restructuring issues.

Horizontal Market Power Issues

Horizontal market power issues concern whether competition in the generation market in a region will be effective — that is, will some firm or firms in the market have

In the forward market, transactions would not be "faceless" and the reputation of the counterparty would be important.[256] A good reputation would be a source of competitive advantage for suppliers.[257] As a "relationship" between a generation marketer/aggregator and an end-use customer emerges, the market is less likely to "clear" by price alone.[258] Table 3 provides a summary.

TABLE 3: Characteristics of the Retail Competition Forward Market	
Attribute/Description	**Discussion**
Product: Terms and conditions as defined by the contracting parties	Heterogeneous product that would usually require a "standard-form" contract
Interconnection: ISO provides a network	Realizes economies of scale
Nonprice Factors: Market would not clear based on price alone	Nonprice factors (e.g., reputation, relationship, quality, service, frequent-flyer-miles, deep-pockets) are important
Market Intermediaries: Clear transactions but at a higher cost than auction-market transactions	Parties use contracts to support transactions. There is a risk of contract maladaption over the term of the contract. Futures contracts may be available.
Incentive Intensity: Semi-strong incentives	Incentives less strong than auction-like market but stronger than those within a firm (incentives of a hybrid contract would apply)*
* Williamson notes that "weaker incentive intensity (greater bureaucratic costs) attend the move from hybrid to hierarchy, ceteris paribus." Williamson, *THE MECHANISMS OF GOVERNANCE*, at 104.	

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[256] Olson, *supra* note 7, at 53-56.

[257] *Id.*

[258] Carlton, *supra* note 19, at 939.

customer will be a homogeneous product.[252] Scale economies would promote the development of a regional/national forward contracting marketplace; however, the absence of a central market that provides price transparency may make it difficult to determine whether there is allocative efficiency.[253] If the forward market turns out to be imperfect and incomplete, the presence of a robust spot market would allow contracting parties to develop forward contracts that take into account the availability of the spot market if the forward contract becomes maladapted *ex post*.[254]

While the characteristics of the forward market would give parties flexibility regarding the terms of forward contracts, there would also be costs. These costs could include: (1) search and information costs each time that end-use customers seek a new source of supply; (2) intermediation costs, which arise because market intermediaries would emerge; (3) contracting costs, associated with negotiating a bilateral contract; (4) monitoring costs; and (5) search and haggling costs at the contract renewal interval.[255] While there would be costs associated with forward contracting, forward contracts could provide an important supplement to futures markets by helping end-use customers to manage price risk over time.

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[252] In the flexible poolco model described in this report, "direct bilateral contracts" would be available as well as contracts for differences. Stalon (page 65) describes a direct bilateral contract as "a contract between a buyer and a genco that specifies the source and rate of delivery of energy of a particular generator. . .in each trading period into the grid and the location and time pattern at which the buyer will take energy from the grid." A contract for difference is a type of bilateral contract, which can be used to hedge price volatility in a competitive market but that does not determine the generation rate of any generator. Charles G. Stalon, "Electric Industry Governance: Reconciling Competitive Power Markets and the Physics of Complex Transmission Interconnections," 19 *RESOURCE AND ENERGY ECONOMICS* (1997), at 47-83.

[253] Because prices might not be very transparent, it would be difficult to determine whether a firm has market power in the forward market.

[254] Crocker and Masten note that in the natural gas industry, the development of well-functioning spot markets has lead to different contracting approaches for the contracting that remains. Crocker and Masten note that "in contrast to prederegulation agreements, such contracts generally index price to spot prices and often provide for termination on relatively short notice by either party." Crocker and Masten, *supra* note 164, at 32. See also, Lyon and Hackett, *supra* note 251, at 395-396. See also R. Glenn Hubbard and Robert J. Weiner, "Efficient Contracting and Market Power: Evidence from the U.S. Gas Industry," XXXIV *JOURNAL OF LAW & ECONOMICS*, April 1991, at 25-66.

[255] Olson, *supra* note 7, at 59 note 35.

A robustly competitive spot market could: (1) provide high-powered productive efficiency;[247] (2) force inefficient generating plants to close or cut costs if they can not achieve adequate market returns;[248] and (3) aggregate demands to advantage in a way that is generally consistent with economic dispatch (i.e., the successful bidders would be the more efficient plants).[249] The experience in England is generally corroborative.[250]

A robust forward market will be a critically important supplement to the spot market because of its role in providing incentives to build efficient generating plant. While a power exchange is likely to facilitate the development of a thick spot market, it is less clear whether a thick forward market will develop. Unlike the power exchange spot market, the forward contract market could involve significant transaction costs. The forward market could allow contracting parties some discretion in what they contract,[251] given the constraint that the product delivered by the network to the

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[247] Joskow notes that "precisely how intense competition is in this auction will depend on the usual variables such as the distribution of ownership of generation, the asymmetry of costs among competing generators, entry conditions, the availability and costs of information, and transactions costs associated with writing and enforcing any associated contracts." Joskow, *supra* note 99, at 21.

[248] Joskow notes that "the economic efficiency problems in electric power sectors in developed countries have much more to do with poor (evaluated ex post) investment decisions, construction cost overruns, excessive fuel prices, too many personnel, low levels of generator reliability, continued operation of plants that should be retired, and regulated price structures that provide poor consumption incentives." *Id.* at 9-10.

[249] In New England, the least-cost dispatch sequence will be based on actual bids. If a generator's bid *is not* below the market-clearing bid, the generator will not be dispatched and will receive no revenue. If a generator's bid *is* below the market-clearing bid, the generator *will* be dispatched and *will* receive revenue based on the market-clearing bid.

[250] The primary concerns about the performance of the generation market in England have to do with: (1) imperfect transparency of prices in the market; and (2) market power concerns, which result from a relatively high level of concentration in the generation market in England. See Olson, *supra* note 7, at 60 (note 72).

[251] Lyon and Hackett argue (at 384-385) that long-term governance structures (e.g., contracts, vertical integration, and so on) will be used to: (1) assure reliability over time; (2) avoid short-term demand or supply shocks, and the related risk of curtailment; (3) reduce the transaction cost of repeated spot market purchases; (4) reduce price risk where futures markets are incomplete; and (5) protect against price increases resulting from an access provider's use of its market power. Lyon and Hackett, "Bottlenecks and Governance Structures: Open Access and Long-Term Contracting in Natural Gas," 9 *JOURNAL OF LAW, ECONOMICS, AND ORGANIZATION*, at 380-398.

exchange where the identity of the buyer or seller would not be important.[245] The power exchange spot market could have the purpose and effect of economizing on transaction costs because it could have many of the characteristics sought in a well-functioning market.[246] Table 2 provides a summary.

TABLE 2: Characteristics of the Retail Competition Spot Market	
Attribute/Description	**Discussion**
Product: One-hour increments of kWh	Homogeneous, fungible product
Interconnection: ISO provides a network	Realizes economies of scale
Faceless exchange: Electricity becomes a commodity at the spot price	Becomes a price market with less emphasis on other factors (e.g., reputation, fuel type, environmental emissions, and so on)
Ex ante contract costs: Can reduce the risk of *ex post* contract maladaption	A robust spot market serves to reduce the need for forward contracting, which reduces the cost of *ex post* contract maladaption
Institutions: Can support low transaction costs	Power exchange provides a central spot market
Incentives: High-powered incentives	Strong efficiency incentives and may provide some investment incentives*
* The spot market price would provide investment incentives for plants that can generate at a cost that is less than that of the "marginal" generator. For those efficient plants, the market-clearing price covers the plant's short-run marginal cost plus an increment that could allow it to recover some or all of its other costs of doing business.	

[245] For ISO New England, for example, the "physical" dispatch of electricity will be based on least cost dispatch based on actual bids. The "market-clearing" price will be determined by the highest bid resource that was dispatched to meet actual load. This market-clearing price will be paid to all suppliers by buyers who purchase power from the market.

[246] Thus, the "power exchange" electricity market intermediates transactions between buyers and sellers in a way that makes the exchange "faceless." The market provides strong incentives for suppliers to bid at a competitive price. If a supplier bids too high of a price, then the unit is not dispatched and the supplier receives no revenue.

Market Characteristics

The spot and forward markets are likely to operate in strikingly different ways. The spot market is likely to be a low-transaction-cost auction market. Except for any futures markets that may develop,[242] the forward market is likely to have the characteristics of a search market. While the forward market is likely to be less efficient than the spot market, the forward market may be able to accommodate the contract-market nature of forward transactions, in a way that moderates search, information and other transaction costs for end-use customers.

The power exchange spot market has the potential to meet the criteria of an efficient market for three reasons. First, properly-defined "spot market" units of electricity are a homogeneous, fungible product.[243] Second, there are sufficient scale economies in electric generation to justify a significant level of interconnection to provide a network that realizes those scale economies.[244] Third, because the homogeneous characteristics of electricity serve to reduce incentives to purchase electricity from a particular seller, there is little reason to forego the realization of spot market economies through a central market; this results in "faceless" spot-market

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[242] Futures markets are highly-organized, standardized, auction-like forward markets that feature low transaction costs and greater liquidity than forward contracts. The instruments traded on futures markets generally have a maturity of less than one year. Robust futures markets have efficiency characteristics that are similar to spot markets. See Dennis W. Carlton, "Futures Markets: Their Purpose, Their History, Their Successes and Failures," 1 *JOURNAL OF FUTURES MARKETS*, 1984, at 237-271. Carlton identifies five features that a commodity traded on a futures exchange can be expected to have. These features include: (1) price risk (volatility); (2) prices across different specifications and locations are highly correlated; (3) there is a large number of interested participants; (4) a large volume of the product is sold; and (5) the price of the commodity is competitive (no firm has significant market power with respect to the commodity). Carlton also notes that demand for a futures contract will vary depending on the structure of the industry; if significant vertical integration is present, some demand for futures may be supplanted by "risk management" within a firm. *Id.* at 242-244.

[243] For example, ISO New England is a "day-ahead-hourly" market where wholesale electricity suppliers and generators will bid their resources into the market the day before and submit separate bids for each resource for each hour of the day.

[244] In the case of ISO New England, the existence of this market facilitates trades of "residual" wholesale electricity. Thus, if a participant in the market produces electricity in excess of the demand of its customers, it can sell the excess into the wholesale market. These "gains from exchange" are possible because of the "network" that the transmission and distribution systems provide.

could act as the "central marketplace" in a pool-based market structure in which some or all purchases and sales clear through a central entity.[235] Market participants could use contracts for differences or other types of bilateral contracts, in conjunction with the power exchange spot market, to provide a forward market.[236] This approach accommodates the physical realities of the electric system by allowing generators to make day-ahead bids for a homogeneous product (e.g., one-hour increments of kWh) into the power exchange at whatever price they choose to bid.[237] All successful bidders, however, would receive the same market clearing price from the power exchange.[238] Thus, generators could bid "must-run" plants in at low prices and still receive the market clearing price for their power.[239] These attributes of this "uniform-price-sealed-bid" auction make the power exchange well suited to the physical characteristics of the electric services industry.[240] Other power exchanges could emerge if there is customer demand.[241]

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[235] Fox-Penner, *supra* note 105, at 208.

[236] Contract for differences are a type of bilateral contract where the electric generation seller is paid a fixed amount over time, which is a combination of a "spot" market price (presumably through a power exchange) and an adjustment with the purchaser for the difference between the contract-for-difference price and the spot price.

[237] Joskow, *supra* note 99, at 21.

[238] Joskow refers to this type of auction as an hourly uniform-price sealed bid auction. Joskow, *supra* note 99, at 21.

[239] This feature accommodates a physical feature of the grid: some plants must run in order to maintain the reliability of the transmission system.

[240] Alternative auction models include the discriminatory sealed-bid auction where suppliers are paid their bid prices. See Joskow, *supra* note 99, at 51. For a survey of auctions see Vernon L. Smith, *THE NEW PALGRAVE: ALLOCATION, INFORMATION, AND MARKETS* (New York: Norton, 1989), at 39-53. For bidding, see Robert Wilson, *THE NEW PALGRAVE: ALLOCATION, INFORMATION, AND MARKETS* (New York: Norton, 1989), at 54-63.

[241] For example, another power exchange, which does not pay all generators the same market-clearing price, could emerge.

important to develop market and industry institutions that serve to moderate the cost of electricity for end-use consumers.

Retail Competition Model

In the retail competition model, end-use customers, or agents acting on behalf of those customers, would either: (1) rely on the spot market provided by a power exchange; or (2) contract with generators (or generation marketing/aggregation firms) for the energy needed to meet their needs.[231] The retail competition model uses many of the same institutions as the wholesale competition model; thus, an ISO (or transco) and possibly a power exchange would intermediate power market transactions.[232] The ISO and power exchange would be the critical institutions, with market participants emerging to conduct, facilitate and hedge bilateral contract (e.g., contract-for-differences) transactions.[233] In the retail competition model, all end-use customers, rather than just distribution utilities, would be able to participate in the market.[234]

In designing the institutional infrastructure of an electric market, policymakers can use a power exchange to provide a spot market. If used, the power exchange

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[231] This section describes a "hybrid" model that features a power exchange that is not "mandatory" and an ISO. There has been much debate over the relative advantages of the "poolco" and "bilateral contract" models. Hunt and Shuttelworth argue that either model is feasible and that both models can be designed to moderate transaction costs. See Hunt and Shuttleworth, *supra* note 183, at 77-87. The hybrid model described in this report has some features of each model. Elsewere, I have argued that the "pure" poolco model is not feasible in the U.S. because it does not meet a "no losers" test. Olson, *supra* note 7, at 47.

[232] Fox-Penner, *supra* note 105, at 208.

[233] Guesnerie discusses the recent literature on contract economics and notes that "contract theory suggests an entirely decentralized alternative to Walrasian pricing theory based on the auctioneer's intervention. According to this alternative view, prices are set and revised in a succession of bilateral sessions. Such an approach has obvious merits and, perhaps, far-reaching implications. . . .contract theory can provide explanation for the respective roles of markets and organizations in the allocation of resources." Roger Guesnerie, "The Arrow-Debreu Paradigm Faced with Modern Theories of Contracting: a Discussion of Selected Issues Involving Information and Time," *CONTRACT ECONOMICS*, edited by Lars Werin and Hans Wijkander (Oxford: Blackwell, 1992), at 12-13.

[234] Hunt and Shuttleworth, *supra* note 183, at 65.

because of the magnitude and importance of the regulatory decisions that are necessary to accommodate a competitive generation market).

- *ENOUGH MARKETS*. Retail competition will not be fully effective in minimizing costs if there are not "enough markets."[228] The transaction volume that retail competition would provide holds out the best promise of providing relatively "complete" spot and forward markets, although it will be important to have institutions and market makers in place to moderate the costs of small transactions.

Because "the action resides in the details,"[229] it is important that policymakers and regulators implement a workable and economical retail competition model. An appropriate retail competition model should: (1) provide clear and efficient boundaries between the regulated and unregulated sectors of the electric services industry; (2) effectively address asymmetric information and reputation issues so that competition between utility affiliates and other market participants is even-handed and fair; (3) moderate the information and search costs of end-use customers, especially those that do not wish to seek out a generation services provider;[230] and (4) modify the regulatory contract in ways that are fair to incumbent utilities (which have made substantial investments in long-lived utility assets), nonutility entrants into the deregulated generation market, and utility ratepayers. More generally, it will be

[228] Ledyard, *supra* note 25, at 185.

[229] Williamson, *supra* note 12, at 349.

[230] Stevenson and Ray note that "utilities generally have good information about present and future supply options; customers generally do not. Such an information asymmetry limits the ability of consumers to make socially optimal consumption and conservation decisions." At least in the early days of retail competition, there may be a role for regulators to reduce these information asymmetries through consumer education, outreach, and product labeling requirements. See Rodney Stevenson and Dennis Ray, "Transformation in the Electric Utility Industry," *NETWORKS, INFRASTRUCTURE, AND THE NEW TASK FOR REGULATION*, edited by Werner Sichel and Donald L. Alexander (Ann Arbor, MI: Univ. of Michigan Press, 1996), at 89-99. For a discussion of product labeling requirements, see David Moskovitz, Richard Cowart, Alan Levy, and Brian Roe, "What Consumers Need to Know if Competition is Going to Work," *ELECTRICITY JOURNAL*, June 1998, at 38-48.

- *LARGE-NUMBERS BARGAINING.* Retail competition has the potential to transform the generation market from a "small numbers bargaining situation"[222] to a robust power generation market that features many buyers and sellers. Retail competition has the potential to increase the number of transactions that take place in the generation market and in doing so could increase the competitiveness of the spot and forward generation markets and reduce transaction costs.[223]

- *NO MANDATORY AGENT-PRINCIPAL ROLES IN GENERATION AND GENERATION AGGREGATION/MARKETING.* Under retail competition, each utility customer could select her sources of generation,[224] thereby sharply reducing the agent-principal and asymmetric information issues that give rise to regulation.[225] Because the distribution utility would no longer act as an exclusive and mandatory generation purchasing agent for its customers,[226] the regulator's tasks would be substantially narrowed.[227] As a result, the risks that investors face from regulatory hold-up and opportunism will presumably decline over time (although during the transition to competition these risks increase

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[222] Williamson, *supra* note 10, at 345.

[223] There would need to be enough transaction volume to outweigh the substantial costs of "creating" a retail market and it would be important that means of aggregating small transactions be available (either through a power exchange or generation aggregation/marketing firms).

[224] In addition, some distribution services (e.g., metering, billing, and so on) and some ancillary transmission services may become competitive.

[225] Olson, *supra* note 7, at 47-48.

[226] Contracting issues are likely to still be present once policymakers reduce or eliminate the regulator's agency role. The contracting issues are likely to remain, and result from the asset-specificity associated with generation and the risks associated with incomplete contracting. These contracting issues raise market power concerns. See Olson, *supra* note 7, at 54-56.

[227] Regulatory issues could arise with respect to a utility or its affiliate competing to provide generation marketing/aggregation services to its customers. First, "asymmetric information" issues could arise if the utility affiliate has better access to competitive information than its competitors. Second, "reputation" issues could emerge if a utility is able to use its name and reputation in ways that give it an "unfair" advantage over its competitors. Finally, consumer disclosure requirements and consumer education programs might be needed to assist in preparing consumers for retail competition.

developing a portfolio of contracts with distribution utilities and load aggregators, with varying terms and conditions.[216]

RETAIL COMPETITION PROVIDES LARGE-NUMBERS BARGAINING, REDUCES PRINCIPAL AGENT-PROBLEMS, AND REDUCES TRANSACTION COSTS

Following approval of EPAct, as the FERC began the process that led to Orders No. 888 and 889, many states, including California, New York, and the New England states, began to explore retail competition models.[217] Policymakers in eleven states have already passed retail competition legislation.[218] Utility regulators in an additional four states have ordered retail competition by a date certain.[219] Most other states are considering retail competition.[220] In addition, Congress has a number of retail competition bills before it.[221]

Potential Benefits of the Retail Competition Model

Unlike the wholesale competition model, the retail competition model has the potential to be economically and politically sustainable. Three potential advantages of the retail competition model are noteworthy.

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[216] To the extent that significant bilateral dependence remains, vertical integration of generators and distribution utilities and load aggregators is likely.

[217] For example, California issued its "Blue-Book" report in April 1994. California Public Utilities Commission Order Instituting Rulemaking and Investigation, R94-04-031/I94-04-032, April 20, 1994.

[218] These states include California, Connecticut, Illinois, Maine, Massachusetts, Montana, Nevada, New Hampshire, Oklahoma, Pennsylvania, and Rhode Island." At a Glance: State Restructuring," *ELECTRIC POWER ALERT*, June 3, 1998, at 32-34.

[219] These states include Arizona, Michigan, New Jersey, and New York. *Id.*

[220] *Id.*

[221] "At a Glance: Federal Restructuring," *ELECTRIC POWER ALERT*, June 3, 1998, at 35. See also "Special Report: Administration Details Vision of Reform with Legislative Language," *ELECTRIC POWER ALERT*, May 21, 1998, at 1-4.

sustainable because the transaction costs to become a load aggregator are low. In addition, the regulatory transaction costs of this model are high. As a result, the wholesale competition model would likely devolve into a model that approximates retail competition, at least for economically attractive customers and areas.

Wholesale Competition: Precursor to Retail Competition

Robust wholesale markets are necessary to the development of effective retail competition. In a well-functioning wholesale competition model, spot, forward, and futures markets would emerge. The spot market would emerge through the price transparency provided by a power exchange, as supplemented by bulletin boards and other information sources. Forward markets, whether the securities trade in organized markets (e.g., futures, options, and so on) or as negotiated contracts (e.g., swaps, contracts for differences, and so on), are also likely to emerge. Robust spot and forward markets would reduce the need to rely on long-term contracts to support a transaction between a generator and a distribution utility.

Wholesale competition would markedly reduce the asset specificity and bilateral dependence associated with generation plants. The emergence of spot, futures, and forward markets (and open-access, nondiscriminatory transmission) would help to create an environment where a generator could contract with a number of distributors, rather than depend on a single power purchase contract with a utility.[215] The relations between the merchant generator and its customers would be more likely to be constructive over the contract interval behavior because: (1) effective wholesale competition reduces the dedicated nature of generation assets, which reduces the bilateral dependence of the parties to the QF/utility power purchase contract; and (2) the bilateral dependence that remains can, to some extent, be diversified away by

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[215] If a significant risk of *ex post* contract maladaption remains, there might be incentives for "merchant" generators to vertically integrate with distribution companies.

generation contract portfolio for a distributor. Risk aversion by distributors could have a significant impact on the contract opportunities of wholesale generators and could, over time, have an impact on the incentives to construct new generating capacity in the wholesale competition model.[211]

- *Regulatory Risk*. Because of the risk of regulatory holdup or recontracting, market participants would view the wholesale competition model as unattractive and risky.

- *Rent-Seeking Behavior by Market Participants*. Because there would be more and better opportunities to enter unregulated businesses in the retail competition model, market participants have strong incentives to encourage policymakers to adopt the retail competition model.[212]

- *Small Numbers Bargaining*. Given the highly specific nature of generating plant, problems could emerge if the competitiveness of the bidding process at the contract renewal interval is not robust.[213] Generation marketing/aggregation firms would have stronger efficiency incentives than distribution utilities.[214]

For retail competition to succeed, many of the elements of the effective wholesale competition model are necessary — but wholesale competition will be merely a "milestone" on the way to retail competition. Wholesale competition will not be

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[211] The other side of this "coin" is that, if regulators "bless" purchases to reduce risk on the utility-purchasers, the stranded cost problem is recreated.

[212] Joskow, *supra* note 5, at 120 and 127.

[213] Williamson, *supra* note 10, at 338.

[214] Bohi and Palmer argue that generation marketing companies that fail to provide low-cost alternatives to customers will lose customers to more efficient competitors. The lack of competition among distribution utilities, on the other hand, would reduce the pressure to negotiate the best possible deal on behalf of their customers. Bohi and Palmer, *supra* note 196, at 15-16.

competition could quickly begin to approximate the retail competition model, at least for customers and areas that aggregators find attractive to serve.[207]

- *Regulatory Boundary Problem.* While regulators would not "regulate" generation in the wholesale competition model, regulating the contracting activities of the distributor would result in substantial regulatory costs.[208] The regulator's evaluation of a distribution utility's "generation portfolio manager" activities would be complicated and difficult and would take place in a turbulent and difficult environment.[209] If a distribution utility vertically integrates into generation, the regulatory transaction costs would be even higher because regulators would need to scrutinize the distribution utility's build-or-buy decision.[210]

- *Risk Aversion by Distributors.* As a result of the risk of stranded cost exposure from bypass, a distribution utility would be reluctant to make long-term contracts with generators on behalf of customers — who might bypass by becoming a distribution utility or a generation marketer/aggregator. This would create incentive problems and risks that could result in a maladapted

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[207] This would be analogous to the current situation in telecommunications. Under the federal Telecommunications Act of 1996, low-cost local service areas (e.g., Manhattan, Chicago, and so on) are experiencing substantial local competition. While rural, insular, and high-cost areas might have "resale" competition, "facilities-based" competition is not likely to emerge rapidly in these areas. See Peter W. Huber, Michael K. Kellogg, and John Thorne, *THE TELECOMMUNICATIONS ACT OF 1996: SPECIAL REPORT* (Boston: Little, Brown, 1996), at 17-20. Sidak and Spulber (at 135) argue that "regulators may inadvertently foreclose the possibility of intermodal competition among rival networks [which could benefit all segments of the population] in their attempt to use the information superhighway as a tool to redistribute income." See J. Gregory Sidak and Daniel F. Spulber, "Deregulation and Managed Competition in Network Industries," 15 *YALE JOURNAL ON REGULATION*, Winter 1998, at 117-147.

[208] Joskow, *supra* note 5, at 129.

[209] The regulatory environment would be contentious because parties to regulatory proceedings would be likely to strenuously argue for widely-divergent positions.

[210] This could be comparable to the contentious regulatory proceedings in Virginia, Wisconsin, and other states in the late-1980s/early-1990s regarding construction of independent power plants or utility-owned generation.

The Wholesale Competition Model Breaks Down

The wholesale competition model would not be economically or politically sustainable. There are six reasons why the wholesale competition model breaks down.

- *EASE OF ENTERING THE GENERATION MARKETING BUSINESS*. Because customers are likely to seek to become a distribution utility (e.g., through "municipalization")[203] or a generation marketer/aggregator,[204] distribution utilities will not be able to maintain their status as the exclusive generation purchasing agent for customers.[205] While it would be difficult and costly to become a distribution utility,[206] it would be relatively easy to become a generation marketer or aggregator because these firms would not necessarily need to make investments in generating facilities to begin business. As a result, end-use customers would have incentives to find ways to bypass the distribution utility and take service from a marketer or aggregator. Because of the relatively low transaction costs to become a load aggregator, wholesale

[203] Municipalization is where a municipality forms a publicly-owned utility, which then acquires the existing transmission and distribution utility system in that municipality. Sidak and Spulber, *supra* note 194, at 196-197.

[204] Generation marketer/aggregator firms would compete to provide aggregation, or retailing, services. Joskow, *supra* note 5, at 121.

[205] Hunt and Shuttleworth note that it is doubtful that wholesale competition can survive for two reasons. First, there is the definitional problem of who can and who cannot buy power. Second, there is the threat of bypass of the T&D company through "municipalization," with the related threat to the utility's recovery of stranded costs. Hunt and Shuttleworth, *supra* note 183, at 62-63.

[206] Because the utility that previously served the municipality would have investments that were stranded as a result of municipalization, FERC Order No. 888 allows utilities to charge exit fees. Fox-Penner, *supra* note 105, at 400.

The risk of regulatory opportunism exacerbates these costs.[199]

The transaction costs of regulating a distribution utility's generation portfolio management activities will vary depending on the extent to which policymakers and regulators have made credible commitments to honor the regulatory contract. Levy and Spiller argue that:

> the credibility and effectiveness of a regulatory framework, and so its ability to encourage private investment and support efficiency in the production and use of services, vary with a country's political and social institutions. Performance can be satisfactory under a wide range of regulatory procedures, so long as three complementary mechanisms are in place to restrain arbitrary administrative action: substantive restraints on discretionary actions by the regulator, formal or informal restraints on changing the regulatory system, and institutions to enforce the restraints.[200]

While it might be possible to develop a wholesale competition model that moderates regulatory transaction costs, a fundamental problem would remain — the model would extend the boundary of regulation to the generation sector with respect to the distribution utility's management of its generation contract portfolio.[201] This is a significant extension of regulation into a potentially competitive industry, which could have a significant effect on the robustness of the generation market.[202]

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[199] Transaction cost economics defines opportunism as "self-interest seeking with guile" and assumes that "*some* individuals are opportunistic *some* of the time and that it is costly to ascertain differential trustworthiness ex ante." Williamson, *supra* note 12, at 6 and 48. Sidak and Spulber note that "concerns over reputation effects normally keep regulatory commissions from behaving opportunistically" and that regulatory opportunism would give the utility the incentive to underinvest and would increase the utility's cost of capital. Sidak and Spulber, *supra* note 194, at 499.

[200] Brian Levy and Pablo T. Spiller, ed., *REGULATIONS, INSTITUTIONS, AND COMMITMENT: COMPARATIVE STUDIES OF TELECOMMUNICATIONS* (Cambridge: Cambridge Univ. Press, 1996), at 1.

[201] Olson, *supra* note 7, at 50.

[202] Joskow, *supra* note 5, at 129.

market power such that prices are higher than a fully competitive result?[259] To evaluate horizontal market power, the analyst defines the relevant geographic and product markets,[260] analyzes the structural preconditions of the market,[261] studies the behavior of one[262] or more[263] of the firms in the market, and, in some cases, develops a simulation model.[264]

While it will be important to ensure that competition is effective in the generation market, transaction cost economics emphasizes the potential efficiencies that are possible through vertical integration and the importance of considering the tradeoffs

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[259] Armstrong, Cowan, and Vickers, *supra* note 94, at 13-14.

[260] Jacquemin and Slade emphasize that it is difficult to define a "market" because many products have close substitutes and many geographic markets overlap. Alexis Jacquemin and Margaret E. Slade, "Cartels, Collusion, and Horizontal Merger," *HANDBOOK OF INDUSTRIAL ORGANIZATION, VOLUME 1*, edited by Schmalensee and Willig (Amsterdam, North-Holland, 1989), at 415-473.

[261] Structural preconditions include: (1) the dominant firm's market share; (2) the size and market shares of other firms in the market; (3) the stability of market share over time; (4) the dominant firm's profit history; (5) residual elasticities of demand; and (6) the ease/difficulty and other conditions of entry into the market. P.L. Joskow and A.K. Klevorick, "A Framework for Analyzing Predatory Pricing Policy," 89 *YALE LAW JOURNAL*, at 213-270.

[262] This would include review of whether a rival in the market engaged in anticompetitive, strategic behavior; for example, by "signaling" deep pockets, using "reputation" as a tough competitor to deter entry or encourage exit, or engaging in strategies that raise rivals' costs. Janusz A. Ordover and Garth Saloner, "Predation, Monopolization, and Antitrust," *HANDBOOK OF INDUSTRIAL ORGANIZATION, VOLUME 1*, edited by Schmalensee and Willig (Amsterdam, North-Holland, 1989).

[263] In particular, anticompetitive behavior that is implicitly or explicitly collusive would be studied. Anticompetitive behavior could include cases where firms in a market coordinate their quantity and price decisions. While overt, collusive price leadership clearly violates Section 1 of the Sherman Act, "conscious parallelism," where there is no evidence that firms got together and made overt agreements to fix prices, is a much more difficult antitrust problem. Price leadership, for example, where the price leader openly announces its intention to change price, and other firms follow with similar price changes, could be an example of conscious parallelism. It is difficult, however, to prove that price leadership/conscious parallelism is a violation of the antitrust laws.

[264] There have been recommendations, in some FERC merger proceedings, that a decision be delayed pending detailed simulation studies of market power in a region. Given the difficulty of making a simulation study truly dynamic and relevant, and given the difficulty in predicting how retail competition will change the supply and demand for electricity over time, even the most comprehensive and time-consuming simulation analysis is unlikely to provide useful information on market power in a region. Rather than bog the merger approval process down in delays, regulators should rely on a straightforward evaluation of horizontal market power and rely upon "sharp-in/sharp-out" remedies for market power concerns (e.g., ISO, divestiture of certain generation assets).

between efficiency benefits and market power concerns.[265] Thus, while some have called for a "moratorium" on horizontal mergers in the U.S. electric industry, there is a major risk that potential efficiencies could be lost.[266] Electric restructuring will require a substantial redeployment of capital[267] — a moratorium on horizontal mergers would needlessly delay the attainment of an efficient restructured electric industry.

Policymakers and regulators should recognize that if retail competition is effective (as this report suggests it could be) than horizontal market power may, in the long run, not be the major road-block that a more static analysis would suggest. As Schumpeter pointed out, the new type of organization and the new product and processes — which retail competition could provide — is the most powerful form of competition, and is much more important than textbook notions of price competition.[268] Schumpeter observed that:

> [I]n capitalist reality, as distinguished from its textbook picture, it is not that kind of competition [price competition] that counts but the competition that comes from the new commodity, the new technology, the new source of supply, the new type of organization (the largest-scale unit of control for instance) — competition which commands a decisive cost or quality advantage and which strikes not at the margins of the profits and the outputs of the existing firms

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[265] Williamson notes that, during the 1960s, the "application of the basic partial equilibrium welfare economics model to an assessment of market power versus economies tradeoffs disclosed that to sacrifice economies for reduced market power came at a high cost." Williamson, *supra* note 10, at 369.

[266] Joel I. Klein, "Making the Transition from Regulation to Competition: Thinking About Merger Policy During the Process of Electric Power Restructuring," Speech made at the FERC Distinguished Speakers Series, Washington, D.C., January 21, 1998.

[267] Mergers may be needed to reposition utility assets and maximize value.

[268] See Thomas M. Jorde and David J. Teece, *ANTITRUST, INNOVATION AND COMPETITIVENESS* (New York: Oxford Univ. Press, 1992), at 5, 25-26.

> but at their foundations and their very lives. This kind of competition is as much more effective than the other as bombardment is in comparison with forcing a door, and so much more important that it becomes a matter of comparative indifference whether competition in the ordinary sense functions more or less promptly; the powerful lever that in the long run expands output and brings down prices is in any case made of other stuff."[269]

If retail competition facilitates the development of robust spot and forward markets, the efficiencies that the market can provide could outweigh losses due to market power. In this context, it is important to emphasize that a market can be "competitive" even if there is a significant level of concentration in the market. What matters is whether competitors in the market compete strongly based on price and do not engage in anticompetitive (strategic) behavior.[270]

Vertical Control Issues

Vertical control issues relate to the ownership and control over neighboring stages of production and distribution.[271] In the electric restructuring debate, policymakers must determine whether an ISO or transco should own and operate transmission, whether divestiture of generation is appropriate, and the structural, accounting, and behavioral safeguards that are appropriate if a utility remains vertically integrated. If a vertically-integrated firm competes to market energy services in its service territory, policymakers would discuss whether codes of conduct on information

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[269] Joseph A. Schumpeter, *CAPITALISM, SOCIALISM, AND DEMOCRACY* (New York: Harper, 1942), at 84-85.

[270] Compare the infant formula and combustion turbine industry. The infant formula market — a three-firm industry — is widely held to engage in "anticompetitive" pricing. The combustion turbine industry, on the other hand, is widely viewed as highly competitive. The differences may be in the behavior of the firms and differences in the bargaining power of the buyers.

[271] Perry, *supra* note 46, at 186.

sharing between affiliates are needed and whether safeguards against "unfair" use of the utility's reputation by the utility affiliate are appropriate.[272]

Policymakers and regulators should balance the need for an "efficient boundary" between regulated and competitive businesses with the need to maintain an efficient utility industry.[273] If efficiencies from vertical integration are lost, then other means of economizing (e.g., horizontal or convergence mergers) might provide an offset. Incumbent utilities should be able to compete[274] — "fairly" — against new entrants during the current period of rapid change in the electric utility industry. In the short-term, however, regulators are likely to seek to micromanage incumbent utilities' activities by engaging in "command-and-control" deregulation.

While it is understandable that regulators would want to "get the details right" given the political scrutiny that they will be under as electric restructuring proceeds, the administrative costs of command-and-control deregulation are likely to be substantial. Efficiency and competitive effects are also likely. Efficiency effects could include lost economies resulting from vertical disaggregation. Competitive effects could include

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[272] California, for example, issued rules on utility affiliates' use of the utility's "brand name" on December 16, 1997 (Dockets nos. R.97-04-011 and I.97-04-012). California's rules forbid a utility to advertise its utility affiliate's association with the utility, or allow the utility name or logo to be used in any material circulated by the affiliate unless the affiliate discloses clearly, audibly and/or legibly on the first page or at the first point where the utility name or logo appears that: (1) the affiliate is not the same company as the utility; (2) the affiliate is not regulated by the California PUC; and (3) consumers do not have to buy the utility affiliates' products to continue to receive quality regulated services from the utility. California regulators rejected a proposal that would have banned utility retail marketing affiliates from selling electricity within the regulated utility's boundaries for the first two years of the transition to competition. "Cal. Sets Affiliate Trading Rules, Rejects Most Stringent Standards," *ELECTRIC POWER ALERT*, December 31, 1997, at 4-5.

[273] Olson, *supra* note 7, at 50.

[274] Sidak and Spulber argue that regulators "should not 'pick winners' in terms of technology, products and services, companies, or market institutions" and "should neither attempt to manage competition nor retain rules that arbitrarily favor one market outcome over another." Sidak and Spulber, *supra* note 207, at 136 and 142.

increased prices resulting from foreclosing some competitors (e.g., incumbent utilities) from competing in a market.

The regulatory response to vertical control issues appears to be, in part, a response to the need to get the structure right *ex ante* as well as a reaction to rent-seeking behavior by potential competitors of the incumbent utilities.[275] While regulators should seek to get the industry structure right *ex ante* because antitrust is unlikely to be effective in remedying problematic market structures *ex post*, regulators should not micromanage participation in the competitive market.[276] In particular, regulators should avoid expropriating assets and property rights (including intangible assets, such as the benefits derived from having a good reputation) from incumbent utilities.[277]

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[275] Joskow, *supra* note 166, at 120. See also Krattenmaker and Salop, *supra* note 4.

[276] Alfred E. Kahn, "Electric Deregulation: Defining and Ensuring Fair Competition," *ELECTRICITY JOURNAL*, April 1998, at 39-49.

[277] Salanié notes that roman law defined property rights as the combination of *usus* (the right to use the good), *fructus* (the right to what it produces), and *abusus* (the right to sell or give away the good). Bernard Salanié, *THE ECONOMICS OF CONTRACTS: A PRIMER* (Cambridge, MA: MIT Press, 1997), at 180. In the electric utility industry, managers typically operate utility plant on behalf of its shareholders, while also acting as an agent for ratepayers. Ratepayers typically have the right to purchase the good produced by the utility (electricity) based on tariffed rates (which are typically designed to recover the utility's costs, including its cost of capital, as adjusted based on prudence, regulatory lag, and so on); thus, ratepayers "share" some but not all of the risks associated with the utility's operations and financial structure. The utility's board of directors typically has the right to sell or give away its assets (subject to bond covenants, and so on), although regulatory review is often required because the utility acquires and operates its assets as part of its role of acting as agent for ratepayers. When assets are sold, the utility's board of directors and management should act to maximize value for shareholders — while ensuring that the remaining company is capitalized in a way that minimizes the cost of capital going forward. The key point here is that these gains should typically go to investors (in some cases, the regulatory contract in a given state may apportion some of the gains from sale of assets to ratepayers). After all, investors provided the capital and took most of the risks associated with those assets. These concepts are applicable to a number of regulatory issues including royalty payments, rights-of-way issues, divestiture issues, and mergers. An exception may be where the utility is securing recovery of stranded costs: if the utility sells generation assets to mitigate its stranded costs, ratepayers should share in the benefits of divestiture. See also Yoram Barzel, *ECONOMIC ANALYSIS OF PROPERTY RIGHTS*, 2ND ED. (Cambridge, England: Cambridge Univ. Press, 1997).

Independent System Operator

The ISO model could be very useful in improving the functioning of the power generation market.[278] Because this form of hybrid contracting presents numerous contracting difficulties, however, it will be difficult to develop a truly independent system operator.[279] Traditionally, electric utilities have sought to lower the transaction costs associated with limited interconnection of the electric grid by banding together into more complex governance structures, i.e., "tight" or "loose" power pools.[280] The ISO model will be considerably more difficult to negotiate and structure because the ownership and operation of transmission assets is separated in the ISO model.

The contracts that underlie traditional power pools have a number of interrelated features. First, the power pool participants would develop a pricing rule, typically based on economic dispatch.[281] Second, the parties would establish policies regarding reciprocity between the members of the pool.[282] Third, parties would set rules that constrain opportunistic behavior by members.[283] Fourth, the parties would establish contractual safeguards to assure that the members act in a manner that is consistent

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[278] See Fox-Penner, *supra* note 105, at 194-201. For an FERC Commissioner's survey of "second-generation" ISO issues see William L. Massey, "Prospering in the New Markets: Ten Key Second-Generation ISO Issues," *ELECTRICITY JOURNAL*, May 1998, at 15-22.

[279] Olson, *supra* note 7, at 52.

[280] The most important benefit that power pools provide are economies of integration, which serve to lower the cost of electric service by reducing the amount of generating capacity that a vertically-integrated utility needs to have available to meet the demand of its customers. Economies of integration are achieved through the creation of a governance structure (a power pool) that is designed to minimize the transaction costs associated with the interconnection of the electric grid.

[281] Fox-Penner, *supra* note 105, at 35.

[282] Reciprocity applies where specialized assets are placed at hazard by both parties. Williamson, *supra* note 12, at 135. In a power pool arrangement, a group of utilities agree to pool together as a group to coordinate some aspects of their operations and to share in the benefits of that pooling. The power pool imposes requirements that assure that each power pool member makes comparable investments in installed capacity (or contracts for that capacity).

[283] Thus, for example, the pool can impose severe penalties on its members for failing to make required investments in installed capacity.

with the interests of the network as a whole.[284] In the strongest form of power pool (i.e., a "tight" power pool), the pool provides a high level of integration of the dispatch of the economic and physical operation of the utility system in the region.

Establishing an independent system operator is markedly more difficult than establishing a power pool. The ISO model separates ownership of transmission assets from operation of those assets and requires a new system of transmission pricing. The transmission pricing model would, in turn, determine the economic value of the transmission assets. Given the economic importance of these negotiations to users and owners of transmission, the negotiations to develop an ISO are likely to be protracted and difficult. In the ISO governance model, the owners of the transmission assets would no longer "govern" their assets; instead, an independent board would govern the operation of the transmission assets.

Barker, Tenenbaum, and Woolf suggest that appropriate goals for governing an ISO include: (1) the pool and system operators are independent (not controlled by any single market participant or class of market participants); (2) the market is non-discriminatory and efficient; (3) the grid achieves targeted reliability levels; (4) decision making is transparent; (5) the pool and operator are adaptable to change in a

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[284] The formation and successful continued operation of a power pool is complicated by the adaptability limitations of contractual exchange. The difficulties associated with forming an ISO are rooted in the adaptability limitations of contractual arrangements. Williamson notes that:

> Whereas internal adaptations can be effected by fiat, outside procurement involves effecting adaptations across a market interface. Unless the need for adaptations has been contemplated from the outset and expressly provided for by the contract, which often is impossible or prohibitively expensive, adaptations across a market interface can be accomplished only by mutual, follow-on agreements. Inasmuch as the interests of the parties will commonly be at variance when adaptation proposals (originated by either party) are made, a dilemma is evidently posed. . . .What is needed, evidently, is some way for declaring admissible dimensions for adjustment such that flexibility is provided under terms in which both parties have confidence. This can be accomplished partly by (1) recognizing that the hazards of opportunism vary with the type of adaptation proposed and (2) restricting adjustments to those where the hazards are least. But the spirit within which adaptations are effected is equally important. Williamson, *supra* note 10, at 76.

Traditional power pools are finding that it is difficult to make the coordinative adaptations that are needed to accommodate a competitive generation market.

reasonable period of time; and (6) governance costs are minimized.[285] It will be difficult to develop binding ISO agreements that implement these goals.

Implementing these goals will be difficult because of:

- *INCOMPLETE CONTRACTING.* Because of the impossibility of "complete" *ex ante* contracting, it will be impossible to anticipate all possible future circumstances upfront. Thus, as circumstances change over time, the parties to an ISO arrangement will need to negotiate to fill in the "gaps." If severe maladaption occurs, these negotiations could be protracted and difficult.[286]

- *ADAPTABILITY LIMITATIONS.* While power pools can operate effectively once established, changing the "rules of the game" can be a difficult, time-consuming, and contentious process.[287] Thus, while hybrid contractual governance structures can be very effective in terms of coordination among the players in a contractual governance structure, these structures have major limitations in terms of adaptation to changed circumstances.[288]

- *ASSET SPECIFICITY.* Transmission assets have a high level of asset specificity, which means that these assets are vulnerable to holdup.[289] Transmission owners can be expected to aggressively seek to protect the economic value of their transmission assets.

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[285] Barker et al. (at 263) suggest that "most people would probably agree with the following goals." James Barker, Jr., Bernard Tenenbaum, and Fiona Woolf, "Regulation of Power Pools and System Operators: An International Comparison,"18 *ENERGY LAW JOURNAL*, 1997, at 261-331.

[286] Regulators (i.e., FERC) may be in a position to resolve disputes in a less costly and more credible way.

[287] For example, NEPOOL's transition to an ISO model (from a traditional "tight" power pool based on economic dispatch) required extensive negotiations.

[288] Williamson, *supra* note 12, at 103-105.

[289] Klein, Crawford, and Alchian, *supra* note 93, at 297-326. Armstrong, Cowan and Vickers, *supra* note 94, at 139.

- *STRATEGIC BEHAVIOR*. The major owners of transmission assets are likely to be reluctant to lose control of "strategic" transmission assets, particularly when, as here, the economic value of these assets could be greater if owned and operated by a vertically-integrated utility.

Williamson notes that "governance is concerned with the *identification, explication, and mitigation of all forms of contractual hazards*."[290] To be successful, an ISO agreement must: (1) provide a framework for governing the ISO; (2) properly take into account the asset specificity associated with transmission assets; (3) include a process for dealing with contracting issues that emerge *ex post*; (4) provide contractual features to ease resolution of disputes that arise *ex post* (e.g., by providing incentives for cooperative behavior by transmission owners and by providing distributional mechanisms for dealing with gaps, errors, and omissions);[291] and (5) provide mechanisms for symmetrical information disclosure to all transmission users. While achieving an ISO model that meets these criteria will not be easy, a well-specified ISO structure is essential.

Stranded Costs and Securitization

Introducing retail competition requires fundamental changes in the "regulatory contract." Eliminating or reducing the barrier to entry into the electric generation or generation services businesses in a state, constitutes a major change in regulatory policy.[292] To encourage entry into the generation business, a state must: (1) scrutinize and restructure many aspects of the way that utilities currently operate; and (2) modify the regulatory contract to fit the changed circumstances. Because electric restructuring requires new legislation in most cases, the major "players" in a state (e.g., utilities,

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[290] Williamson, *supra* note 12, at 5.

[291] Williamson, *supra* note 12, at 105, 378, 379.

[292] The three primary components of the regulatory contract are entry controls, rate regulation, and utility service obligations. Sidak and Spulber, *supra* note 194, at 113.

consumer groups, industrial intervenors) are likely to engage in rent-seeking to further their interests.[293] And legislators will seek to develop a solution that meets a "no-losers" test.[294]

The flexibility of the implicit regulatory contract has helped to make the regulatory model workable over time and adaptable to changing circumstances.[295] While legislatures have substantial discretion to change the prospective rules of the game, it is critically important that utilities, which have made substantial and irreversible investments in long-term assets, have a reasonable opportunity to recover the costs that they incurred under an earlier regulatory framework. Changing the rules for cost recovery after utilities have made investments to fulfill service obligations could impair a state government's credibility and deter investment in a state.

Utilities should have a reasonable opportunity to recover legitimate and unmitigatable costs that are stranded as a result of retail competition. First, policymakers should provide for recovery from ratepayers of legitimate stranded costs for equity and efficiency reasons.[296] Because credible government is an important ingredient to success for a state's economy, legislative and regulatory policies must encourage long-term investment. In this context, the 1996 *Economic Report of the President* states that "although policy reforms inevitably impose losses on some holders

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[293] Joskow, *supra* note 166, at 120.

[294] In the face of rent-seeking behavior by utilities, consumer groups, industrial intervenors, and others, a legislature will seek to craft a solution that is satisfactory to all of the "players" in the legislative process. A key question, then, is whether "the public" is adequately and appropriately represented. Noll points out that "the central problem of a citizen in dealing with government is powerlessness" and thus "voters face relatively high costs but low expected benefits" from engaging in the political process. Roger G. Noll, "Economic Perspectives on the Politics of Regulation," *HANDBOOK OF INDUSTRIAL ORGANIZATION: VOLUME 1*, edited by Schmalensee and Willig (Amsterdam: North-Holland, 1989), at 1253-1287. See also Olson, *supra* note 7, at 50.

[295] Crocker and Masten point out that the regulatory contract is "inevitably incomplete" and "complex or uncertain transactions requiring durable, specialized investments require long-term, incomplete, *relational* contracts." Crocker and Masten, *supra* note 164, at 12.

[296] The President's Council of Economic Advisors points out that "recovery should be allowed for legitimate stranded costs." Economic Report of the President (Government Printing Office, February 1996), at 187-188.

of existing assets, good policy tries to mitigate such losses for investments made based on earlier rules, for instance, by grandfathering certain investments when laws and regulations change."[297]

Second, to mitigate[298] stranded costs, regulators should require utilities to pursue all reasonable means to reduce uneconomic costs and to obtain the highest possible value for their generation assets and contracts.[299] By the same token, regulators should have a duty not to impede mitigation.[300] Securitization of stranded costs is a novel and feasible way to mitigate stranded costs.

Securitization, in essence, provides a "special-purpose" regulatory contract for designated utility assets. Securitization legislation would provide: (1) explicit constraints on the state legislature's and the regulatory agency's ability to modify recovery of securitized costs from ratepayers in the future;[301] (2) mechanisms to increase the assurance that end-use customers cannot avoid supporting the securitized costs (i.e., cost recovery mechanisms to make these costs "non-bypassable");[302] (3) an institutional framework that ensures that securitized assets are isolated from the utility's other

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[297] *Id.*

[298] Goetz and Scott note that "the duty to mitigate is a universally accepted principle of contract law requiring that each party exert reasonable efforts to minimize losses whenever intervening events impede contractual objectives." Charles J. Goetz and Robert E. Scott, "The Mitigation Principle: Toward A General Theory of Contractual Obligation," 69 *VIRGINIA LAW REVIEW* No. 6, at 967-1024.

[299] While the "duty" to mitigate is well understood, Goetz and Scott point out that it is "startling how many questions remain unanswered as to precisely what efforts the mitigation duty requires and what point in time the obligation arises." *Id.* Thus, contract law may provide limited guidance to regulators on these issues.

[300] Sidak and Spulber, *supra* note 194, at 183.

[301] While it is difficult to design a legal structure that completely constrains a future legislature from changing a law (or a regulator from changing an order), once a securitization mechanism is in place, a change in that mechanism could be viewed to be a taking. For an overview of the issues, from a financial perspective, see Peggy Jones, Lisa Pendergast, and Joseph Sebastian Fichera, "The State of Utility Securitization: Stranded Costs and Other Tariff-Based Financings Opportunities, Risks and Rewards," Prudential Securities, March 1998, at 27-28.

[302] *Id.* at 27-29.

assets (i.e., bankruptcy remote);[303] and (4) contractual features that support and enhance the creditworthiness of the securities (e.g., true-up mechanisms, overcollateralization).[304] To be beneficial, a securitization transaction structure should avoid tax liabilities and, if possible, allow the securitization to be eligible for treatment as an "off-balance-sheet" liability.[305] While the difficulty of meeting all of these constraints is significant, securitization could provide important benefits to ratepayers and utility investors.

Policymakers in each state would specify whether and the extent to which stranded costs will be recoverable from ratepayers. Regulators would then implement mechanisms to recover these costs. While stakeholders and regulatory analysts have sharply differing views on how to interpret the "regulatory contract" regarding stranded cost recovery,[306] for retail competition to succeed, each state must resolve these issues soon.

Securitization takes stranded cost recovery one step further by providing a very detailed and specific "regulatory contract" for the securitized costs. Thus, rather than use the traditional, incomplete "regulatory contract," securitization provides a very complete and specific "regulatory contract" to support the transaction. Securitization transactions will be difficult to structure and implement because of: (1) the incomplete nature of the regulatory contract; (2) the vulnerability of capital-intensive utility assets to

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[303] *Id.* at 31-32.

[304] Jones et. al note that "potential credit support mechanisms include overcollateralization, subordination, financial guarantees, a true-up mechanism, third-party insurance and/or reserve and equity accounts." *Id.* at 29-31.

[305] The California securitization transactions did not qualify for off-balance-sheet accounting treatment. *Id.* at 32.

[306] Compare, for instance, Sidak and Spulber, *supra* note 194, with Ken Rose, *AN ECONOMIC AND LEGAL PERSPECTIVE ON ELECTRIC UTILITY TRANSITION COSTS* (Columbus, OH: National Regulatory Research Institute, July 1996).

holdup; (3) strategic behavior by ratepayers that would prefer to avoid paying these costs; and (4) strategic behavior by new entrants that wish to enter the market. But securitization represents a novel and feasible way to mitigate stranded costs.[307]

[307] In the context of electric restructuring legislation, securitization represents a way to encourage utilities to "buy into" electric deregulation, which, after all, represents both risks and opportunities to utility shareholders and managers. Regulators, in implementing electric restructuring legislation, should take these tradeoffs into consideration when considering securitization proposals. The danger is that regulators may view securitization in a "piecemeal" way and fail to appreciate fully the importance of securitization in implementing electric restructuring legislation.

SECTION 4

CONCLUSION

Retail competition is rapidly emerging in the electric utility industry, which will increase the volume of transactions dramatically, thereby helping to ensure that there are enough markets to provide robust competition in generation. To make retail competition feasible, changes in technology, markets, and regulation are necessary.

Technological change is an important catalyst to effective competition in generation.[308] Changing generating technology has reduced the "natural monopoly" characteristics of generation further — they never were strong.[309] Highly efficient combined-cycle combustion turbines, typically fueled by natural gas, are now the generating capacity of choice in the electric industry.[310] In addition, improvements in computer technology and the emergence of the Internet will facilitate the operation of the generation market[311] and will economize on the cost of clearing transactions.[312] A

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308 Richard E. Balzhiser, "Technology — It's Only Begun to Make a Difference," *ELECTRICITY JOURNAL*, May 1996, at 32-45.

309 Joskow, *supra* note 5.

310 Rodney E. Stevenson and David W. Penn, "Discretionary Evolution: Restructuring the Electric Utility Industry," 71 *LAND ECONOMICS*, August 1995, at 357.

311 Bo Kallstränd notes that "Modern IT-solutions make it possible for the supplier to work in an interactive way with virtually all his customers — down to individual households. . . .Interactive collaboration between supplier and consumer of this kind, combined with expanding transmission capacity and international integration, has a potential of strongly increasing the efficiency in the use of production assets and of the entire power system." Bo Kallstränd, "Note on Information Technology and Efficiency of Deregulated Electricity Markets, A Panel Contribution," 19 *ENERGY JOURNAL*, at 133-134.

312 Jeffrey K. MacKie-Mason and Hal R. Varian, "Some Economics of the Internet," *NETWORKS, INFRASTRUCTURE, AND THE NEW TASK OF REGULATION*, edited by Werner Sichel and Donald L. Alexander (Ann Arbor, MI: Univ. of Michigan Press, 1996), at 107-136.

well-functioning generation market will be important: for retail competition to succeed there must be "enough markets" to ensure that spot and forward contracts can be completed, consumers and producers must behave competitively, and an equilibrium must exist."[313]

While technological change and the development of robust spot and forward generation markets support the viability of electric restructuring, an essential driving force for retail competition has been changes in laws and regulation. Since 1978, the vertically-integrated electric utility industry structure has begun to disaggregate. Through PURPA, it became apparent that it would not be easy to disaggregate the electric generation business because of the difficulties associated with long-term contracting and regulation. By the mid- to late-1980s, however, it had become feasible for project developers to build non-QF independent power plants, with credit support from a long-term contract. Wholesale competition, as set forth by EPAct and FERC, further reduces the barriers to entry into the power generation market, and reduces the need for long-term contracts to support the transaction. Given the importance of legislative and regulatory action, an appropriate transition to retail competition will be needed.

A competitive power market could not have emerged without changes in regulation. The regulatory contract that emerges to address information disparities between utilities and end-use customers is flexible and adaptable. Because the regulatory contract is the concatenation of a number of documents that arise over time as circumstances evolve, the regulatory contract can change over time. Changes of this type are inherently both a political and an economic process. In this context, government policymakers and regulators will have the challenging task of changing the regulatory "rules of the game" in ways that are consistent with prior government

[313] If these preconditions are present, then the allocation of resources is Pareto optimal. Ledyard, *supra* note 25, at 185.

commitments,[314] while also providing an institutional infrastructure that allows robust competition to flourish.

Electric restructuring is taking place in a turbulent, discontinuous, and "hypercompetitive"[315] environment, which makes it difficult for policymakers and regulators to implement electric restructuring effectively.[316] As electric restructuring progresses, the challenges for policymakers and regulators will be to: (1) develop market and industry structures that promote technological innovation; (2) reduce the transaction costs of electricity exchange by developing appropriate markets and institutions prior to launching retail competition; and (3) develop regulatory structures that promote competition while the market institutions develop but then stand aside and let the market work.[317]

As electric restructuring continues and retail competition begins in more states and countries, policymakers and regulators may be asked to intervene to improve the performance of the market or to resolve disputes between market players. In some cases, policymakers and regulators may be able to resolve disputes in ways that are both credible and efficient (e.g., by improving the transparency of the generation market, providing information to consumers, and ensuring appropriate enforcement

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[314] *Winstar* is likely to be an important court case for guiding policymakers, regulators, and the courts with respect to the boundaries of legislative and regulatory discretion over the recovery of stranded costs and related electric restructuring issues. 116 S. Ct. 2432 (1996) [Supreme Court upheld the determination by the U.S. Court of Appeals that the government had breached contractual obligations to the S&Ls and was liable for breach of contract]. See also Winstar Corp. v. United States, 63 F.3d 1531 (Fed. Cir. 1996). See also Sidak and Spulber, *supra* note 194, at 171-177.

[315] See D'Aveni, *supra* note 1, at 217-218.

[316] In this environment, firms will aggressively seek to protect their property rights and strive to succeed in the new industry environment. At the same time, firms will seek to disrupt the strategies of their rivals – and the regulatory process provides a "forum" for these activities. See Ordover and Saloner, *supra* note 262, at 565-577. See also Owen and Braeutigam, *supra* note 4, at 2-9.

[317] Kahn, *supra* note 276, at 39-49. Sidak and Spulber, *supra* note 207, at 137.

when violations occur). Policymakers should be cautious, however, about intervening prematurely — retail competition, which features the high-powered incentives of markets, is more likely to provide efficiency incentives than regulation.[318]

[318] The dilemma that is posed is that incentive intensity is a function of the degree to which a party can reliably appropriate the net receipts associated with the party's efforts and decisions." Williamson defines incentive intensity as "the degree to which a party reliably appropriates the net receipts (which could be negative) associated with its efforts and decisions." Williamson, *supra* note 12. To the extent that there is high risk of expropriation by government intervention, incentives would be diminished, which would reduce the efficiency benefits that market competition would provide.