Institutional Arrangements for Governing the Construction of Electric Generating Units: A Transaction Cost Analysis

I. Introduction

The total cost of providing this nation's electric utility service is in excess of $150 billion per year.[1] During the past decade, an increasing portion of that cost has resulted from the construction of generating plants which ultimately are either canceled or redundant.[2] Recent estimates indicate that some $50 billion have been spent on plants which were canceled before ever going into service, while billions more have been spent on plants which are redundant due to excess capacity in the system.[3] In most cases, the canceled or redundant plant was planned and constructed by utility investors in a good faith effort to provide ample electric power resources for robust economic growth.[4]

As electricity prices have spiraled ever higher, regulatory commissions have begun to disallow complete recovery of costs which are attributable to canceled or redundant plants.[5] For consumers, the immediate effect of these cost disallowances has been a significant reduction in utility bills relative to full-recovery levels.[6] For the utilities concerned, the most immediate effect has been financial hardship or bankruptcy.[7] The long term consequences to both consumers and investors may be less readily observable, but they are equally important. For example, some analysts

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1. Standard & Poor's, Utility Compustat II (1988).

2. Depending on jurisdiction, estimates go as high as 20%. *See e.g.*, Komanoff, *Assessing the High Costs of New Nuclear Power Plants*, Pub. Util. Fort., Oct. 11, 1984.

3. *Id.* at 33.

4. No cases have been found in which a utility was charged with intentionally constructing excess electric capacity.

5. States which have disallowed construction costs include Maine, New Hampshire, Vermont, Delaware, New York, Pennsylvania, Connecticut, Massachusetts, Ohio, Indiana, Michigan, Kentucky, Georgia, Illinois, Missouri, California, Washington, South Carolina, Alabama, Mississippi, Texas, Oregon and Idaho. *The Salomon Brothers 100 Electric Utilities - Company Summaries* (1987).

6. For example, in the recent case of Public Service Co. of Indiana, a 27% rate reduction was urged by intervenors based on the difference between emergency and cost-based rates. Indiana Utility Regulatory Commission, Cause No. 37414. In the case of Northern Indiana Public Service Co., the regulatory agency ultimately disallowed some $200 million in utility costs - resulting in an annual revenue reduction of approximately $40 million. Public Service Commission of Indiana, Cause No. 37023.

7. Among the investor-owned utilities which have faced threats of bankruptcy due to construction cost disallowances are Long Island Lighting Co., Middle South Utilities, Consumers Power Co., Gulf States Utilities, Public Service Co. of Indiana and Public Service Co. of New Hampshire.

have predicted that significant shortages in electricity supply will occur in the 1990's as investors become increasingly concerned that the construction of new generating facilities does not provide the opportunity for reward commensurate with the investment risk.[8] Even if shortages do not occur, it is anticipated that the increasing risk will manifest itself in higher costs of capital for utilities engaged in construction—and, ultimately, in higher rates for the consumers of electric power.[9]

In response to this and other problems, a variety of regulatory reforms have been proposed.[10] Those reforms are widely disparate and may be mutually exclusive.[11] While most of the reform proposals advocate introducing competition to utility markets, there is significant disagreement as to the appropriate nature or extent of that competition.[12] Due to the significant financial impact of any reform alternative, it is imperative that any alteration in current policy be a well-reasoned response aimed at minimizing total costs.[13]

This discussion evaluates potential institutional structures for governing transactions between utility investors and consumers by applying the theories of transaction cost analysis. Transaction cost analysis is a framework for evaluating contractual relations with an increased emphasis

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8. *See, e.g.*, *Power Supply Forecasts Grow Pessimistic*, Wall St. J., October 12, 1988 at A2, col. 2; P. NAVARRO, THE DIMMING OF AMERICA (1985); Studness, *Why a Shortage of Electric Generating Capacity is All But Inescapable*, PUB. UTIL. FORT., August 22, 1985, at p. 44.

9. Estimates by financial professionals included a 200 basis point risk premium in cost of equity calculations performed for Public Service Company of Indiana in a 1986 rate case following Indiana's disallowance of some $2.8 million of construction costs. Testimonies of Prof. Eugene Brigham, Ph.D., and John Curley, Morgan Stanley & Co., in Public Service Company of Indiana's rate case before the Indiana Utility Regulatory Commission, Cause No. 37414 (1985).

10. A good overview of specific proposals can be found in P. JOSKOW & R. SCHMALENSEE, MARKETS FOR POWER: AN ANALYSIS OF ELECTRIC UTILITY DEREGULATION (1983). Other proposals can be found in Plummer, *A Different Approach to Electricity Deregulation*, PUB. UTIL. FORT., July 7, 1983, at 16; Meyer, *A Modest Proposal for the Partial Deregulation of Electric Utilities*, PUB. UTIL. FORT., April 14, 1983, at 23; Dowd & Burton, *Deregulation is Not an Answer for Electric Utilities*, PUB. UTIL. FORT., September 16, 1982, at 21; Killian & Trout, *Alternatives for Electric Utility Deregulation*, PUB. UTIL. FORT., September 16, 1982, at 34; Butler, *A Social Compact to be Restored*, PUB. UTIL. FORT., December 26, 1985, at 17; Scranton, *Reforming and Improving Electric Utility Regulation*, PUB. UTIL. FORT., August 4, 1983, at 19; and the proposals discussed in *Re Pricing and Rate-making Treatment for New Electric Generating Facilities Which Are Not Qualifying Facilities*, 93 PUR 4th 313 (Mass. Dept. Pub. Util. 1988).

11. For example, the deregulation proposals are mutually exclusive with the approach taken in Massachusetts. *See infra* notes 105-07 and 133-43 and accompanying text.

12. This debate is articulated in the articles cited in note 10, above.

13. Total costs are defined to include the costs of producing electricity and the costs of negotiating, monitoring and enforcing the transaction.

on the economic and behavioral characteristics of the transaction and the actors involved.[14] It recognizes that a determination of the most efficient institutional arrangement for governing transactions must take into account the costs of negotiating, monitoring and enforcing the contract.[15] It also recognizes that characteristics such as the uncertainty, complexity and frequency of the transaction are central in predicting those costs, and that the potential for opportunistic behavior is an important factor in determining least-cost institutional structures.[16]

II. An Overview of the Industry

The electric utility industry encompasses the generation, transmission and distribution of electric power.[17] Generation is the production of electric power, typically from fossil fuels; transmission is the bulk transfer of power at high voltages from the generating unit to the local distribution grid; and distribution is the disbursement of low voltage power to end-users.[18] Although the physics of electricity require that the generation, transmission and distribution systems operate together as a coordinated whole,[19] there is no legal requirement that all of those services must be provided by a single company.[20] Economies of scale, however, have led to a large amount of vertical integration within the industry so that, in most cases, the generation, transmission and distribution functions are all accomplished by one corporate structure.[21]

Most companies in the electric utility industry are privately owned and operated.[22] There are, however, a large number of co-operative utilities, as well as some utilities which are governmentally owned.[23] All utilities are granted a legally enforceable monopoly franchise to provide service to some particular geographical area.[24] This monopoly franchise is granted in recognition of the economies of scale which can be realized by constructing only one transmission/distribution system.[25] The mo-

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14. Williamson, *Assessing Contract*, 1 J. Law, Econ. and Organ. 177, at 179 (1985).

15. P. Joskow & R. Schmalensee, *supra* note 10, at 109.

16. *Id.* at 111.

17. A good overview of the electric utility industry can be found in C. Phillips, The Regulation of Public Utilities (1985).

18. *See, e.g.*, P. Joskow & R. Schmalensee, *supra* note 10, at 25.

19. L. Hyman, America's Electric Utilities: Past, Present, and Future (1983).

20. P. Joskow & R. Schmalensee, *supra* note 10, at 11.

21. *Id.* at 11.

22. *Id.* at 12.

23. *Id.*

24. P. Joskow & R. Schmalensee, *supra* note 10, at 29-32. *See also* C. Phillips, *supra* note 17, at 38-41.

25. *Id.*

nopoly franchise is granted subject to limitations imposed by regulatory authorities who determine utility rates calculated to preclude monopoly profits.[26]

The sale of electricity is regulated by both state and federal regulatory agencies.[27] The Federal Energy Regulatory Commission (FERC) has jurisdiction over wholesale transactions between electric utilities based on the federal commerce power,[28] while state regulatory agencies generally have jurisdiction over sales between the utility and its retail customers.[29] State authority over utility rates and charges is limited when a state decision is inconsistent with some federal determination.[30]

The decisions of both state and federal regulatory agencies are framed within the parameters of statutes and case law.[31] Although the administrative agency ultimately determines the absolute level of rates and charges, the parameters of that decision are determined by statutes as interpreted by the courts. For example, in *Citizens Action Coalition of Indiana v. Northern Indiana Public Service Co.*,[32] the Indiana Supreme Court interpreted Indiana statutes to preclude a particular state commission determination. In the general rate case which spawned that litigation, the Indiana commission had determined the legal level of rates and charges based on the commission's determination of the value of NIPSCO's utility plant.[33] That net plant value included costs incurred during the partial construction of an electric generating unit which had ultimately been cancelled. The commission's decision was overturned by the Indiana Supreme Court which held that the commission's determination was contrary to Indiana law which allows only "used and useful" plants to be included in the calculation of utility rates and charges.[34] On remand, the regulatory commission recalculated plant value in accordance with the guidelines of the state court.[35]

III. The Construction of Electric Generating Capacity

Before evaluating the effect of institutional structure on the governance of any transaction, the characteristic features of that transaction

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26. C. Phillips, *supra* note 17, at 75-77.

27. P. Joskow & R. Schmalensee, *supra* note 10, at 117, 127.

28. *Id.* at 69-72.

29. *Id.* at 117.

30. *See, e.g.*, Mississippi Power & Light Co. v. Mississippi, 108 S. Ct. 2428 (1988); Nantahala Power & Light Co. v. Thornburg, 476 U.S. 953 (1986).

31. Utility regulatory agencies, like all administrative agencies, must operate within the confines of law. Due to the significant public interest in public utilities, there is a significant amount of both statutory and judicial law on most issues. The development of public utility law can be found in C. Phillips, *supra* note 17, at 67-108.

32. 485 N.E.2d 610 (Ind. 1985), *aff'g* 472 N.E.2d 938 (Ind. Ct. App. 1984).

33. Public Service Commission of Indiana, Cause No. 37023.

34. Citizens Action Coalition of Indiana, 485 N.E.2d 610.

35. Public Service Commission of Indiana, Cause No. 37023.

must be clearly understood. This Note focuses on the transaction between utility investors and consumers in which investors agree to provide electric generating capacity while consumers agree to pay for that service. Among the distinguishing features of the transaction are the length of time required to complete the exchange and the high degree of idiosyncrasy of the physical asset.

The length of time required to construct a utility power plant ranges from five to ten years depending on such factors as size, type, location.[36] In addition, full recovery of the plant's value is not achieved until the completion of its useful life if the transaction is governed by traditional regulatory structures.[37] This pay-back period is longer than that of most other investments and subjects the transaction to a greater degree of uncertainty.[38] During construction, a variety of factors are subject to change, including: the cost of borrowed money, the cost of materials and supplies, the design standards for the unit, and the demand for the final output.[39] Because all of those factors can have a significant impact on costs and/or profits, the length of the construction period directly impacts the uncertainty of the transaction.[40]

The "idiosyncratic" characteristics of a utility plant are also significant.[41] Idiosyncratic investments are investments which are of value primarily to the original parties to the transaction; they cannot be marketed to third parties if the original transaction cannot be completed.[42] The presence of idiosyncratic investments creates the potential for opportunistic behavior by a party poised to take advantage of differences in ex post versus ex ante valuation.[43] An investment in electric generating

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36. Estimate of A. Chang. Ph.D., Assistant Chief-Technical Analysis, Indiana Utility Regulatory Commission.

37. Full recovery is accomplished by the collection of depreciation expense as an element of authorized rates and charges. Because depreciation expense is calculated and collected according to the useful life of the plant, full recovery is not complete until that period of time has expired. *See* FEDERAL REGULATORY ENERGY COMMISSION, UNIFORM SYSTEM OF ACCOUNTS (1983).

38. Teisberg, *Investment Cost Recovery and Incentive for Power Plant Construction*, PUB. UTIL. FORT. March 3, 1988, at 9.

39. Changes in design standards during construction have been cited as a primary reason for the high cost of nuclear power plant construction. *See, e.g.*, Komanoff, *supra* note 2.

40. Uncertainty here is defined to mean that probabilities cannot be assigned for potential outcomes. This is distinguished from risk which recognized that unfavorable outcomes may occur, but that they can be identified and quantified as to probability.

41. A more complete discussion of idiosyncrasy and its effects on transaction costs can be found in Williamson, *infra* note 49. *See also infra* notes 76-79.

42. *Id.* at 239-41.

43. *Ex ante* means before the transaction, *ex post* means after the transaction. Discussions of idiosyncrasy and opportunistic behavior can be found in Williamson, *supra* note 14, Williamson, *infra* note 49, and Pierce, *A Proposal to Deregulate the Market for Bulk Power*, 72 VA. L. R. 1183 (1986).

capacity is highly idiosyncratic for both physical and institutional reasons.[44] Physically, electric generating units cannot be moved and the power they produce cannot be "wheeled" long distances due to a variety of engineering constraints.[45] Institutionally, the unified ownership of generation and distribution facilities creates incentives for each utility to purchase power only from its own generating units so that full recovery of those construction costs can be realized.[46]

IV. Transaction Cost Analysis: A Law and Economics Approach

A variety of economic theories may be, and have been, applied to evaluate which institutional arrangements are most likely to lead to the efficient governance of contractual relationships.[47] This analysis applies "transaction cost" theories to determine which institutional arrangements are most likely to lead to the efficient governance of the contractual relationship between utility investors and consumers.[48] Although transaction cost theories were first described by Coase some 50 years ago, they have only recently been developed by a new school of institutional economists including Williamson, Klein, Joskow, Goldberg and others.[49]

In his 1937 paper "The Nature of the Firm," Ronald Coase argued that governance structures emerge to minimize the costs of making transactions.[50] The governance structures Coase considered included both internal (corporate) and external (market) structures. He recognized that the determination of whether an internal (intracorporate) or external (market exchange) framework governed an exchange between two or more parties depended on which institutional arrangement could most

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44. The institutional reasons for generating asset idiosyncrasy are described in Pierce, *supra* note 43.

45. Wheeling is moving electric power from one company's service territory to another's. *See, e.g.*, Casazza, *Understanding the Transmission Access and Wheeling Problem*, Pub. Util. Fort. October 31, 1985, at 35.

46. So long as the generation and distribution functions are owned by the same entity, joint profit maximization will require that the distributor purchase power from affiliated generating unit unless the difference in operating costs is unreasonable large.

47. Among the economic theories which have been applied to problems in contract are price theory and the theory of property rights. *See, e.g.*, Posner, *The Chicago School of Antitrust Analysis*, 127 Univ. Pa. L.R. 925-48 (1979).

48. Institutional arrangements to be discussed herein include free markets, regulatory control, binding arbitration and vertical integration.

49. Williamson, *Transaction-Cost Economics: The Governance of Contractual Relations*, 22 J. Law Econ. Organ. 233 (1979); Goldberg, *Regulation and Administered Contract*, 7 Bell J. Econ. 426 (1976); Klein, *Transaction Cost Determinants of "Unfair" Contractual Relations*, 70 Am. Econ. Rev. 356 (1980); Joskow, *Vertical Integration and Long-Term Contracts*, 1 J. Law Econ. & Organ. 33 (1985).

50. Coase, *The Nature of the Firm*, 4 Economica 386 (1937).

efficiently govern that transaction.[51] He further recognized that the total costs of a transaction include not only the cost of the goods or service to be exchanged, but also certain transaction costs associated with establishing and administering a business relationship.[52]

The transaction costs applicable to contracts in general, and to utility construction contracts in particular, include the costs of negotiating contractual terms, the costs of monitoring contractual performance, the costs of enforcing contractual provisions and the costs of breach of the agreement.[53] All of these costs are real economic costs which must be taken into account along with the traditional costs of production in determining the cost-minimizing structure of any legal/economic relationship.[54] Before evaluating transaction costs, however, we must understand not only their general nature, but also the specific characteristics which allow them to be used in a predictive way.[55]

Williamson in particular has focused on identifying the critical dimensions of transaction costs which indicate how and why transactions can be matched with governance structures in an efficient manner.[56] To date, he has identified three characteristics of transactions that affect the nature and magnitude of transaction costs, and thus the efficient governance structure.[57] Those characteristics are: (1) The complexity and uncertainty of the contemplated transaction; (2) The frequency with which the transaction is likely to recur; and (3) The extent to which one party must make transaction-specific (idiosyncratic) investment of time, money and labor.[58] These characteristics have subsequently been used by other authors in their applications of transaction cost theory.[59]

The complexity of the transaction is important because it increases the costs of bargaining, monitoring and enforcing the contract.[60] Complexity increases transaction costs directly by increasing the number of terms which must be negotiated, monitored and enforced.[61] Complexity may also increase transaction costs indirectly by making information

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51. *Id.*
52. *Id.*
53. Joskow, *supra* note 49, at 36.
54. *Id.* at 35.
55. Specific transaction characteristics are described in Williamson, *supra* note 49.
56. *Id.*
57. *Id.*
58. *Id.* at 239.
59. *See, e.g.*, P. Joskow & R. Schmalensee, *supra* note 10; Joskow, *supra* note 49, and Klein, *supra* note 49.
60. Williamson, *supra* note 14.
61. Complex transactions are defined here to include transactions which have a large number of terms, typically involving technical or specialized knowledge.

more costly and/or less reliable.[62] Finally, complexity generally increases uncertainty due to the constraints of imperfect information and increased transaction terms.[63]

The uncertainty of the transaction is also an important determinant of transaction costs.[64] When the future course of performance is uncertain, contractual gaps are apt to be larger and occasions for adaptation will increase in number and importance.[65] A more elaborate and costly governance structure is typically required, including provisions for arbitration when unanticipated contingencies arise.[66] Uncertainty also lowers the economic "utility" of any outcome for risk-adverse parties since all outcomes must be discounted by the likelihood of success.[67]

Another factor that has been shown to impact transaction costs is the frequency of the transaction.[68] When a transaction is frequently repeated, standard terms and conditions may become defined by past performance, reducing the costs of negotiating those terms independently for each transaction.[69] The frequency may also impact transaction costs by affecting the uncertainty of the transaction.[70] Transactions which are frequently repeated are apt to have a more certain set of potential outcomes since information is available concerning the outcomes of past transactions executed under similar circumstances.[71] Frequency of transactions may also impact transaction costs by affecting the behavior of the parties.[72] Parties who must deal frequently with each other are less apt to engage in opportunistic behavior that may adversely affect future transactions.[73] Personal ethical standards may also be higher when the same individuals must frequently interact, and those personal standards may replace the more opportunistic corporate ethic which operates when personal relationships have not developed between the contracting parties.[74]

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62. The relationship between information and transaction costs is described in Heckathorn & Masur, *Bargaining and the Sources of Transaction Costs: The Case of Government Regulation*, 3 J. Law, Econ. & Organ. 69 (1981).

63. *Id.*

64. Williamson, *supra* note 49, at 254.

65. *Id.* at 253-54.

66. Williamson, *supra* note 49, at 246-54.

67. Discussions of the effect of uncertainty on utility maximization can be found in many advanced texts in economics. *See, e.g.*, E. Malinvaud, Lectures on Microeconomic Theory (1972).

68. Williamson, *supra* note 49, at 248-54.

69. Heckathorn & Masur, *supra* note 62.

70. *Id.*

71. *Id.*

72. Williamson, *supra* note 14.

73. *Id.*

74. *Id.*

The idiosyncrasy of the investment impacts transaction costs by allowing one party to behave in an opportunistic manner.[75] Idiosyncratic goods are goods in which transaction-specific investments in either human or physical capital have been made.[76] Transaction-specific investments are those investments which are of value primarily to the intended purchaser under the contract.[77] These investments pose nonmarketability problems because the investor cannot readily recover costs by selling the investment to alternative buyers.[78] When idiosyncratic investments must be made, the relationship between buyer and seller is quickly transformed into one of bilateral monopoly, and transaction costs increase in direct proportion to the ability of one party to exploit that monopoly power.[79] Opportunistic behavior is behavior that involves the appropriation of wealth from one party to the other due to an unanticipated changes in circumstances.[80] As a general rule, opportunistic behavior does not maximize joint profits.[81] The potential for opportunistic behavior has been cited as a primary source of transaction costs due to its impact on transaction risk.[82] The recognition of idiosyncratic investment and its impact on opportunistic behavior is a distinguishing feature of transaction cost analysis.

V. Transaction Cost Analysis of the Traditional Structure

Transaction cost analysis is especially useful in evaluating transactions which involve high degrees of uncertainty and idiosyncrasy, and which occur only infrequently for any two contracting parties because it places greater emphasis on the behavioral characteristics of the parties. The transaction for the construction and cost-recovery of an electric generating unit is subject to a great degree of uncertainty due to the long time required to complete construction and recover costs.[83] The transaction is also highly complex due to the technical nature of the exchange and the long time period required to complete the project.[84] Due to the economies of scale in the construction and operation of generating units,

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75. Williamson, *supra* note 49, at 238-42.
76. *Id.* at 241.
77. *Id.* at 239-40.
78. *Id.* at 238-42.
79. *Id.* at 241. A bilateral monopoly occurs when both the buyer and the seller face a monopoly market; i.e., when there is only one buyer and one seller.
80. Joskow, *supra* note 49, at 37.
81. *Id.*
82. *See* Pierce, *supra* note 43, at 1199-1202.
83. Construction times range from five to ten years for most generating units. *See supra* note 35 and accompanying text.
84. Pierce, *supra* note 43.

construction transactions also take place infrequently for any one utility.[85] On average, a new unit is added every seven to ten years in most service territories.[86] Finally, the investment in electric generating plants may be highly idiosyncratic if the power cannot be sold to an alternative buyer once construction is complete.[87]

The institutional structure traditionally governing utility-consumer transactions is a command-and-control regulatory structure.[88] That structure imposes terms and conditions on the parties to the construction transaction by application of law.[89] With respect to the contract in question, statutes typically provide for rates which are "fair and reasonable."[90] Recovery of the costs of a generating unit are allowed if, and only if, the generating unit becomes "used and useful."[91] The used and useful standard evaluates the "price" term after the investment decision has been made.[92]

The traditional institutional structure allows for an ex post revision of the value of the generating plant since the used and useful determination cannot be made prior to project completion.[93] Because the investment is highly idiosyncratic, this presents an ideal environment for opportunistic behavior on the part of consumers acting through the state regulatory agency.[94] Thus, the ex ante expectations of the parties are frustrated and the seller is placed in the position of being forced to accept terms which have not been bargained for.[95] Ultimately, the opportunistic behavior increases transaction costs and, therefore, the costs of future transactions.[96]

As was noted earlier, one example of ex post revision of the parties' ex ante expectations can be found in the case of Northern Indiana Public

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85. Due to significant differences in demand growth across local jurisdictions, there is a wide variation in capacity plans for local generating companies. The economies of scale indicate that the optimal size for new generating capacity is approximately 1200 megawatts, so if demand grows at 200 megawatts per year, a six year interval between transactions would be implied.

86. Recent and forecast additions to generating capacity indicate that an average electric utility might be expected to add new generating capacity once every 5 to 7 years. *See* Northeast Area Reliability Council Report on Electric Power Capacity (1986).

87. *See supra* notes 44-46 and accompanying text.

88. Pierce, *supra* note 43, at 1191-97.

89. *Id.*

90. *See, e.g.*, IND. CODE § 8-1-2-4 (1988).

91. *See, e.g.*, Citizens Action Coalition v. Northern Indiana Public Service Co., 485 N.E.2d 610 (Ind. 1985), *aff'g* 472 N.E.2d 938 (Ind. Ct. App. 1984).

92. Pierce, *supra* note 43, at 1199-1202.

93. *Id.*

94. *Id.*

95. *Id.*

96. *Id.*

Service Company (NIPSCO).[97] In that case, NIPSCO determined that the future electricity needs of its service territory would require the addition of significant new generating capacity. After construction was begun, the economic climate of the service territory changed and the capacity additions were no longer necessary.[98] In *Citizens Action Coalition of Indiana v. Northern Indiana Pub. Serv. Co.*,[99] the Indiana court refused to allow recovery of construction costs, regardless of their prudency, based on the statutory requirement that utility property must be used and useful before recovery is warranted.[100] That disallowance was later cited as a significant factor which had increased NIPSCO's cost of capital when construction was subsequently begun on additional NIPSCO capacity.[101]

VI. Alternative Institutional Arrangements

If the traditional institutional structure does not efficiently govern the utility construction transaction, it is important to determine what institutional structure would accomplish that goal. A variety of regulatory reforms have been proposed in response to this problem, although no alternative structure has been proposed as a transaction cost minimizing solution per se.[102] Many of those proposals have, however, explicitly recognized their economic consequences, normally characterizing themselves as efforts to either maximize "economic efficiency" or minimize "economic costs."[103]

This discussion addresses two general types of reforms- "deregulation" alternatives, and preapproved contract approaches. The deregulation reforms at issue here are those proposals which incorporate competitive bidding structures as alternatives to state and federal reg-

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97. *See supra* notes 33-35 and accompanying text.

98. Testimony of J. Neiting, representing Petitioner NIPSCO before the Public Service Commission of Indiana, Cause No. 37023.

99. 485 N.E.2d 610 (Ind. 1985), *aff'g* 472 N.E.2d 938 (Ind. Ct. App. 1984).

100. Citizens Action Coalition of Indiana v. Northern Indiana Public Service Co., 485 N.E.2d 610 (Ind. 1985), *aff'd*, 472 N.E.2d 938 (Ind. Ct. App. 1984).

101. Testimony of J. Langum in NIPSCO case before the Indiana Utility Regulatory Commission, Cause No. 38045.

102. Transaction cost analysis has been applied to utility regulatory problems in P. Joskow & R. Schmalensee, *supra* note 10, and Pierce, *supra* note 43.

103. *See, e.g.*, S. Breyer, Regulation and Its Reform (1982); Essay, *Efficiency and Competition in the Electric-Power Industry*, 88 Yale L.J. 1511 (1979); Fairman, *Transmission, Power Pools, and Competition in the Electric Utility Industry*, 28 Hastings L.J. 1159 (1977); Miller, *A Needed Reform of the Organization and Regulation of the Interstate Electric Power Industry*, 38 Fordham L.R. 635 (1970); and the articles cited in notes 10 and 42.

ulation.[104] The preapproved contract reforms take an alternative approach, requiring an increase in the amount of regulatory oversight.[105] Because the competitive bidding proposals rely on market-based governance, while the preapproved contract proposals rely on a regulatory structure to govern the contractual relationship, consideration of these two proposal types will provide a good comparison of institutional arrangements which are reasonably "opposite" in structure.

A. Competitive Bidding Proposals

Competitive bidding proposals typically involve the separation of ownership of generation and distribution facilities, the assurance of equal access to transmission facilities, and the deregulation of wholesale (bulk) power prices.[106] After bulk power prices are deregulated, the institutional structure governing transactions would be the competitive market rather than the regulatory governance structure which has traditionally controlled.[107] Because the deregulation of bulk power prices is the central focus of competitive bidding proposals, those proposals are also commonly referred to as "deregulation" proposals.[108] Although there are a variety of specific competitive bidding proposals, each of which is unique in one or more aspects, it is practical to consider them collectively as a proposal type which incorporates the essential characteristics described below.

The first characteristic of a competitive bidding proposal is the separation of ownership of generation and distribution facilities.[109] The traditional institutional structure reflects the transaction cost economies of vertical integration through the common ownership of generation and distribution facilities. One result of this diversified corporate structure is an economic incentive for the local distribution grid to utilize affiliated generating capacity regardless of whether there is an alternative, lower cost provider.[110] Competitive bidding alternatives, on the other hand, typically require that generating and distribution facilities be owned by

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104. Competitive bidding is accomplished in a free-market structure, as opposed to the traditional command-and-control regulatory structure.

105. *See, e.g.*, *Re Pricing and Rate-making Treatment for New Electric Generating Facilities Which Are Note Qualifying Facilities*, 93 PUR 4th 313 (Mass. Dept. Pub. Util. 1988).

106. One comprehensive example of a competitive bidding proposal is found in Pierce, *supra* note 43. *See also* Plummer, *supra* note 10; Meyer, *supra* note 10; and the articles listed in note 101.

107. *See, e.g.*, Pierce, *supra* note 43.

108. P. Joskow & R. Schmalensee, *supra* note 10.

109. *See, e.g.*, Pierce, *supra* note 43, at 1211.

110. P. Joskow and R. Schmalensee, *supra* note 10.

separate entities, thus eliminating any financial incentive for the distribution portion of the company to favor any particular generator.[111] Competitive bidding will lead to efficient market transactions only when there is no unity of interest between the buyer and the seller; otherwise there is an incentive for the purchaser to contract only with the related supplier.[112] When the local distributor has no financial interest in the success of particular generating facilities, the distributor will have no incentive to purchase from an inefficient supplier and will seek a competitive market-based transaction instead.[113]

Equal access to transmission facilities is the second characteristic of a successful competitive bidding program.[114] Equal access to transmission facilities involves assuring that any buyer and any seller of electricity may transport power over the transmission grid at a non-discriminatory price.[115] Because transmission facilities are required by the transaction as a physical means of exchange, equal access to transmission facilities is required by a competitive market so that buyers and sellers may be efficiently matched.[116] If equal access is not assured, purchasers (distribution companies) may face a monopoly market. Regardless of the number of potential suppliers, the generation market realistically includes only those suppliers who could actually deliver power.

Deregulation of bulk power sales is the final component of competitive bidding proposals.[117] The deregulation of bulk power sales is appropriate when a competitive market for those sales exists, because the competitive market, rather than the regulatory system, will provide the necessary governance structure.[118] If open access to transmission facilities is assured for both suppliers and end-users, a free market may be maintained and prices for generating capacity are determined on the basis of competitive bidding.[119] Competitive prices are driven toward cost and inefficient suppliers are driven from the market.[120]

Competitive bidding proposals would not affect the complexity or uncertainty of the transaction to build and pay for generating facilities.

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111. Pierce, *supra* note 10.
112. *Id.*
113. *Id.*
114. *See, e.g.*, Pierce, *supra* note 43, at 1215-18.
115. *Id.*
116. *Id.*
117. *See, e.g.*, Pierce, *supra* note 42, at 1218-21.
118. *Id.*
119. *Id.*
120. Inefficient suppliers are those suppliers who are unable to provide service at competitive market prices. *See, e.g.*, M. Crew & P. Kleindorfer, Public Utility Economics (1979); R. Millward, Public Sector Economics (1983); F. Scherer, Industrial Market Structure and Economic Performance (1980).

Construction times would not be shortened, nor would costs be more accurately estimated or controlled.[121] Estimating future demand would not be any more precise.[122]

The frequency of transactions would also not be affected by competitive bidding alternatives. The frequency of construction transactions is a function of the size of the generating units which are constructed, while the size of the units is a function of non-institutional factors such as the rate of anticipated demand growth and the construction and operating costs of the units.[123] There is no reason to believe that the frequency of electric generating plant construction would be affected by a competitive bidding governance structure.

The most important implication of competitive bidding proposals is their impact on the idiosyncrasy of the generating plants. Under the existing regulatory scheme each electric plant is "marketed" primarily to one distribution company.[124] Under competitive bidding proposals, each generating unit could be marketed to any distributor.[125] The conditions of bilateral monopoly would never arise and the potential for opportunistic behavior would be correspondingly reduced.[126] The elimination of opportunistic behavior would lower the costs of the transaction because investors will not bear the risk of having their investment appropriated by consumers.[127] The risk of opportunistic behavior has been cited as a primary source of transaction cost, so any governance structure which reduced that risk could more efficiently govern the transaction.[128]

Negotiation costs would, however, be significantly increased under a competitive bidding approach. The present regulatory structure requires only minimal negotiation and bargaining costs because the terms of the

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121. Dowd & Burton, *supra* note 10.

122. *Id.*

123. For a discussion of the determinants of optimal generating unit size, *see* EDISON POWER RESEARCH INSTITUTE, MOVING TOWARD INTEGRATED VALUE-BASED PLANNING (1988) (hereinafter EPRI).

124. The output from any generating station is used primarily to serve the generating company's own service territory. Sales are made to other territories, however, on both a short-term (economy power) and long-term (unit power) basis. The regulatory scheme does not specifically preclude extensive inter-jurisdictional, unit power sales; however, those sales remain the exception rather than the rule.

125. The output from each unit could be marketed on either a short-term or a long-term basis.

126. Pierce, *supra* note 43. Bilateral monopoly was defined in note 79.

127. *Id.*

128. *See, e.g.*, Pierce, *supra* note 43; Williamson, *supra* note 48; and Joskow, *supra* note 49.

transaction are largely defined by law.[129] Market transactions of this complexity would require extensive bargaining and contracting procedures—procedures which would raise transaction costs.[130] Monitoring and enforcement costs would be decreased, though, as market governance replaced much of the existing regulatory structure.[131]

The net impact of the competitive bidding proposals would be a more efficiently governed utility construction transaction if a competitive market can truly be established. Unfortunately, the engineering constraints on wheeling power long distances, as well as the institutional constraints of disintegrating the generation and distribution functions, may be too great to allow a market to form and survive.[132] If those difficulties can be overcome, the elimination of opportunistic behavior would reduce transaction costs making the governance of the transaction more efficient.

B. Preapproved Contract Approaches

As an alternative to competitive bidding proposals, some states have adopted a preapproved contract approach to governing the utility construction transaction.[133] Preapproved contract approaches typically require pre-construction (ex ante) approval of all construction plans, followed by a continuing re-evaluation of the need and cost of those capacity additions.[134] If the need or cost of construction changes, the approval for construction may be terminated at any time.[135] All costs incurred prior to the termination of regulatory approval are recoverable—regardless of whether the plant is ultimately completed.[136]

One benefit of this alternative is that it requires minimal change in the current structure of the industry and in the regulatory framework. Generating divisions would not have to be separated from the transmission and distribution functions—thus economies of scale could be main-

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129. The negotiation and bargaining costs are already "sunk" costs, having been expended as the statutes were written and the judicial cases were litigated. Little if any negotiation is now performed, due to the existence of legal requirements which may not be bargained away.

130. Dowd & Burton, *supra* note 10.

131. *See, e.g.*, Pierce, *supra* note 43; Miller, *supra* note 100; and Weiss, *Antitrust in the Electric Power Industry*, in PHILLIPS & ALMARIN, PROMOTING COMPETITION IN REGULATED MARKETS (1975).

132. *See supra* notes 45-46 and accompanying text.

133. States which have adopted some form of preapproved contract approach include California, Connecticut, Maine, Indiana, Massachusetts and Wisconsin.

134. *See, e.g.*, IND. CODE § 8-1-8.5-1 *et seq.* (1988).

135. *See, e.g.*, IND. CODE § 8-1-8.5-6 (1988).

136. *Id.*

tained.[137] Many, if not most, states currently have deemed forecasting components which are increasingly able to adequately review construction proposals.[138]

The frequency and uncertainty of the transaction would not be affected significantly by the preapproved contract approach. Non-institutional factors would continue to define optimal unit size and the uncertainties of cost and demand would not be affected.[139] The complexity of the transaction would be increased, however, as the parties are forced to evaluate and re-evaluate the prudency of the construction.[140]

Negotiation, monitoring and enforcement costs are high under a preapproved contract structure. The regulatory agency would acquire responsibility to approve the construction expenditures prior to construction, thereby increasing the costs of negotiation.[141] The regulatory agency would also be required to re-evaluate the construction program on an ongoing basis, increasing the costs of monitoring the transaction.[142] Although the regulatory structure required to perform these negotiation and monitoring functions is currently in place in many jurisdictions, the increase in workload that would accompany implementation of a preapproved contract alternative would most certainly increase negotiation and monitoring costs as construction programs are begun.[143]

The primary benefit of the preapproved contract approach is its powerful limit on opportunistic behavior. A preapproved contract creates a legal obligation on the part of the regulatory commission to allow

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137. Economies of scale are economic savings which are realized solely due to the size of the transaction. For example, many goods can be purchased at a lower price when many units are bought at once. Some economies of scale in management, purchasing, etc., would be present regardless of whether generation and distribution are separated or not. The magnitude of those economies, of course, would be greatest with a larger, integrated corporate structure.

138. States with some demand forecasting ability include California, Connecticut, Delaware, Florida, Indiana, Iowa, Maine, Maryland, Michigan, Nevada, New York, Ohio, Oklahoma, Pennsylvania, Texas, Virginia, Washington and Wisconsin. Berry, *Least-Cost Planning and Utility Regulation*, Pub. Util. Fort. March 17, 1988 at 9.

139. *See* EPRI, *supra* note 123.

140. The preapproved contract approach includes a continual re-evaluation of construction needs and costs. *See, e.g.*, Ind. Code § 8-1-8.5-1 to 8-1-8.5-7 (1988); and *Re Pricing and Rate-making Treatment for New Electric Generating Facilities Which Are Not Qualifying Facilities*, 93 PUR 4th 313 (Mass. Dept. Pub. Util. 1988).

141. *Id.*

142. *Id.*

143. Although several states have initiated preapproved contract provisions, or have created demand forecasting components within their utility regulatory agencies, no state has yet constructed a generating unit following that approach. The regulatory effort necessary to evaluate and monitor construction programs is significant indeed, and because the utilities must duplicate those efforts, the total negotiation and monitoring costs of the transaction would doubtless increase when compared to historical levels.

full recovery of all approved costs; there can be no ex post re-evaluation of the contract price.[144] Although the idiosyncrasy of the asset would remain high under this alternative, the statutory controls over the recovery of costs provide the necessary balance to avoid opportunistic behavior.[145]

Total transaction costs should be reduced from present levels under a preapproved contract approach.[146] Although the costs of negotiating and monitoring are high, reducing the potential for opportunistic behavior would more than compensate for that increase.[147] The preclusion of opportunistic behavior allows investment decisions to be based on economic value, and significantly reduces unnecessary transaction costs.[148]

VII. Development of Alternative Governance Structures

An understanding of transaction costs makes it possible not only to evaluate existing proposals, but also to devise additional institutional alternatives that might more efficiently govern the construction transaction.[149] This section will suggest two alternative governance structures and will discuss how those structures could lead to a more efficient utility construction transaction.

A. Binding Arbitration

In "Transaction-Cost Economics: The Governance of Contractual Relations," Oliver Williamson suggests efficient governance structures for a variety of transaction types.[150] Among those transaction types are "occasional" transactions which involve a high degree of uncertainty and idiosyncratic investment.[151] The governance structure identified by Williamson as most efficient for that transaction type is a "trilateral" governance structure whereby third party assistance (arbitration) is em-

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144. *See, e.g.*, Ind. Code § 8-1-8.5-6 (1988); and *Re Pricing and Rate-making Treatment for New Electric Generating Facilities Which Are Not Qualifying Facilities*, 98 PUR 4th 313 (Mass. Dept. Pub. Util. 1988).

145. Opportunistic behavior cannot occur when *ex post* revision is precluded by statute.

146. Recall that total transaction costs include the costs of production, plus the costs of negotiation, monitoring and enforcement.

147. There is no empirical data supporting this conclusion. The conclusion is based on the opinions of the commentators in *Re Pricing and Rate-making Treatment for New Electric Generating Facilities Which Are Not Qualifying Facilities*, 93 *PUR* 4th 313 (Mass. Dept. Pub. Util. 1988).

148. Pierce, *supra* note 43.

149. Efficient transaction governance is that governance which minimizes total transaction costs.

150. Williamson, *supra* note 49.

151. *Id.* at 249.

ployed to evaluate performance and resolve disputes.[152] One governance structure consistent with Prof. Williamson's suggestion could be achieved by providing for federal arbitration of state decisions concerning whether construction costs should be fully recovered.[153] For example, the Federal Energy Regulatory Commission could be given binding arbitration power over any state disallowances of construction costs, and, in addition, the freedom to apply federal prudency rules to that arbitration. The freedom to apply federal prudency rules is an important component of this proposal since the success of arbitration depends largely on the ability to allocate costs fairly.[154] An alternative that provided for federal arbitration yet required the arbitrator to use state "used and useful" rules would deprive the arbitrator of the flexibility necessary to achieve an efficient allocation.

Federal arbitration should have the effect of reducing opportunistic behavior. Although the federal commission is also theoretically subject to opportunistic pressures, the fact is that the FERC has never disallowed any utility investment as being imprudent or excessive.[155] The potential for federal disallowance of imprudent construction expense would preclude the utilities from constructing unnecessary plants except when the reasonable expectations of the parties are that the capacity will be required.[156] On the other hand, federal arbitration would preclude the states from appropriating the utility investment by eliminating ex post review of the transaction based on results which could not have been reasonably anticipated.[157] This elimination of opportunistic behavior reduces transaction costs by allowing the investment to be valued economically in a predictable manner.[158]

Negotiation and monitoring costs would be unaffected by binding arbitration alternatives since the existing regulatory framework would continue to operate unless disagreement as to cost recovery is encoun-

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152. *Id.* at 249-50.

153. Federal arbitration of state decision-making is an example of the trilateral governance structures described by Williamson.

154. Arbitration without flexibility is no more than administrative review of the application of set rules and procedures. Flexibility is typically necessary to find efficient solutions which are distinct from the proposals of the parties.

155. Teisberg, *supra* note 38.

156. No profit-maximizing firm will knowingly construct imprudent generating facilities if a procedure exists for regulatory disallowance of those imprudent costs. If there is a good faith expectation that the facilities will be needed, generating plants that are eventually unnecessary may be constructed.

157. The appropriation of utility investment occurs by the *ex post* revision of the mutual expectations of the parties. *See, e.g.*, Pierce, *supra* note 43.

158. *Id.*

tered.[159] The cost of enforcement would, however, be increased due to the inevitable cost of the arbitration structure.[160] This increase in enforcement costs would be minimal when compared with the reduction in transaction costs which accompanies the reduction in opportunistic behavior.[161]

A consideration of transaction costs implies that an institutional structure incorporating binding arbitration would more efficiently govern the utility construction transaction.[162] Although enforcement costs would increase, the potential for opportunistic behavior that pervades the existing institutional structure would be reduced significantly.

B. Public Ownership of Generating Facilities

Another alternative governance structure is suggested by Williamson's analysis if the utility construction transaction is determined to be recurrent, rather than infrequent.[163] When the frequency of the transaction is recurrent, a unified (vertically integrated) governance structure is implied.[164] Vertical integration exists when one firm both supplies and utilizes some factor of production such that the output from one portion of the company is the input for another portion.[165] For example, the current electric utility industry is vertically integrated since each utility company generates, transmits and distributes electric power.[166] The output from the generation portion of the company is the input of the transmission portion, and the output of the transmission portion is the input for the distribution function. The advantage of vertical integration is that adaptations can be made sequentially without the need to consult,

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159. Binding arbitration would not affect negotiation and monitoring costs in this case because those costs are determined by the existing regulatory structure. In some cases, binding arbitration would affect negotiating and monitoring costs depending on the confidence the parties have in the arbitration process. The less confidence the parties have in arbitration, the more likely they are to address all terms and conditions in the negotiation process.

160. A federal arbitration structure would be relatively inexpensive to establish and maintain because the federal institutional structure is already in place. It can be reasonably assumed that the FERC would seldom have to arbitrate specific disagreements since it is the threat of arbitration, rather than the arbitration itself, that will modify the parties' behavior.

161. Again, the costs of opportunistic behavior are believed to be significant in most jurisdictions. *See* Pierce, *supra* note 43.

162. Efficiency is achieved by minimizing transaction costs.

163. Williamson, *supra* note 49.

164. *Id.* at 253.

165. M. Crew & P. Kleindorfer, The Economics of Public Utility Regulation (1986).

166. P. Joskow & R. Schmalensee, *supra* note 10, at 11.

complete or revise interfirm agreements.[167] When a single ownership spans both sides of the transaction, joint profit maximization exists and price and quantity adjustments can be made with the frequency necessary to maximize joint profits.[168]

One example of an institutional structure which incorporates the principals of unified governance is the public ownership of generating facilities.[169] Although public ownership of generating facilities is not vertical integration per se, public ownership does provide for unified ownership on both sides of the transaction, thereby creating a unity of interest similar to vertical integration schemes.[170] With public ownership, the same party would be both buyer and seller, and opportunistic behavior would not occur since it has no ability to maximize joint profits.[171]

The complexity, uncertainty and frequency of the transaction is not affected by public ownership of generating capacity. As was the case with the competitive bidding scenario, construction times would remain long, while predicting costs and demand would remain highly complex and subject to error.[172] The frequency of the transactions should not be impacted so long as the optimal unit size is determined by non-institutional factors.[173] The significant cost of financing utility construction might, however, be an incentive for constructing smaller units.[174]

The idiosyncrasy of the investment may not be affected by a public ownership scenario since neither the asset nor its output need be transferable for public ownership to be in force.[175] If generating units are financed and owned by local consumers, and are to be used solely for their benefit, the physical and institutional constraints may continue to exist.[176] If the ownership of generating facilities is accomplished at the state or federal level the idiosyncrasy of the investment may be reduced as the output from any unit may be used to serve a variety of service

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167. Williamson, *supra* note 49, at 253.

168. *Id.*

169. Public ownership of generating facilities incorporates the principles of vertical integration, but it is not truly a vertical integration structure.

170. Public ownership is distinct from true vertical integration since individual consumers would still purchase the electricity. With true vertical integration assets are transferred intrafirm, without a market transaction.

171. Joint profits are the sum of the buyer's profits and the seller's profits. Joint profits are not necessarily achieved by maximizing the profits of each party separately.

172. Dowd & Burton, *supra* note 10.

173. *Id.*

174. If the economies of scale tending to make large units more economic are not significant it may be more efficient to build smaller units more frequently.

175. Public ownership per se does not require that a generating unit serve more than one service territory.

176. The physical and institutional constraints are described in notes 45-46 and accompanying text.

territories.[177] The impact of the idiosyncrasy would be eliminated because the unification of financial interest precludes opportunistic behavior.[178] Idiosyncrasy is only important due to its opportunistic impact so the idiosyncrasy of the investment is not of great concern when public ownership is accomplished.[179] Under public ownership, the consumers are at interest on both sides of the transaction so there is no potential for opportunistic gain by ex post revision of the contract.

The most persuasive factors against the public ownership proposal are political and financial. On the political level, there is a national aversion to public ownership.[180] The American economy is based on free enterprise and any proposal to eliminate private ownership of utility assets would undoubtedly meet substantial resistance. The significant cost of generating capacity would also create financial constraints.[181] While utility investors may voluntarily commit millions of dollars to a construction project, a public ownership scenario would make those investments mandatory for all consumers.[182] Many people do not have sufficient resources to prospectively pay for generating facilities which may not be used for several years.[183]

A transaction cost analysis of public ownership of generating facilities indicates that transaction costs could be significantly reduced through that alternative. The potential for opportunistic behavior would be eliminated, although bargaining and monitoring costs may be increased. Political and financial constraints may, however, preclude this alternative from extensive consideration.

VIII. Conclusion

Governance structures—the institutional framework within which transactions are negotiated and executed—vary with the nature of the

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177. When the output from a generating unit can be sold to a competitive market of potential purchasers the investment is no longer idiosyncratic. Idiosyncrasy requires that the asset be transaction-specific.

178. Opportunistic behavior is precluded since joint profit maximization is not achieved by uncooperative behavior for a unified firm.

179. Williamson, *supra* note 49, at 241.

180. The trend in the United States has been toward more private ownership rather than more public ownership.

181. Costs of new generating facilities range from $100 million to $5 billion. *See* Dept. of Energy, Projected Costs of Electricity from Nuclear and Coal-Fired Power Plants (1986).

182. It can be assumed that all taxpayers would participate in any public ownership of electric generating facilities since any plan involving optional participation would encounter "free-rider" problems.

183. The cost to consumers over time would remain the same as it currently is since the existing regulatory scheme provides for the "purchase" of generating facilities through the collection of depreciation expense. There would be an upfront cost, though, as existing plant were transferred from private to public ownership.

transaction. Transaction cost analysis evaluates the characteristics of a transaction to determine what institutional structure can most efficiently govern. In particular, the characteristics of complexity, uncertainty, frequency and idiosyncrasy are emphasized by transaction cost analysis. Transaction cost analysis recognizes that these characteristics affect the costs of negotiating, monitoring and enforcing the contract, and that these transaction costs are real costs which must be accounted for in determining the least-cost institutional structure.

The transaction at issue here is the transaction whereby utility investors finance and build an electric utility plant for consumers who subsequently compensate the investors for their costs. That transaction may be characterized as an infrequent transaction requiring significant amounts of transaction-specific investment to be made under conditions of great uncertainty. The transaction is infrequent because economies of scale dictate the addition of large generating units which are added every five to ten years. The transaction requires a large amount of transaction-specific (idiosyncratic) investment so long as physical and institutional factors preclude the wheeling of bulk power. The transaction is uncertain since the long time necessary to build the plant and complete the transaction makes the ultimate economic value of the plant difficult to predict.

The traditional regulatory governance structure is not an efficient way to govern the utility construction transaction because it allows the amount of construction expense which can be recovered through rates to be determined after the investment has been made. Because the investment is idiosyncratic (involves a high level of sunk costs), this ex post determination of asset value allows opportunistic behavior by consumers acting through the regulatory agency. The potential for opportunism is especially troublesome under this governance structure because of the great uncertainty caused by the long time necessary to build the plant and complete the transaction. The potential for opportunistic behavior by regulators increases the cost of the transaction by imposing significant risks on investors who may have their investment "appropriated" by an ex post determination of the asset's value.

Competitive bargaining proposals may reduce transaction costs by eliminating the generating asset's idiosyncrasy. Once the investment is not transaction-specific, the potential for opportunistic behavior is significantly lowered and the total cost of the transaction is correspondingly reduced. The risks and uncertainties of opportunistic behavior present significant costs to the transaction, and any institutional arrangement which reduces those costs should more efficiently govern. The costs of regulation (monitoring and enforcement) are also decreased significantly as a market governance structure accomplishes those duties at a lower cost. Competitive bidding proposals do require an increase in bargaining

costs, although the reduction in other transaction costs should more than compensate for that increase.

Preapproved contract approaches may also reduce transaction costs by limiting the potential for opportunistic behavior. In contrast to competitive bidding proposals, preapproved contract alternatives do not limit opportunistic behavior by reducing the investment's idiosyncrasy; instead, they utilize extensive regulatory monitoring coupled with the statutory preclusion of opportunistic behavior. Preapproved contract approaches will increase negotiation and monitoring costs, but the reduction in opportunistic behavior makes the total transaction cost low.

Institutional arrangements incorporating binding arbitration might also be a more efficient means of governance. Binding arbitration is a form of the trilateral governance structure that is especially efficient when investments are idiosyncratic and transactions are infrequent. Binding arbitration increases enforcement costs, but decreases the risk of asset appropriation and thereby lowers the cost of the construction transaction. Like preapproved contract alternatives, binding arbitration would require minimal change in the existing institutional structure.

The public ownership of generating facilities is another institutional structure which would decrease total transaction costs. When one party is both "seller" and "buyer" there is no incentive to shift costs onto another party by behaving in an opportunistic manner. Negotiation, monitoring and enforcement costs would also be reduced as those processes are internalized through vertical integration. In spite of the potential benefits, however, the political and financial constraints arising from the public ownership of private property would appear to preclude this option from gaining widespread acceptance.

The transaction cost literature has identified opportunistic behavior as a primary determinant of transaction costs, and of the efficiency of institutional structures which govern transactions. All of the proposals discussed reduce transaction costs by limiting opportunistic behavior when compared with traditional regulatory governance. Serious consideration of alternative institutional structures for governing the utility construction transaction is required if transaction costs are to be reduced and utility construction is to proceed at the levels necessary to support American economic growth.

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