

**THE ECONOMICS OF
NEGATIVE BARRIERS TO ENTRY:
HOW TO RECOVER STRANDED COSTS
AND ACHIEVE COMPETITION
ON EQUAL TERMS IN THE
ELECTRIC UTILITY INDUSTRY**

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EXECUTIVE SUMMARY

Stranded costs seem to be a major roadblock to structuring a successful transition to deregulation in the electric utility industry. A major pillar of this roadblock is the belief among some observers that recovery of stranded costs is incompatible with competitive markets and an impediment to a successful transition to deregulation. We show that this is not the case by distinguishing between strong and weak "competitive neutrality."

The test for what we will call "strong" competitive neutrality is that the stranded cost recovery mechanism, combined with the obligation of the incumbent to amortize the sunk cost legacy from the past regulatory regime with the revenues provided by the recovery mechanism, should in combination be neither a competitive advantage or disadvantage as far as incumbents and entrants are concerned. Equally efficient incumbents and entrants going forward should have the same *expectation* of earning their cost of capital going forward. "Weak" competitive neutrality means only that both incumbents and entrants should be free to compete for both existing and new load on the basis of their competitive advantages or disadvantages arising from true efficiency differences (real resource costs) going forward. Strong competitive neutrality includes weak neutrality, but not vice versa.

Allowing incumbents a fair opportunity for recovery of stranded costs as we have defined them during a transition to deregulation is not an impediment to competition on equal terms. By definition, a *fair opportunity for recovery of stranded costs creates competition on equal terms* (and conversely) because it imposes on all competitors the same degree of exposure to the legacy of sunk costs of the past regulatory regime. If done correctly, strong neutral recovery of stranded costs achieves a "level playing field" because it removes an artificial financial and competitive advantage arising (in the absence of the stranded cost recovery mechanism) solely because entrants do not bear the sunk cost of the past regulatory regime and incumbents do.

If the stranded cost recovery mechanism produces this result, it has achieved strong competitive neutrality, insofar as the recovery mechanism is incurred. All competitors would bear the full

competitive advantages or disadvantages arising solely from differences in non-stranded costs, *i.e.*, true efficiency differences. The mechanism would thus also achieve weak competitive neutrality.

Our paper shows these results with some detailed examples. However, there is nothing new or remarkable about the competitive neutrality of stranded cost recovery. After all, there are numerous examples of raising revenue through competitively neutral methods. Sales taxes are one example. They create no artificial competitive advantages and disadvantages as long as they are borne equally by all competitors, and they can be designed to recover as little or as much as desired.

The sales tax analogy also points to a rather profound and perhaps unexpected “robustness”¹ of weak competitive neutrality as defined solely by preserving the relative true cost advantages of competitors going forward. The playing field will be leveled regardless of whether the sales tax is one percent or five percent or any other level—as long as the tax is indeed recovered in a uniform, non-discriminatory manner. Thus, the narrow goal of preserving forward-looking relative efficiency differences does *not*, by itself, require any particular degree of recovery of sunk costs.

Weak competitive neutrality is an amazingly robust property of revenue recovery mechanisms in terms of preserving the true relative efficiency advantages of competitors going forward. But, perhaps paradoxically, it is so robust that weak competitive neutrality (defined as preserving true relative efficiency difference of competitors) has little discriminatory power to tell us what the level of revenue recovery ought to be. For this determination, we need to consider the additional dimension that is recognized in strong neutrality.

All analogies break down at some point, so it might be useful to illustrate a simple case of a competitively neutral stranded cost recovery for utilities to motivate the findings. Suppose that it were possible for electric utility stranded costs as we have defined them to be accurately identified up front and paid by a third party who agreed to assume the liability in exchange for the right to assess all competitors reasonable non-discriminatory fees necessary to amortize the liability. Obviously, this mechanism, if successfully implemented, would be competitively neutral.

¹ “Robustness” is a term of art used by economists to describe a property that tends to be invariant with respect to assumed conditions.

It is not so obvious that other possible stranded cost recovery mechanisms, such as transmission or distribution surcharges, exit fees, and the like, will also be weakly competitively neutral. However, we show that any non-discriminatory mechanism will, in fact, be no different in effect than a sales

tax levy of equal magnitude on all competitors, despite differences in the formal means of recovery of the various proposed methods. Moreover, any such mechanism that collects *all* and only the true stranded costs will be strongly neutral, again regardless of means of collection.

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INTRODUCTION

The Stranded Cost Problem

The problem of "stranded costs" is undoubtedly the most vexatious issue confronting customers, utilities, investors, and regulators in the electric utility industry.² Even when all parties can agree that a transition to more competition and less regulation would be desirable, stranded costs seem to be a major roadblock to structuring a successful transition.³ A major pillar of this roadblock is the belief among some observers that recovery of stranded costs is incompatible with competitive markets and an impediment to a successful transition to deregulation.⁴ While charges of anticompetitive effect have been commonly heard in the debate, there has been surprisingly little rigorous economic analysis of these claims. This paper seeks to fill that void.

What are these "stranded costs"? There are numerous definitions and disagreements over how to define "stranded costs." For the purposes of this discussion, "stranded costs" are defined to be

² See Benjamin A. Holden, "Shift to Deregulation May Cost Electricity Industry \$135 Billion," *The Wall Street Journal*, August 7, 1995, p. B4; and "Moody's Report Predicts \$135-Billion in Stranded Costs Over Next 10 Years," *Electric Utility Week*, August 14, 1995, p. 3. This figure represents 80 percent of the equity base of the electric utility industry, according to the Moody's Investor's Service, "Stranded Costs Will Threaten Credit Quality of U.S. Electrics," August 1995.

³ See Benjamin A. Holden, "Power Plays: California's Struggle Shows How Hard It Is to Deregulate Utilities," *The Wall Street Journal*, November 28, 1995, pp. A1 and A11, and "California Regulators Approve Plan to Deregulate Market for Power by '98," *The Wall Street Journal*, December 21, 1995, p. A2.

⁴ Typical of these claims, David W. Penn, "Where Have You Gone, Dr. Kahn?," *The Electricity Journal*, December 1994, pp. 2-3, asserts:

Stranded cost payments have anticompetitive effects. They will delay or prevent desired new competition—by erecting a barrier to entry for alternative suppliers and trades; by discriminatorily favoring and shielding certain individual competitors; by artificially giving an entrenched competitor a paid-off asset with which to compete with rivals; and by distorting transmission prices if such generation charges are placed there. . . .

Putting generation stranded cost charges on transmission is indeed a tying arrangement. . . .

See also Robert Michaels, "Unused and Useless: The Strange Economics of Stranded Investment," *The Electricity Journal*, October 1994, pp. 12-22. See also Peter Navarro, "Electric Utilities: The Argument for Radical Deregulation," *Harvard Business Review*, January-February, 1996, pp. 113-125; for a rebuttal, see Paul Joskow, "Does Stranded Cost Recovery Distort Competition?," *The Electricity Journal*, April 1996, pp. 31-45.

investments or cost commitments made by incumbents in the prior regime of cost-of-service regulation (i.e., "sunk costs") that cannot expect to earn their cost of capital and/or be recovered from customers under the proposed new rules of competitive access to utility systems.⁵ Stranded costs are also sometimes referred to as "transition costs."

Acceptable stranded cost recovery mechanisms should try to satisfy as many as possible of the following criteria: reliable cost recovery, competitive neutrality, allocational efficiency, fairness of incidence on customers, transparency and predictability, administrative simplicity, objectivity (few concerns about biases or distortions in the estimates), automatic termination ("sunsetting"), and incentives to mitigate. Most of these are familiar regulatory policy objectives, but the question of competitive neutrality is relatively new, so it is examined in detail.

By our definition of stranded costs, we mean to convey the common sense idea that stranded costs represent "negative barriers to entry"⁶ that arise from competitive handicaps that originate purely because only incumbents are burdened with the sunk costs arising in the past regulatory regime.⁷ They do not arise from true efficiency advantages or disadvantages of incumbency. Stranded costs thus represent an artificial competitive asymmetry in favor of entrants that would not arise in a

⁵ By this definition, we do not intend to depart from conventional definitions of stranded costs and methods for measuring their magnitude.

⁶ "Barriers to entry" are generally defined in economics as cost advantages held by incumbents over entrants. See Christian C. von Weizsäcker, "A Welfare Analysis of Barriers to Entry," *Bell Journal of Economics*, Vol. 11, No. 2 (1980), pp. 399-420. We have dubbed the reverse situation to be one of "negative barriers to entry." By definition, the sunk cost disadvantages arising from incumbency in the transition to deregulation are the stranded costs.

⁷ The problems of a transition to competition from regulation almost always arise as a result of such legacies of the prior regulatory regime, which may create both competitive advantages or disadvantages to incumbents. See John R. Meyer and William B. Tye, "Toward Achieving Workable Competition in Industries Undergoing a Transition to Deregulation: A Contractual Equilibrium Approach" in William B. Tye, *The Transition to Deregulation* (New York: Quorum Books, 1991), pp. 13-18. We assume here the principle of bifurcation, as discussed below, which means that competitive access pricing mechanisms are employed separately to address and rectify any anticompetitive advantages arising solely from incumbency. Bifurcation does not necessarily imply that stranded cost recovery mechanisms are necessarily separate from other cost recovery mechanisms, however (see discussion below).

purely competitive market.⁸ Entrants⁹ obviously suffer no such handicaps from the legacy of regulation, in the absence of a stranded cost recovery mechanism.

The Competitive Neutrality Test for Stranded Cost Recovery

How shall we know "competitive neutrality," a "level playing field," or "competition on equal terms" when we see them? The test for what we will call "strong" competitive neutrality is that the stranded cost recovery mechanism, combined with the obligation of the incumbent to amortize the sunk cost legacy from the past regulatory regime with the revenues provided by the recovery mechanism, should in combination be neither a competitive advantage or disadvantage as far as incumbents and entrants are concerned. Equally efficient incumbents and entrants going forward should have the same *expectation*¹⁰ of earning their cost of capital going forward. "Weak"

⁸ William J. Baumol, Paul L. Joskow, and Alfred E. Kahn, "The Challenge for Federal and State Regulators: Transition from Regulation to Efficient Competition in Electric Power," submitted to the Federal Energy Regulatory Commission, Docket No. RM95-8-000, *et al.*, December 4, 1994, identify the following mutually non-exclusive categories of stranded costs:

The three main categories of potential stranded costs are: (1) past investments in utility-owned generation whose total costs exceed the prices that either do prevail in markets that are already competitive or would prevail in that event; (2) power purchase contracts (most often with non-utility companies), which the utilities were forced to undertake, based on forecasts of costs and prices that have turned out to be too high; and (3) regulatory assets—including deferred taxes, costs of post-retirement employee benefits, nuclear decommissioning costs and other expenses capitalized for ratemaking purposes such as DSM—which could similarly not be recovered in competition with generators not similarly burdened.

See also Steven C. Anderson, *et al.*, "Electricity Transition Costs," Harvard Electricity Policy Group, John F. Kennedy School of Government, Harvard University, October 22, 1993 (Draft).

⁹ We use the term "entrant" generally to describe firms that seek to serve customers in a service territory newly opened to competitive access. The "incumbent" is the prior certificated utility which previously served the customer. The entrant may well be an incumbent firm in an adjacent service territory—one which in fact may have incurred stranded costs in connection with providing that service as well. (This case is considered below.)

¹⁰ "Expectation" by all means does not guarantee that the cost of capital will be earned. Confusion arises if one applies common dictionary meanings of "expected": "to consider probable or certain" or "to consider reasonable, due, or necessary" (*Webster's* 1976, 402). These meanings are altogether different from the statistical meaning of expecting to earn the cost of capital as an average return over all possible future states of the world during the transition. Hereafter, we use "expected" only in the statistical sense:

... the idea of expectation of a random variable is closely connected with the origin of statistics in games of chance. Gamblers were interested in how much they could "expect" to win in the long run in a game, and in how much they should wager in certain games if the game was to be "fair." Thus,

(continued...)

competitive neutrality means only that both incumbents and entrants should be free to compete for both existing and new load on the basis of their competitive advantages or disadvantages arising from true efficiency differences (real resource costs) going forward. Strong competitive neutrality includes weak neutrality, but not vice versa.

Intuitively, we may thus propose the following "smell test" for the strong competitive neutrality of a stranded cost recovery mechanism. Given the combination of (1) the burden of amortizing the sunk costs of the past regulatory regime, (2) the revenues from the offsetting stranded cost recovery mechanism for the incumbent, and (3) no competitive advantages or disadvantages arising from other sources (*i.e.*, assume "all else equal"), would an investor prefer to be the entrant or the incumbent? If the stranded cost recovery mechanism produces indifference to this choice, it has achieved strong competitive neutrality, insofar as the recovery mechanism is incurred. All competitors would bear the full competitive advantages or disadvantages arising solely from differences in non-stranded costs, *i.e.*, true efficiency differences.

Allowing incumbents a fair opportunity for recovery of stranded costs as we have defined them during a transition to deregulation is not an impediment to competition on equal terms. By definition, *a fair opportunity for recovery of stranded costs creates competition on equal terms* (and conversely) because it imposes on all competitors the same degree of exposure to the legacy of sunk costs of the past regulatory regime. If done correctly, strong neutral recovery of stranded costs achieves a "level playing field" because it removes an artificial financial and competitive advantage arising (in the absence of the stranded cost recovery mechanism) solely because entrants do not bear the sunk cost of the past regulatory regime and incumbents do.

¹⁰ (...continued)

expected value originally meant the expected long-run winnings (or losings) over repeated play; this term has been retained in mathematical statistics to mean the long-run average value for any random variable over an indefinite number of samplings. This holds whether a large number of samplings will actually be conducted or whether the situation is a one-trial affair and we consider hypothetical repetitions of the situation. Over a long series of trials, we can "expect" to observe the expected value. At any *single* trial, we in general cannot "expect" the expected value; usually the expected value is not even a possible value of the random variable for any single trial. . . .

See William L. Hayes and Robert L. Winkler, *Statistics*, Vol. I (New York: Holt Rinehart & Winston, 1970): 136-137.

Before we show this result with some detailed examples, it might be helpful to consider that there is nothing new or remarkable about the competitive neutrality of stranded cost recovery. After all, there are numerous examples of raising revenue through competitively neutral methods. Sales taxes are one example. They create no artificial competitive advantages and disadvantages as long as they are borne equally by all competitors, and they can be designed to recover as little or as much as desired (ignoring income effects).

Consider a group of merchants selling oriental rugs in a highly competitive market at a bazaar. Assume that all merchants are price takers and only earn a competitive rate of return, so that the same rug would sell for the same price. They seek to pay the rent on a previously constructed facility that will be used by all merchants. Obviously, if one merchant had to pay the cost of the building, that merchant would be at a competitive disadvantage. If all merchants assess themselves an equal sales tax that they pay into an escrow fund to pay the rent, all merchants are free to compete on equal terms on the basis of their true efficiency differences going forward. The sales tax the customer pays on a rug of equivalent price is the same regardless of which merchant he or she patronizes. And the competitive neutrality is the same whether we assess the levy on the merchants (who include it as a cost of business in their prices) or on the customers directly. As we shall show, the same result holds even if only one merchant is obligated legally to pay the rent, but is allowed to assess an actuarially fair sales tax (access charge) on all other merchants that exactly offsets the per unit liability. Finally, customers will get the benefits of true efficiency gains as a result of competitive pressures on the rug merchants, despite the requirement to fund the escrow account to pay the rent.

The sales tax analogy also points to a rather profound and perhaps unexpected "robustness"¹¹ of weak competitive neutrality as defined solely by preserving the relative true cost advantages of competitors going forward. The playing field will be leveled regardless of whether the sales tax is one percent or five percent or any other level—as long as the tax is indeed recovered in a uniform, non-discriminatory manner. Thus, the narrow goal of preserving forward-looking relative efficiency differences does *not*, by itself, require any particular degree of recovery of sunk costs (whether for the tents of the bazaar or for the sunk costs of prudent but now out-of-market investments made under utility regulation).

¹¹ "Robustness" is a term of art used by economists to describe a property that tends to be invariant with respect to assumed conditions.

Weak competitive neutrality is an amazingly robust property of revenue recovery mechanisms in terms of preserving the true relative efficiency advantages of competitors going forward. But, perhaps paradoxically, it is so robust that weak competitive neutrality (defined as preserving true relative efficiency differences of competitors) has little discriminatory power to tell us what the level of revenue recovery ought to be. For this determination, we need to consider an additional dimension—such as how much rent must be paid every month—that is recognized in strong neutrality.

All analogies break down at some point, so it might be useful to illustrate a simple case of a competitively neutral stranded cost recovery for utilities to motivate the discussion that follows. Suppose that it were possible for electric utility stranded costs as we have defined them to be accurately identified up front and paid by a third party who agreed to assume the liability in exchange for the right to assess all competitors reasonable non-discriminatory fees necessary to amortize the liability. Obviously, this mechanism, if successfully implemented, would be competitively neutral.

It is not so obvious that other possible stranded cost recovery mechanisms, such as transmission or distribution surcharges, exit fees, and the like, will also be weakly competitively neutral. However, we will show below that any non-discriminatory mechanism will, in fact, be no different in effect than a sales tax levy of equal magnitude on all competitors in our rug bazaar, despite differences in the formal means of recovery of the various proposed methods. Moreover, any such mechanism that collects *all* and only the true stranded costs will be strongly neutral, again regardless of means of collection.

Goals for Stranded Recovery Mechanisms

We are now in a position to define more precisely the goals for the recovery mechanism for stranded costs:

1. Provide a mechanism for reliable collection of the revenues required to fully amortize the legacy of stranded costs;
2. Allow both incumbents and entrants the opportunity to compete on equal terms to recover fixed costs not sunk in the prior regulatory regime and not stranded as a result of the transition to deregulation;

3. Limit the duration and magnitude of the recovery mechanism in the transition only to true stranded costs (e.g., encourage mitigation and sunseting);
4. Allow all competitors to realize the competitive advantages of any true efficiencies they have going forward;
5. Promote price and service competition among competing suppliers so that true efficiency gains will tend to benefit customers in the long run;
6. Minimize transaction costs of administering the transition; and
7. Ensure that the transition costs are borne by customers in an equitable way.

The strong form of competitive neutrality is concerned with the full recovery of sunk costs on equal terms and is addressed by the first three goals. The basic idea behind strong competitive neutrality is that all equally efficient competitors should have an equal fair opportunity to *expect* to earn their cost of capital, i.e., to recover fixed or sunk costs in the transition. The first goal achieves this equal opportunity by using stranded cost recovery to offset the sunk cost liabilities from the prior regulatory regime which would otherwise be unrecoverable in the competitive environment. The second and third goals assure that both incumbents and entrants will face going forward exactly the same risk of recovering any fixed costs not deemed stranded from the transition (in particular, any new fixed costs incurred after the transition). Put differently, all investments (both new and old, for incumbents and entrants) will *expect* to earn their cost of capital after the transition—stranded costs because of the recovery mechanism and non-stranded fixed costs because they are expected to earn (at least) their cost of capital in the transition even without the recovery mechanism (else new investments would never take place during and after the transition in an economically rational capital market).

The present discussion focuses on weak competitive neutrality, but some brief comments explaining the economic rationale for strong competitive neutrality are in order. Much of the discussion to date has focused on investor expectations and the equity and efficiency rationale for a transition mechanism from a regime of strict regulation to more competition. The transition ought to preserve a fair opportunity for investors to *expect* to earn their cost of capital on prudent investments made in the prior regulatory regime. Competitive symmetry with respect to the *expectation* that all

investments, both old and new, will earn their cost of capital is the heart of the strong competitive neutrality rationale for stranded cost recovery.¹²

There are many legal and economic arguments in favor of a transition mechanism that preserves that expectation. The Supreme Court, in *Duquesne Light Co. v. Barasch*, 109 S.Ct. 609 (1989), identified a test of "constitutional magnitude" that surely would be flunked by a complete disallowance of stranded cost recovery, given the magnitudes involved:

*The risks a utility faces are in large part defined by the rate methodology because utilities are virtually always public monopolies dealing in an essential service, and so relatively immune to the usual market risks. Consequently, a State's decision to arbitrarily switch back and forth between methodologies in a way in which required investors to bear the risk of bad investments at some times while denying them the benefit of good investments at others would raise serious constitutional questions. But the instant case does not present this question.*¹³

From an economic point of view, a regulatory regime that sets revenue requirements so that the expected rate of return allows investors to expect to earn the cost of capital balances the best interests of both investors and ratepayers. An expected rate of return above the cost of capital makes customers overpay and an expected rate of return less than the cost of capital shortchanges investors. Such a rate of return denies the company the ability to attract capital, to maintain its financial integrity, and to expect a rate of return commensurate with that on other enterprises attended by corresponding risks and uncertainties.¹⁴ The economic rationale for maintaining that expectation in

¹² Some critics of stranded cost recovery offer a third dimension of competitive neutrality, sometimes expressed as a fairness test. This test concerns the fact that some utilities have "written off" past investment mistakes in the prior regulatory regime while others did not. Allegedly, those who have already written off these costs are being treated asymmetrically. But this is not the case if these excess costs were written off as part of an agreement with regulators. These costs would never have been recovered anyway had the prior regime of regulation continued, unlike true stranded costs. Of course, it may be the case that some excess costs would not have been recoverable from ratepayers because of competitive pressures even in the prior regulatory regime. But that will also be true in the stranded cost recovery regime (see discussion of this case below). The objective of the recovery should be to allow investors in the incumbent the same opportunity to expect to earn their cost of capital as a fair regulatory system under the prior regulatory regime.

¹³ *Duquesne* at 619 [emphasis added].

¹⁴ See A. Lawrence Kolbe, et al., *The Cost of Capital* (Cambridge, MA: MIT Press, 1984).

the transition is really no different than the rationale for creating that *expectation* in the first place.¹⁵ Regulatory agencies such as the FERC have developed numerous rate methodologies to prevent arbitrary windfalls or losses during regulatory transitions.¹⁶

Critics of stranded cost recovery sometimes claim that investors in electric utilities need not be afforded such an expectation during the transition because they have been previously compensated for the risks of stranded assets.¹⁷ As it turns out, the economic principles of asymmetric risk imply that even if: (1) investors are fully cognizant of the risks, (2) capital market prices fully reflected such risks, and (3) regulators always set the allowed rate of return equal to the true cost of capital, it is mathematically impossible for investors to have been previously compensated automatically for these risks.¹⁸

Apart from the arguments that recovery of stranded costs would impede weak competitive neutrality (which we address below) and the argument that investors have already been compensated for these risks (which we address elsewhere), economic arguments against stranded cost recovery appear to come down to expediency—customers can get away with “stiffing” investors as a last parting shot under the old regulatory scheme, without the adverse consequences for economic efficiency that would otherwise prevail under continuation of the old regulatory regime. The apparent logic is that

¹⁵ The belief that setting rates in a manner so that investors in regulated industries can *expect* to earn the cost of capital is the pillar upon which rests most of the application of financial economics to regulated industries. See Stewart C. Myers, “Application of Finance Theory to Public Utility Rate Cases,” *Bell Journal of Economics*, Vol. 3 (Spring 1972), pp. 58-97. See also discussion by Baumol, Joskow, and Kahn.

¹⁶ Transitions of regulatory rules that have the potential for creating arbitrary windfalls and losses to customers and investors have been part of the regulatory scene for many years. Treatment of deferred income taxes and accounting for inflation are two notable examples. For a discussion of the rationale for avoiding arbitrary windfall gains and losses and for the mechanics of how to do so, see Stewart C. Myers and A. Lawrence Kolbe, “Inflation and Rate of Return Regulation,” *Research in Transportation Economics*, Vol. 2 (1985), pp. 83-119, and A. Lawrence Kolbe, William B. Tye, and Miriam Alexander Baker, “Conditions for Investor and Customer Indifference Among Regulatory Treatments of Deferred Income Taxes,” *Rand Journal of Economics*, Vol. 15, No. 3 (Autumn 1984), pp. 434-446.

¹⁷ For this claim, see Irwin M. Seltzer, “Stranded Investment: Who Pays the Bill?,” Remarks delivered at Southwestern Electric Exchange, American Enterprise Institute, Washington, DC, March 30, 1994. See also Stelzer, “Restructuring the Electric Utility Industry: Further Tentative Thoughts,” *The Electricity Journal*, October 1994, pp. 36-41, for a revision of some of these views.

¹⁸ See A. Lawrence Kolbe and William B. Tye, “It Ain’t In There: The Cost of Capital Does Not Compensate for Stranded-Cost Risk,” *Public Utility Fortnightly*, Vol. 133, No. 10 (May 15, 1995), pp. 26-28. Those wishing to pursue the matter further are referred to A. Lawrence Kolbe and William B. Tye, “Compensation for the Risk of Stranded Costs,” working paper in progress, April 1996.

customers will no longer need to depend on investors' *expectations* of fair treatment in a new regime of competition. This argument ignores the fact that the transition to competition could be quite lengthy for electric utilities. Regulation of competitive access, transmission pricing, *etc.*, could continue for quite some time, if not indefinitely.¹⁹ "It ain't over 'til it's over," as they say.

The weak form of competitive neutrality is addressed by the fourth goal. The objective here is to prevent the stranded cost recovery mechanism from undercutting the ability of all competitors, incumbents and entrants alike, from utilizing any true cost efficiencies they may have which do not arise from the legacy of sunk costs from the prior regulatory regime. As noted, weak neutrality is extremely robust with regard to alternative ways of achieving strong neutrality. This rather profound result permits us to concentrate on achieving strong neutrality, which we shall show is the much more important and useful condition, embodying "going forward" efficiency with *no* relative financial disadvantages for any party. This means competition will be fair and will allow dynamic competition on equal terms for new products and services that require *investments* as well as efficient operations.

Finally, our last three goals ensure that customers are fairly treated in the transition. The fifth goal ensures that stranded cost recovery does not interfere with the emergence of a truly competitive wholesale power market and that customers benefit from the true efficiency gains realized in the transition and beyond. The last goals ensure that the incidence of the recovery among customers is non-discriminatory and that the cost of administering the transition is minimized. In some ways, these have little to do with neutrality but much to do with public acceptance of the mechanism as fair and reasonable. Hence, they should be regarded as constraints on any stranded cost recovery mechanism.

Focusing on our standard of competitive neutrality, the recovery mechanism must accomplish three important features during the transition:

- *Self-limiting in time:* Once the legacy of stranded costs has been amortized, the asymmetry arising from past regulation has ended, along with the recovery mechanism.

¹⁹ A. Lawrence Kolbe, William B. Tye, and Stewart C. Myers, "Response to Book Review," *Yale Journal on Regulation*, Vol. 13, No. 1 (Winter 1996), pp. 413-417.

- *Self-limiting in scope:* Since the asymmetry of past regulation applies to only a portion of the incumbents' costs, only that portion should be recovered under the mechanism. Recovery of all other incumbents' costs in markets opened to effective competition (including new investments) would be exposed to competitive risk during the transition, just as they are for the entrants.
- *Comparability:* Recovery of stranded costs is simply the flip side of equal access to facilities such as transmission and distribution that would otherwise create anticompetitive asymmetries that favor incumbents. The legacy of both incumbents' assets and liabilities should be purged of artificial impediments of effective competition—but comparability is a two-way street.²⁰

Restatement of the issue as correcting for artificial negative barriers to entry also permits some rather important insights into how recovery of stranded costs can be used to permit competition on equal terms. First, the problem is one of requiring all competitors to face the costs of the legacy of the prior regulatory regime on equal terms as a condition to compete. To date, debate over whether regulators should require customers rather than investors in incumbent firms to bear these costs has tended to obscure the competitive neutrality issue.

Second, the problem of recovering stranded costs to achieve competition on equal terms is really nothing new. Experience in other industries undergoing regulatory transitions towards increased competition can shed light on alternative means of measuring and collecting out-of-market sunk costs. In the transition to deregulation in the New Zealand telecommunications industry, the regulatory policy is defined to be achieving "competitive neutrality" in the funding of public service obligations through a levy on all market participants, while achieving competition on equal terms for network interconnection. In the United Kingdom electric system, all distribution companies (RECs) were required to enter long-term "contracts for differences" (CFDs) for a proportionate share of the out-of-market coal costs imposed on the generators.

²⁰ We recognize that there may well be continued asymmetries that favor or disfavor incumbents that are a permanent feature of the regulatory scheme. For example, a residual obligation to serve may well be imposed on incumbents, if only in the threat to reregulate if the transition fails. It may be necessary to compensate incumbents for these residual obligations. However, we view these not as sunk cost legacies of the prior period of regulation, but rather as future regulatory mechanisms that must be addressed and compensated on a permanent basis and are not part of a regulatory transition.

This leads us to a major insight: the idea of bifurcating the thinking on the stranded cost recovery from the thinking on the access (*i.e.*, transmission) pricing. We need to be very clear in what we mean by this bifurcation, however. As the Federal Energy Regulatory Commission (FERC) recognized in combining its transmission access and stranded cost recovery proceedings, the issues of access pricing and stranded cost recovery must be examined in tandem because policies with regard to the access will cause the cost stranding. Nevertheless, as a practical matter, the stranded cost recovery mechanism may be combined with other charges, and transmission access charge is only one of the possible candidates. Nor does bifurcation mean that the utility will necessarily de-integrate generation from transmission and distribution as part of its stranded cost recovery mechanism²¹ or place stranded costs into an entirely separate corporate entity with the duty to amortize stranded costs with levies on all market participants, although it may wish to do so. Bifurcation only means that we will segment the stranded cost problem for separate measurement and examine the consequences of alternative recovery mechanisms for competitive neutrality irrespective of the particular transmission pricing mechanism chosen. These pricing mechanisms for stranded cost recovery might be combined in the final charge, or separately specified in the billing arrangement.²²

As explained in more detail in Appendix A, there are perhaps two main lessons to borrow from the experience in the U.S. natural gas industry and apply to the electric industry. First is that stranded costs are so difficult to estimate that flexible, adaptive mechanisms for their recovery ought to be allowed. This flexibility can include allowing different means of estimating costs, different means of collecting them, and means of resetting the allowances. Second, lump-sum, pay-when-you-go approaches (such as the FERC's proposed electric exit fees) are not strictly necessary, nor are they

²¹ "Utilities Urged to Break Up Companies to Recover Stranded Costs Under NOPR," *Electric Utility Week*, May 8, 1995, p. 5.

²² We have chosen the term "bifurcation" to avoid the confusions surrounding the terms "bundling" and "unbundling." There are a variety of mechanisms proposed for isolating and collecting stranded charges for which the "unbundling" term might be applied. For example, it has been suggested that stranded costs be isolated into a separate corporate entity that would recover all stranded costs from all customers or all competitors in a competitively neutral manner. It has been debated whether the stranded cost recovery mechanism should be recovered in a charge bundled with transmission access or recovered separately from customers. It has been debated whether all competitors (including the incumbent) should pay the charge, or only entrants. As will become clear below, none of these options is foreclosed by the requirement of competitive neutrality in a broad range of circumstances, and so we are making no predeterminations with regard to these issues. The point of bifurcation is to isolate the stranded cost recovery mechanism to determine its effect on competition on equal terms independent of other issues such as access pricing of transmission.

necessarily preferred by customers. Both customers and the utilities may prefer the clarity of a charge like a GIC that is unbundled regardless of customer switching to third-party suppliers.

As explained in more detail in Appendix B, the U.S. telecommunications industry is not a perfect analog for the electric industry, largely because of its extremely strong growth. However, the telecommunications industry has a significant bypass problem which causes "lost contributions" or stranded costs, and they have used a few mechanisms that could be very attractive to electric utilities:

- *Accelerated depreciation of at-risk assets:* These are copper cables and analog switches for telecommunications carriers, primarily generation for utilities. A swap of depreciation between transmission and generation could achieve this without any rate increases.
- *Access charges:* Somewhat like the gas industry, the telecommunications industry has addressed its transition costs with a recovery mechanism that is applied globally, to all customers rather than with a customer-specific exit fee. This may be significantly simpler administratively than the exit fee approach, especially at the retail level. Unlike the telecommunications industry, the electric industry could seek to make its access charges non-bypassable and non-distorting, *i.e.*, demand charges not usage (per kWh) charges.
- *Price-cap regulation:* A shift to price-cap regulation was justified in the telecommunications industry because of its high growth and rapidly emerging competition in all aspects of supply. The electric industry is not quite so naturally poised, but there is a potentially valuable role for incentive regulation of some kind during restructuring: It will prove both difficult and controversial to forecast expected stranded costs, net of reasonable mitigation. An incentive scheme could allow "light-handed" regulation of the stranded cost recovery mechanism itself, *e.g.*, by allowing revenue-requirement mitigating cost reductions to be shared between ratepayers and shareholders. This would give utility managers a stronger, unambiguous incentive to find such opportunities, and customers assurance that they are participating in such savings without onerous regulatory reviews.

Is Recovery of Stranded Costs Inherently Anticompetitive?

Many of those who object to recovery of stranded costs would label any method of recovery as inherently anticompetitive and inconsistent with competition. To them, a competitively neutral method of collecting revenues to fund stranded costs is an oxymoron.

Skeptics claim that stranded cost recovery would distort price signals, result in inefficient decisionmaking, and unfairly favor the least efficient utilities. To a large degree, these claims rest on the belief that stranded costs do not represent a legacy of regulation but, rather, inherent inefficiencies among utilities. According to this logic, a transition to competition should reward efficiency and punish inefficiency, and recovery of stranded costs allegedly does just the opposite. These skeptics define competition as a market environment purged of any recovery of stranded costs.²³

While we disagree with this view, it is interesting to note that it would achieve weak competitive neutrality, in that it clearly reveals relative efficiency differences in prices. However, that standard is so easily achieved that it does not inform the debate about stranded cost recovery at all. That is, an electric sales tax to recover nothing is just as competitively neutral and non-distortive of relative prices as a sales tax to recover some or all of the stranded costs.

We show below that, if true efficiency gains are realizable from the introduction of competition, customers can and will realize the benefits of those efficiencies as reflected in prices in a competitive power market and pay lower rates than would have been charged under a continuation of the prior regime of regulation, full recovery of stranded costs notwithstanding. Customers, therefore, will expect to pay lower rates than otherwise would occur under continuing regulation as a result of true efficiency gains going forward in a transition with stranded cost recovery. (Of course, this may not

²³ See "Stranded-Cost Recovery Will Slow Competition Where Needed Most: RDI," *Electric Utility Week*, November 13, 1995, p. 2:

The Federal Energy Regulatory Commission's provisions for stranded-cost recovery in its open-access rulemaking will significantly slow the onset of competitive power markets, a new report from Boulder, Colo.-based Resource Data International concluded.

"Full recovery of stranded investment will erode the competitive advantage of utilities that have made prudent investment decisions and carry little stranded investment," RDI said.

Stranded-cost recovery will slow the onset of competition particularly in California, Illinois, New York, Ohio, Pennsylvania and Texas—states with the highest stranded investment and the highest electricity costs—where customers have the most to gain from competitive markets, the report said.

be as satisfying to customers wanting even lower rates from avoiding responsibility for sunk costs altogether, but it will still be beneficial and efficient.)

However, a successful transition mechanism will tend to produce price levels higher than those otherwise prevailing in a *de novo* competitive regime (without stranded costs), by the amount of the allowance for recovery of stranded costs. This conclusion follows from the definition of stranded costs and the fact that a successful recovery mechanism is designed to achieve strong competitive neutrality. The claim of anticompetitive consequences merely on the basis that retail prices are higher than would otherwise occur is thus nothing more than simply an objection to the idea of achieving strong competitive neutrality with full stranded cost recovery. While the argument may be couched in the language of competition, it is really an argument about income distribution—that incumbents, not customers, should bear transition costs. (While we are prepared to debate this issue, it is not one about achieving competition on equal terms, and so will not be addressed further herein.)

At the most basic level, it is simply not true that recovery of stranded costs is inherently incompatible with competitive markets. After all, lease agreements in competitive markets frequently incorporate “exit fees” and other contract deficiency or termination provisions that give customers options while encouraging suppliers to make long-term commitments or investors to make idiosyncratic investments in risky markets. These contractual agreements are binding even when the associated costs are out-of-market, as utility stranded costs are by definition.

Other claims about anticompetitive consequences simply rest on a confusion about how to measure the differences in true economic efficiency going forward. The key to strong competitive neutrality is to ensure that the sunk cost burden is funded in a way that neutralizes the competitive effect of the legacy, and only those sunk cost differences. If so, then incumbents compete on the basis of their true relative efficiencies or inefficiencies going forward and each competitor bears its proportionate share of the sunk cost legacy of the past regulatory regime. There is thus nothing inherently anticompetitive about stranded cost recovery if it achieves both weak and strong competitive neutrality as discussed above.

Despite these reassurances, many customers and potential entrants are likely to be unpersuaded. There persists a belief that recovery of stranded costs is a reward to inefficiency and a mechanism for conferring artificial competitive advantages to those allegedly least deserving—high cost firms.

We show this not to be true under a competitively neutral successful stranded cost recovery mechanism. To do so, we first identify the specific mechanisms by which it is claimed that stranded cost recovery is anticompetitive. Then we examine the FERC's proposed "lost revenues" mechanism and other proposed mechanisms to test for competitive neutrality. Next, we consider a proffered counterexample alleged to show that stranded cost recovery is anticompetitive. This alleged counterexample shows that competitive neutrality is in fact achieved by successful stranded cost recovery. We examine the consequences of anticipated excess capacity and errors in measuring and funding stranded costs. Finally, we consider the consequences of allowing recovery based on forecasting stranded costs (*ex ante* method) versus allowing recovery based on actual costs (*ex post* method).

THE DEBATE TO DATE OVER STRANDED COST RECOVERY

Rationale Behind the Claims of a Supposed Conflict Between Competition and Stranded Cost Recovery: the *Cajun* Opinion

The D.C. Circuit recently found in *Cajun Electric Power Cooperative, Inc. v. FERC* that the FERC should hold an evidentiary hearing to determine whether recovery of stranded investment costs as part of an open access tariff was anticompetitive and would preclude mitigation of alleged market power.²⁴

There is a great deal of confusion, particularly associated with the *Cajun* decision, over whether the recovery of stranded costs represents an impediment to competition:

What is inescapably before the Commission at this juncture is its validation of the *concept* of stranded investment, because—not surprising really—its view on this matter may itself dictate market structure. The Commission must address whether the [transmission tariff's] provision of a process for recovery of stranded investment costs is itself a deal killer that, perhaps ironically, precludes genuine open access to Entergy's transmission system. In short, the question that must be asked now is whether the [transmission tariff] allows for "meaningful access to alternative suppliers." *Western Systems Power Pool*, 55 F.E.R.C. ¶ 61,099 at 61,317 (1991) (emphasis added).

²⁴ *Cajun Electric Power Cooperative, Inc. v. FERC*, 28 F.3d 173 (D.C. Cir. 1994) (*Cajun*). The actual ruling of the Court went to the FERC procedures, not the substance of the issues: "We find that the Commission failed to adequately address these and other concerns raised by the petitioners and conclude that it was arbitrary and capricious in declining to conduct hearings. [footnote omitted.]"

The challenged transmission tariff included a charge for stranded costs as part of the charge for the transmission service. The Court expressed two major reasons why the recovery of stranded costs might be anticompetitive and that the transmission tariff as a whole (*i.e.*, including stranded cost recovery) "seems to provide [the incumbent] with the means to stifle the very competition it purports to create." The first is that such recovery would "in essence" be a tying arrangement:

... if a company can charge a former customer for the fixed cost of its product whether or not the customer wants that product, and can tie this cost to the delivery of a bottleneck monopoly product that the customer must purchase, the products are as effectively tied as they would be in a traditional tying arrangement.

The second alleged reason for anticompetitive consequence is that the recovery of stranded costs creates an alleged "odd asymmetry" which may actually serve to increase the entity's market power:

... while [the incumbent] can compete for generation sales outside its transmission grid without concern for a stranded investment charge, [the incumbent's] competitors cannot compete for the customers on its transmission system on the same basis.

As a theoretical matter, then, the petitioners would appear to be correct that the stranded investment provision is anticompetitive.

Substantively, then, the argument that stranded cost recovery is an anticompetitive "deal killer" boils down to what we will call (1) the "tying" argument²⁵ and (2) the "competitive asymmetry" argument.

To meet the concerns of the Court, stranded cost recovery mechanisms should be structured so that they are both strongly and weakly competitively neutral. If all suppliers to a market (*i.e.*, the incumbent utility as well as its competitors) equally bear the charges associated with full stranded investment recovery, they will be able to compete on a level playing field. (Note that this does not imply that each utility's stranded cost surcharge must be of the same magnitude. Our examples will prove this.) In this way, the incumbent utility would no longer be unilaterally handicapped through these costs associated with past regulatory mandates, continuing social programs, and sunk investments that are unrecoverable in a market environment. Similarly, no market participant is given a competitive advantage or disadvantage in its effort to serve wholesale or retail customers on the basis of their true efficiency advantages or disadvantages going forward.

²⁵ In the pages that follow, our working definition of "tying" will be a broad one — any situation where a monopolist uses its ownership of a bottleneck facility (in this case transmission) to prevent competition on equal terms in another market (in this case generation).

We turn now to an examination of the proposed methods for recovery of stranded costs in the electric utility industry. We then consider an alleged counterexample which purports to show that stranded cost recovery will not achieve competitive neutrality.

The FERC's "Revenues Lost" Method

The Federal Energy Regulatory Commission (FERC)²⁶ identified the stranded cost problem as associated with a "departing customer" and concluded that recovery of "legitimate and verifiable transition costs" will permit all competitors to "compete on a more equal footing in competitive bulk power markets." Although case-specific proposals would not be foreclosed in some circumstances, the Commission endorsed the "direct assignment of stranded costs to departing customers" via a variant of the "exit fee" approach. Utilities would be allowed to recover the "legitimate and prudent obligations the utility undertook" in connection with serving the customer.

The Commission labeled its preferred approach the "revenues lost" method. Recoverable stranded costs are the difference between a customer's revenues expected under regulation and expected revenues under competition.²⁷ Transmission revenues and mitigation²⁸ would be accounted for as

²⁶ The Federal Energy Regulatory Commission (FERC), in Docket No. RM94-7-001, *Recovery of Stranded Costs by Public Utilities and Transmitting Utilities* (March 29, 1995), concluded that "we do not believe the existing supplier's shareholders or its remaining customers should have to bear costs that were prudently incurred under the old regulatory system to serve the departing customer." The FERC also stated that it believed that the States should allow recovery of stranded costs as a result of competitive access decisions at the state level. Whether and how utilities will be able to recover costs stranded as a result of retail competitive access decisions implemented at the state level will continue to be debated. However, the matter (at least in principle, if not in implementation) seems to be settled at the federal level (pending judicial review). The FERC has yet to approve a stranded cost recovery mechanism for the electric utilities that has withstood judicial scrutiny. See also Federal Energy Regulatory Commission, *Promoting Wholesale Competition through Open Access Non-Discriminatory Transmission Services by Public Utilities: Recovery of Stranded Costs by Public Utilities and Transmitting Utilities*; Order No. 888, Final Rule, issued April 24, 1996.

²⁷ More formally, the Commission defined stranded costs as follows:

(1) Wholesale stranded cost means any legitimate, prudent and verifiable cost incurred by a public utility or a transmitting utility to provide service to:

(i) a wholesale requirements customer that subsequently becomes, in whole or in part, an unbundled wholesale transmission services customer of such public utility or transmitting utility; or

(ii) a retail customer, or newly created wholesale power sales customer, that subsequently becomes, in whole or in part, an unbundled wholesale transmission services customer of such public utility or transmitting utility.

²⁸ The Commission stated that mitigation is automatically accounted for by the reduction of stranded costs by
(continued...)

well. The Commission requested comments as to whether the utility should use the "up front" approach (which we call *ex ante* below) or track the actual selling price and future costs with a periodic "true up" over time (which we call the *ex post* approach).

The Commission contemplated that states would recover retail stranded costs in retail rates, and observed that most commentators agree that the level of potential wholesale stranded costs (subject to FERC jurisdiction) is small relative to that of retail stranded costs (subject to state public utility commission jurisdiction).

Defining stranded costs to be associated with departing customers naturally tends to lead to the exit fee approach to cost recovery. This tendency is further reinforced by the jurisdictional distinction between wholesale and retail service. The same assets often serve both markets, but only customers lie uniquely in one category. Since FERC only regulates wholesale services, it took a customer approach. The logic is that the fee prevents the shifting of stranded costs from departing customers to remaining customers or shareholders (fulfilling a fairness standard). The logic for this method also tends to be reinforced by the fact that buyer-seller relationships in interstate bulk power markets under the FERC's jurisdiction tend to be subject to contracts (as opposed to the prevalence of many tariff sales in retail markets regulated by the states). And it appears designed to respond to the Court's concerns that putting the recovery mechanism into the transmission tariff would possibly constitute an anticompetitive tying arrangement.

Other Proposed Mechanisms

The FERC identified several other possible recovery mechanisms in addition to the "revenues lost" method. The first is what we will call the "cost-of-service" approach. With this method, regulators would develop a total company estimate of stranded costs by looking at contractual liabilities, regulatory assets, certain social program costs, *etc.* These will be allocated among customers after accounting for wheeling service revenues and mitigation measures.

The other method the Commission looked at was the "netting" or "market analysis" method. It would rely on an analysis of the market value of stranded assets, as opposed to regulatory valuations,

²⁸ (...continued)

the competitive price of power, apparently under the belief that these revenues could be recovered from another sale at the competitive price if the customer exits the system.

to determine the estimate of stranded costs. It appears designed to capture expectations about excess capacity in a competitive power market (*i.e.*, the inability of even efficient incumbents to recover total costs). Otherwise, it appears to be similar to the cost-of-service approach.

Because the Commission viewed stranded costs as arising from departing customers, it did not seriously consider recovery mechanisms that rely upon charges to competitors, such as those seeking access to transmission and distribution, or simply granting permission to utilities to raise transmission rates up to market clearing levels in exchange for absorbing losses from stranded costs in generation.

Assuming (1) that the ability to recover stranded costs as a legal matter does not change, (2) that the definition and measurement of stranded cost does not change, and (3) that the administrative burden of assessing competitors is no different from that of assessing departing customers, we show below that the competitive effects of the various collection methods are identically competitively neutral. There may however be strong regulatory, legal, or reasons other than achieving competitive neutrality to prefer one method over another.

HYPOTHETICAL EXAMPLES OF COMPETITIVE NEUTRALITY

Alleged Counterexample That Purports to Show a Perverse Competitive Advantage to High Cost Utilities

Hypothetical examples such as in Table 1 have been offered in the debate over recovery of stranded costs. The example purportedly shows that customers have a perverse incentive to choose high cost utilities in a regime of stranded cost recovery. In reviewing this alleged counterexample, we will look only at the effect of the stranded cost recovery mechanism, bifurcated from the rest of the access pricing procedure.²⁹ That is to say, the only issue is how to recover stranded costs of generating assets, apart from the method of pricing access generally or recovering all other costs of service.

²⁹ Note in the discussion above that we are not necessarily assuming that the stranded cost recovery will be billed separately from other charges. The recovery might well be added to charges for transmission access to competing firms. Or, as discussed below, it might be assessed to all customers or to only departing customers. This bifurcation assumption lets us examine the consequences of the stranded cost recovery mechanism for competition on equal terms independent of the access mechanism.

TABLE 1
ALLEGED COUNTEREXAMPLE WHICH PURPORTEDLY SHOWS PERVERSE
COMPETITIVE ADVANTAGE TO HIGH COST UTILITIES

	Utility A's Service Territory (¢/kWh)	Utility B's Service Territory (¢/kWh)
1. Marginal Cost of Energy (Prior Regulatory Regime)	2.1	2.0
2. Fixed Operating Cost (Prior Regulatory Regime)	1.5	2.2
3. Total Customer Charge (Prior Regulatory Regime)	3.6	4.2

The example assumes that each incumbent utility will recover its stranded costs under the "revenues lost" method. According to the example, a customer of the purportedly high cost Utility B would have to pay 2.2¢ in fixed and stranded costs and 2.1¢ of marginal energy costs to switch to purportedly low cost Utility A, or $(2.2+2.1=)$ 4.3¢. This is more than the 4.2¢ he already pays. Superficially, the "high cost" Utility B would appear to gain an alleged advantage over A from being able to assign its fixed costs as an exit fee. But a customer switching from A to B would pay $(1.5+2.0=)$ 3.5¢, or less than the 3.6¢ he already pays. This seemingly perverse result allegedly demonstrates that stranded cost recovery creates an uneconomic competitive advantage to high cost utilities.

Note that the example assumes that Utility A has the highest incremental cost but lowest total costs.³⁰ It also unrealistically assumes that all fixed costs are sunk in the prior regime and that all sunk costs are stranded. (Below, we explore the consequences of changed assumptions. We first address the correctness of the conclusions given these particular assumptions.) The hypothetical does not use conventional utility accounting for generation costs, but we will follow it anyway because it allows us to prove all of our points about weak and strong neutrality in the context of a simple numerical illustration.

³⁰ In the spirit of this alleged counterexample we are assuming that Utility B is in fact the high cost seller (from an imbedded cost basis). More realistically Utility A might be a gas-fired utility with higher energy costs but lower fixed costs than Utility B, which might be a coal-fired utility where the reverse is true.

The Alleged Counterexample Actually Illustrates Competitive Parity

Based on this example, critics conclude that stranded cost recovery (1) provides a barrier to entry to efficient alternative suppliers and (2) discriminatorily favors incumbents. These conclusions are wrong on the face of the alleged counterexample. These conclusions are based on the assumption that the designation of the most efficient provider should be based on total costs, including stranded fixed costs. But, by definition, these costs are fixed regardless of which supplier competes successfully to get the business. Assume, as does the hypothetical, that all costs of generation but energy are fixed regardless of which supplier is chosen. Looking then at the marginal costs of energy, Utility B (not Utility A, as claimed by the counterexample) is indeed the low cost provider. If static economic efficiency is the goal, the A customer really should switch to B, and the B customer should not switch.³¹ After all, such "economy" transactions are undertaken based on differences in true marginal costs every day in the utility industry, irrespective of fixed costs.³² Thus on its face, the counterexample illustrates that there is no perverse incentive for customers to choose high marginal cost producers, if we are looking at the true relative efficiency of the two utilities going forward. In fact, insofar as we can determine from the facts, all seven of the above goals would be accomplished, even if the example were realistic.

Indeed, it is easy to show a simple example of a recovery mechanism that pays for the stranded costs in Table 1 while leaving any true relative efficiencies of two competitors going forward intact. Suppose a third party agrees to amortize Utility A's sunk costs in exchange for the right to charge all competitors who serve customers 1.5¢ in Utility A's service territory and similarly for 2.2¢ in Utility B's service territory.³³

³¹ This should be intuitively obvious. Fixed costs are indeed fixed, regardless of customer choice of supplier, so their total amount and their distribution among suppliers can have no effect on total industry costs. Every kWh in Utility A's service territory that switches to Utility B will generate $(2.1 - 2.0) = 0.1$ ¢ in true efficiency gains. Conversely, switches in the opposite direction will generate efficiency losses.

³² One way to think of the effect of opening up access to competition is to strengthen the incentives to bring in lower cost generating resources. The efficiency gains from competition in the proffered counterexample exist only because there is an assumed obstacle to an economy transaction between Utility A and Utility B in the prior regulatory regime. Alternatively, the counterexample might be interpreted to claim that competition under stranded cost recovery would obstruct the economy transactions that occurred in the prior regulatory regime from occurring in the transition, leading to efficiency losses.

³³ We show below that the consequences for competitive neutrality are no different for this recovery mechanism as for the "revenues lost" method.

Utility A's incremental costs in its own service territory are $(2.1+1.5=)$ 3.6¢ and Utility B's are $(2.0+1.5=)$ 3.5¢ in Utility A's service territory. The respective incremental costs in Utility B's service territory are now $(2.1+2.2=)$ 4.3¢ for Utility A and $(2.0+2.2=)$ 4.2¢ for Utility B. Precisely because the stranded cost recovery mechanism funded only the legacy of previously sunk costs with competitively neutral per unit charges on all competitors and left marginal energy cost differences intact, it satisfies both weak and strong competitive neutrality.

Some readers will accept this rather simple result, yet with such profound consequences, as an obvious property of a successful stranded cost recovery mechanism. They need read no further. The weak form of competitive neutrality will almost always be accomplished in a regime of any amount of stranded cost recovery, because the incremental costs of both entrants and incumbents will always be raised by the same amount—the stranded access charge.³⁴ Nevertheless, it is instructive to work through alternative scenarios to see how this result is necessarily achieved even in situations where the result is not so obvious.

Examination of a More Realistic Example

The above example assumes that all fixed costs of both utilities are stranded. This may be unrealistic because the FERC's "revenues lost" method requires that the competitive revenues be netted out of the actual regulatory cost of service to determine the true stranded costs. Nevertheless, let us initially assume that all sunk costs are stranded to capture the spirit of the hypothetical. We return later to the more general case where wholesale prices and mitigation will permit some, but not all, recovery of sunk costs.

To undertake a more comprehensive examination of the claims that stranded cost recovery is anticompetitive, we expand on the example presented in Table 1. For the purpose of the argument

³⁴ Some observers have noted that this gap between marginal costs and price is a potential source of inefficiency. See Alfred E. Kahn, "Can Regulation and Competition Exist? Solutions to the Stranded Cost Problem and Other Conundra," *The Electricity Journal*, October 1994, pp. 23-35. It is certainly true that some stranded cost recovery mechanisms may distort decisions about the consumption of electricity versus other goods and services in the economy, i.e., they may alter demand in a second-best fashion. These issues would have to be addressed as part of overall rate design, an issue that goes beyond the scope of this paper. Our current concern is solely with competitive neutrality in the market for the supply of electricity.

(and to keep the example simple), we do not differentiate between wholesale and retail markets,³⁵ avoid issues of federal and state jurisdiction, assume (for now) that stranded costs can be measured accurately,³⁶ and assume that stranded cost recovery is non-bypassable.³⁷ Consistent with the spirit of the example in Table 1, a number of other assumptions are implicit.³⁸ Some of these simplifying assumptions, of course, will not be valid in every real-world situation. For now, we simply seek to move beyond potential complications to examine the consequences of stranded cost recovery for

³⁵ The example simply ignores charges for services such as for transmission, distribution, and customer service. Recovery of costs other than generation costs are assumed to be handled outside the framework of this example by a separate charge to customers (or at least are computed under a separate mechanism). It is assumed that all stranded costs are incurred in the generation part of the industry.

³⁶ That is, we assume initially that we can accurately estimate what the Federal Energy Regulatory Commission calls the "legitimate and prudent obligations the utility undertook," and that the stranded cost estimate is what the Appeals Court for the D.C. Circuit describes as "legitimate, verifiable, and accurately calculated." For simplicity, we also assume initially that the stranded cost recovery mechanism is established at a fixed level *ex ante* for some period of time (maybe the entire transition period) without any "true up."

³⁷ To simplify, the examples assume that only one regulatory agency will be setting the level of the stranded recovery charge and, initially, that the stranded cost charge is assessed by the incumbent utility directly on sales of new entrants—rather than in the form of an "exit fee" (we show below that this assumption does not affect the competitive neutrality of a successful levy). It is also assumed that ratepayers cannot migrate to other service territories to evade the recovery of the stranded cost recovery charge. Obviously, if stranded costs cannot be collected from some customers, stranded cost charges may have a potential asymmetric effect on competitors. It thus is assumed, for the purpose of the argument, that the stranded cost recovery mechanism is cannot be bypassed. (For a discussion of potential bypass strategies, see Bernard Black, "A Proposal for Supplementing Retail Competition in the Electricity Industry," *The Electricity Journal*, October 1994, pp. 58-72.) It is also assumed that all customers go "cold turkey" to the new competitive regime so that no incumbents have residual obligations to serve that create separate regulatory treatment for different classes of customers.

³⁸ For example, stranded cost recovery aside, it is assumed that the incumbent utility has published an open access tariff which offers terms and conditions to entrants equivalent to that available to the incumbent (leaving price as the only difference in the service offerings). It is also assumed that (1) regulators have already determined that incumbent firms should be allowed to recover transition costs; and (2) incumbents will actually be able to recover allowed stranded costs (*i.e.*, there are no legal or economic obstacles to recovery).

To avoid the need to differentiate marginal costs from average variable costs, it is assumed that the two utilities operate only one generating plant for which marginal costs are the same as average variable costs (up to a capacity limit). The example also assumes that both utilities are selling undifferentiated service in service territory in the prior regulatory regime (there are no "non-jurisdictional sales"), and that all other competitive advantages not relating to costs are nonexistent or are accounted for in other terms of access such as a separate methodology for transmission pricing. This means that the only possible efficiency gains in the transition arise from savings in marginal energy costs (more general cases are examined below).

Finally, it is assumed that the firms' costs are known and the competitive price is clearly established. A competitive power market has developed with buyers and sellers all acting as price takers and all maximizing profits, given the regulatory rules of the transition.

competition on equal terms. We will, however, relax a number of assumptions to examine the consequences on our conclusions.

Table 2 continues to assume that all fixed costs of existing generation are sunk in the prior regulatory regime.³⁹ To keep all sunk costs stranded, the market price of power is assumed to be only 2.0¢/kWh (see line 4) and equal to Utility B's marginal costs of power. This may be the case if the value of capacity is close to zero because of very significant amounts of excess (stranded) capacity.

TABLE 2
THE EXAMPLE ACTUALLY ILLUSTRATES
COMPETITIVE NEUTRALITY OF STRANDED COST RECOVERY

	Utility A's Service Territory (¢/kWh)	Utility B's Service Territory (¢/kWh)
1. Marginal Generating Costs (Prior Regulatory Regime)	2.1	2.0
2. Sunk Generating Cost (Prior Regulatory Regime)*	1.5	2.2
3. Total Customer Charge (Prior Regulatory Regime)	3.6	4.2
4. Market Price of Power	2.0	2.0
5. Calculation of Stranded Costs:		
Revenues in prior regulatory regime	3.6	4.2
- Avoided costs	-2.1	-0
- Mitigation benefits (mkt. sales)	-0	-2.0
= Stranded Costs	1.5	2.2
Full Incremental Cost of Service (during transition):**		
6. Utility A	2.1+1.5=3.6	2.1+2.2=4.3
7. Utility B	2.0+1.5=3.5	2.0+2.2=4.2
8. Customer Price of Power	3.5	4.2
9. Price Required for Full Cost Recovery for Efficient Provider in the Transition	3.5	4.2

* Sunk costs are calculated on the basis of load served in the respective service territories in the prior regulatory regime.

** The example ignores charges such as for transmission, distribution, and customer service.

³⁹ To keep with the spirit of the example in Table 1, we are assuming initially that all fixed costs that do not vary with output are sunk (non variable over time) and cannot be avoided by reducing generation or mitigated in any other way. This assumption is relaxed below. (Also note changes in terminology as compared with Table 1 to reflect our assumptions more accurately.)

Marginal costs are avoidable by definition and, thus, cannot be stranded. As a result, the two utilities' stranded costs are also equal to their sunk costs.⁴⁰ Row 5 calculates stranded costs (i.e., the fixed cost liability over what can be expected to be recovered in a regime of competition) formally as the revenue requirements of the prior regulatory regime net of avoided costs and/or mitigation benefits.⁴¹ In this example, Utility B can mitigate the revenue loss from defecting customers by selling into the market for 2.0¢. And Utility A, with marginal generating costs in excess of the market price for power, mitigates revenue losses by avoiding marginal production costs of 2.1¢ for every MWh lost demand.

Under these assumptions, Utility A will compute a stranded cost charge of 1.5¢, and Utility B will set a stranded cost charge equal to 2.2¢. As a result, Utility A has a "full" incremental cost⁴² of service of (2.1+2.2=) 4.3¢ in Utility B's service territory.⁴³ It might appear initially that, as a result of the 2.2¢ stranded cost recovery charge, Utility B has an artificial competitive advantage of 2.3¢ (4.3-2.0) in its own service territory. But this is incorrect: 0.1¢ of that figure is Utility B's marginal cost advantage, and the other 2.2¢ is exactly offset by Utility B's legacy of stranded cost from the prior regulatory regime. The example shows that this 2.2¢ charge is imputed to Utility B's

⁴⁰ Readers will note that our assumption that market prices equaled Utility B's marginal energy costs made the calculation of the appropriate stranded cost recovery obvious—equal to average sunk costs of each utility in the prior regulatory regime. In the more general case, Utility B will be selling power in wholesale markets at prices in excess of marginal costs, thereby partly mitigating the stranded costs. Such revenues would have to be taken into account in calculating the appropriate stranded cost recovery amount. This more general case is considered below.

⁴¹ The general approach used to compute stranded costs in this example is consistent with the formula recommended by the Edison Electric Institute in its comments to the FERC:

$$SC = R(b) - AVC - MB - DR;$$

where $R(b)$ is the bundled revenue expectation under a continuation of the old regulatory regime, AVC is the avoided variable cost, MB is mitigation benefits (including net revenues from the freed up capacity and other net cost savings from buyouts, buydowns, etc.), and DR (delivery, i.e., transmission and distribution, revenues assumed in these examples to be zero).

⁴² We use the term "full" incremental cost to represent the sum of marginal cost (the real non-sunk resource cost, sometimes called the "direct" incremental cost) plus the allowance for recovery of the stranded costs. See William J. Baumol and Robert D. Willig, "Brief of Evidence: Economic Principles for Evaluation of the Issues Raised by Clear Communications Ltd. on Interconnection with Telecom Corporation of New Zealand Ltd.," April 28, 1992, p. 25.

⁴³ The essence of the complaint about competitive disadvantage in Utility B's service territory is this purported "artificial" 2.2¢ incremental cost disadvantage. But it is precisely this wedge that is required to force up prices by the amounts necessary to amortize stranded costs.

incremental costs in its own service territory, so that the cost advantage remains at 0.1¢ despite the stranded cost recovery mechanism.

It is clear that the stranded cost recovery fees exactly offset the utilities' liability for paying stranded costs. However, it may not be immediately obvious that the stranded cost charges become an imputed cost to utilities in their own service territory which they compute to their own costs. In fact, as a result of a 1.5¢ stranded cost change in Utility A's service territory, the full incremental cost of service of Utility A during the transition is 3.6¢ to provide service in its own service territory—compared to 4.3¢ in Utility B's service territory. The full incremental cost of service of Utility B's during the transition are 3.5¢ in Utility A's service territory and 4.2¢ in its own service territory.

The concept that stranded cost charges become imputed costs to each utility is critical to the entire discussion that follows. Once this fundamental point is understood, all of the following examples make the basic point: *weak competitive neutrality (undisturbed competitive advantages going forward for non-stranded costs) will be achieved by virtually any successful stranded cost recovery mechanism because the incumbent will impute to its full incremental cost of service an equivalent stranded cost charge*, no matter how complete or incomplete that allowance may be. Any pre-existing competitive advantages or disadvantages due to true efficiency differences will therefore remain undisturbed by the stranded cost recovery allowance.

Utility B will impute 2.2¢ in stranded cost to the costs of service in its own service territory during the transition. It will do so *even if there is no explicit regulatory mechanism to require that all suppliers, including the incumbent, pay the stranded cost recovery charge*. The reason is that if Utility B provides the service to its customers it can no longer collect a 2.2¢ (or whatever allowed) charge from Utility A.⁴⁴ If Utility B charged to its own customers less than its marginal generating costs plus the stranded cost allowance 2.2¢, the utility would collect less revenue and profits than if the customer were supplied by Utility A. Thus, a utility's own stranded cost charge is a real imputed cost to itself. The utility will realize that it does not make sense to cut prices down to its own marginal generating costs of energy to retain business because it will be competing against its

⁴⁴ William J. Baumol and J. Gregory Sidak, "The Pricing of Inputs Sold to Competitors," *Yale Journal on Regulation*, Vol. 11, No. 1 (Winter 1994), p. 198, appear to have uncovered this imputation principle. Note, however, that it will happen only if there is a competitive market for power in our example, so that incumbents have no incentive to discount the recovery fee on their own sales.

own stranded cost recovery mechanism. As a result, weak competitive neutrality is preserved even if the utility is not explicitly forced to recover stranded costs from its own customers. Utility B retains only its previous 0.1¢ marginal cost advantage in its service territory despite the recovery of stranded costs of 2.2¢ from Utility A. (The competitive consequences of this imputation are even more interesting in the example below where Utility B is undisputedly the higher cost seller.)

Let us examine the Court's concerns about anticompetitive consequences in *Cajun* in the context of Table 2. The Court's concern was that stranded cost recovery represents an "odd asymmetry." The example in Table 2 illustrates clearly the principle of competitive neutrality in recovering stranded costs.

First, comparing line 6 with line 7, we see that Utility B, the most efficient competitor in terms of marginal costs, retains this advantage in both service territories despite the recovery of an unequal stranded cost charge in both service territories. Utility B's stranded cost charge leaves unchanged Utility B's marginal energy cost advantage in its own territory and does not affect the relative cost of service in Utility A's service territory. Utility B always retains its 0.1¢ marginal cost advantage. Stranded cost recovery in Table 2 accomplishes weak competitive neutrality and does in no way change the way (or intensity) in which the two utilities compete. The competitive advantage during the transition period (*i.e.*, until stranded costs are amortized) will be no different from the advantage after the transition period, all else equal.

Second, it is simply untrue that the stranded cost recovery mechanism somehow protects Utility B from the rigors of competition in its own service territory while giving it an unfair competitive advantage in searching for customers in other service territories. Utility B's competitive advantage in both service territories arises from its lower marginal costs, not its stranded cost recovery mechanism (see lines 5 and 6). In fact, Utility A will be priced out of the generating market in both service territories by its high marginal costs regardless of its stranded cost recovery mechanism (it cannot profitably sell into a 2.0¢ power market, even to serve its own customers).

Utility A is priced out of the generation market, not by Utility B's stranded cost recovery mechanism, but because its marginal generating costs (2.1¢) exceed the market price of power (2.0¢). But this is also true in Utility A's own service territory, despite the recovery of the 1.5¢ stranded cost recovery fee. This is exactly what should happen if Utility A is to receive the correct

market signals to cut back its generation in favor of power wheeled in from Utility B. This efficiency gain flows directly through to customers.

Note also that the stranded cost recovery mechanism does not provide relief from the rigors of competition in either service territory during the transition period in so far as non-stranded costs are concerned. We can see that by observing that the market price of electricity is 2.0¢ in both service territories. There is no guarantee that either utility will recover its non-stranded costs during the period in which the recovery mechanism is in place—only that competition will occur unabated within the constraint that rates will not be allowed to fall to levels that prevent recovery of efficient marginal generating costs plus stranded cost in either service territory.

The strong dimension of competitive neutrality (an equal opportunity to *expect* to earn the cost of capital) is illustrated by comparing lines 4 and 8. Both utilities face the same 2.0¢ market price (line 4) regardless of where the customer is located and regardless of differences in stranded cost recovery. Customers in Utility A's service territory will pay 3.5¢ during the transition and those in Utility B's service territory will pay 4.2¢. The difference is exactly equal to the difference in the two stranded cost fees of 0.7¢. After the transition is complete, customers in both service territories will pay the same market price for power (after Utility A has adopted Utility B's efficiency advantage in marginal generating costs or wheeled in Utility B's lower cost power, and Utilities A and B have amortized their stranded costs).

Note that customer prices in Utility A's service territory fall by the 0.1¢ benefit of entry by Utility B, and all true efficiency gains from competition are flowed through to customers. However, this does not create any additional stranded costs. The price decline was brought about by a true efficiency gain from Utility B's entry.⁴⁵ There is no price reduction in Utility B's service territory because it is already the most efficient provider of power there.⁴⁶ By the same token, customers in each service territory pay only for the costs stranded in their service territory and are in no way burdened by the recovery of stranded costs outside their service territory.

⁴⁵ The example assumes that Utility B's 0.7¢ fixed cost disadvantage is a regulatory legacy that cannot be corrected, but that Utility A's 0.1¢ marginal cost disadvantage can be mitigated, either through matching Utility B's efficiencies or by wheeling in Utility B's power.

⁴⁶ Of course, in the more general case, its customers could be receiving benefits of lower prices from efficiency gains from sources other than energy savings.

Before leaving this example, it is noteworthy that it provides several other important by-product insights through the particular choice of numbers. First, Utility B requires a stranded cost charge even though there are likely to be no departing customers. Since Utility B is the most efficient marginal cost provider, power should be flowing from Utility B to Utility A and not the reverse. It is merely the threat of charging the 2.2¢ in stranded costs to suppliers of departing customers that permits Utility B to recover the regulatory costs of service (4.2¢) from the customers who remain (through the imputed 2.2¢ charge). No customers of Utility B should pay an "exit charge" if markets are working effectively to achieve short-run economic efficiency.

Indeed, it will be Utility A's customers that will depart the system if competitive markets work effectively. Even though Utility A has the lowest total costs, either it or its customers will be motivated to wheel in power from Utility B at the 2.0¢ market price to achieve short-run economies. Utility A will require a 1.5¢ stranded cost fee even though it has the lowest fixed and total costs (after market purchases). One therefore should not be confused into believing Utility A does not need stranded cost recovery, or that it is protected from stranded cost recovery because it has the lowest *average* costs.

To capture the Court's concerns about a potential "odd asymmetry," let us consider a case where one believes Utility A does not require stranded cost recovery because it has the lowest rates in the region (*i.e.*, 3.6¢ for Utility A versus 4.2¢ for Utility B). As a result of this belief, one claims Utility A to be competitively disadvantaged by Utility B's stranded cost recovery mechanism. (We make this initial assumption in order to accentuate a rather surprising result regarding which utilities will actually be requiring a stranded cost recovery mechanism). Note first that Utility A's 0.1¢ marginal generating cost disadvantage is not sunk in the prior regime and therefore is not stranded.

If Utility A wheels in Utility B's power at a price of 2.0¢, it can resell it to its customers at 3.5¢ and shut down its own generation. Some may wrongly believe that Utility A has no need for a stranded cost recovery mechanism because it is the lowest average cost producer. However, this will not be a competitive equilibrium. If Utility A can buy 2.0¢ power from Utility B, so can its customers in an open access regime with zero Utility A stranded cost charges. Utility A will thus be unable to charge 3.5¢ without a 1.5¢ stranded cost recovery mechanism.

These important insights should be carefully considered by some of the critics of stranded cost recovery. True relative efficiency differences in a regime of competition should be based on

marginal costs going forward, not sunk costs. The example illustrates that one would be wrong in claiming that Utility A required no stranded cost recovery mechanism and wrong in claiming that it would be competitively disadvantaged by Utility B's stranded cost recovery mechanism. What disadvantages Utility A is its own relatively high (compared to the market price) marginal generating costs.

Likewise, one would be wrong in believing that Utility B's low marginal generating costs conferred a competitive advantage in wholesale markets that obviate the need for stranded cost recovery. A low market price of power could prevent even the most efficient utilities from recovering total costs. One would also be wrong in believing that Utility A's stranded cost recovery prevented Utility B from fully realizing the competitive benefits of that efficiency advantage.

Example of Stranded Cost Recovery Where One Utility Is Undisputed Low Cost Provider

Table 3 provides an example where Utility A is clearly the undisputed low cost provider. The assumptions are the same as before, but Utility A's marginal generating cost is 1.9¢ instead of 2.1¢. Again, the market price for power, 1.9¢ in this case, is assumed to be the marginal generating cost of the most efficient producer. The overall results for efficiency are the same, although there is no "anomaly" where power flows from a territory where a stranded cost recovery mechanism is levied. There will be a level playing field because there is no barrier to entry to efficient suppliers in either market (territory), and no discrimination in favor of incumbents.

Even with stranded cost recovery, Utility A retains its cost advantage in its own service territory (compare rows 5 and 6 of column 1). Utility B gains no artificial competitive advantage from its recovery mechanism when competing either inside or outside its service territory. Costs and prices in Utility A's service territory should be completely unaffected by Utility B's stranded cost recovery mechanism.

Utility B also has a 0.1¢ cost disadvantage in its own service territory, despite the stranded cost recovery mechanism. Both firms sell into the same competitive power market at the same prices and recover their total costs. Therefore, the transition cost recovery mechanism is strongly competitively neutral. The customer prices in Utility B's service territory during the transition (line 8) exceed those

in Utility A's service territory by exactly the amount of the differences in the stranded cost charge. Prices in equilibrium after the transition will converge to the same market level.

TABLE 3
STRANDED COST RECOVERY MECHANISM WHEN
ONE UTILITY IS THE UNDISPUTED LOW COST PROVIDER

	Utility A's Service Territory (¢/kWh)	Utility B's Service Territory (¢/kWh)
1. Marginal Generating Cost (Prior Regulatory Regime)	1.9	2.0
2. Sunk Generating Cost (Prior Regulatory Regime)*	1.5	2.2
3. Total Customer Charge (Prior Regulatory Regime)	3.4	4.2
4. Market Price of Power	1.9	1.9
5. Calculation of Stranded Costs:		
Revenues in prior regulatory regime	3.4	4.2
- Avoided costs	- 0	-2.0
- Mitigation benefits (mkt. sales)	-1.9	-0.
= Stranded Costs	1.5	2.2
Full Incremental Cost of Service (during transition):**		
6. Utility A	1.9+1.5=3.4	1.9+2.2=4.1
7. Utility B	2.0+1.5=3.5	2.0+2.2=4.2
8. Customer Price of Power	3.4	4.1
9. Price Required for Full Cost Recovery for Efficient Provider in the Transition	3.4	4.1

* Sunk costs are calculated on the basis of load served in the respective service territories in the prior regulatory regime.

** The example ignores charges such as for transmission, distribution, and customer service.

Table 3 seemingly provides one of the clearest examples of a claim that the stranded cost recovery charge could represent a barrier to entry for more efficient alternative suppliers and discriminate in favor of incumbents, because it dramatically raises the price of services delivered by A into B. However, these claims forget the fact that Utility B will impute to its own sales the 2.2¢ of lost recovery of stranded costs, even if the regulatory recovery mechanism charges stranded costs explicitly only to departing customers who switch to A. Utility A thus retains the same 0.1¢ marginal cost advantage in both service territories regardless of the recovery of stranded costs in both

territories. Put another way, Utility B is priced out of the market by its higher marginal costs, with or without recovery of stranded fixed costs.

Example of Stranded Cost Recovery with Capacity Rents and Mitigation of Costs

Table 4 illustrates that these conclusions do not change in any significant way if the problem involves multiple firms with numerous service territories and a market price that strands some but not all fixed costs (i.e., where the value of capacity increases market prices of power above marginal costs). This table also affords the opportunity to add more complexity to the example, particularly the need to account for the fact that not all fixed costs will be sunk and that mitigation of stranded costs via buyouts or buydowns of existing commitments (or the cancellation planned commitments) can reduce total exposure.

The example assumes that the market price is 2.2¢ (see line 4). All three firms benefit from selling into the marketplace (assumed here to be a large one where all firms are price takers and find it profitable to generate up to a capacity limit, where marginal energy costs of each firm then exceed 2.2¢).

As with the hypothetical, and consistent with our definition of stranded costs as arising only from costs sunk in the prior regulatory scheme, we start the calculation of stranded costs with revenue requirements under the prior regulatory regime and net out any avoidable costs and mitigation benefits (line 5). Because each utility's marginal generating costs are well below the market price for power, each utility can offset revenue losses from departing customers with 2.2¢ of market revenues from the sale of power that would have been consumed by defecting customers. As a result of continued generation (and the fact that these examples do not account for charges such as for transmission, distribution or customer service), no costs are avoided.

TABLE 4
STRANDED COST RECOVERY MECHANISM WITH CAPACITY RENTS
AND MITIGATION OF COSTS

	Utility A's Service Territory (¢/kWh)	Utility B's Service Territory (¢/kWh)	Utility C's Service Territory (¢/kWh)
1. Marginal Cost of Power (Prior Regulatory Regime)	1.9	2.0	1.9
2. Fixed Generating Cost (Prior Regulatory Regime)*	1.5	2.2	1.0
3. Total Customer Charge (Prior Regulatory Regime)	3.4	4.2	2.9
4. Market Price of Power	2.2	2.2	2.2
5. Calculation of Stranded Costs: Revenues in prior regulatory regime	3.4	4.2	2.9
- Avoided costs	- 0	- 0	- 0
- Mitigation benefits (mkt. sales)	-2.2	-2.2	-2.2
- Mitigation benefits (contract renegot.)	<u>-0.7</u>	<u>-1.0</u>	<u>-0.7</u>
= Stranded Costs	0.5	1.0	0
Full Incremental Cost of Service (during transition):**			
6. Utility A	1.9+0.5=2.4	1.9+1.0=2.9	1.9
7. Utility B	2.0+0.5=2.5	2.0+1.0=3.0	2.0
8. Utility C	1.9+0.5=2.4	1.9+1.0=2.9	1.9
9. Customer Price of Power	2.2+0.5=2.7	2.1+1.0=3.2	2.2
10. Price Required for Full Cost Recovery for Efficient Provider in the Transition	2.7	3.2	2.2

* Sunk costs are calculated on the basis of load served in the respective service territories in the prior regulatory regime.

** The example ignores charges such as for transmission, distribution, and customer service.

Calculation of stranded costs is somewhat more complicated in this example because we also account for the benefits of buyouts or buydowns of existing commitments (or the cancellation of planned commitments). We assume that utilities A, B, and C in Table 4 are able to save 0.7¢, 1.0¢, and 0.7¢, respectively, by renegotiating some of their fixed fuel or purchased power contracts. These cost savings would have benefitted defecting customers had they stayed and created a reduction in unrecovered revenue requirements. Thus, they must be netted from stranded costs. Consumers in each service territory receive the respective benefits of mitigation, and rates during the transition are uniformly below where they would have been otherwise. It is interesting that there are no stranded

cost recovery charges in Utility C's service territory because the 0.7¢ savings from contract renegotiations mitigated the "out of market" cost.

Note again how competitive neutrality is retained. All three utilities face the exact same market price of power (2.2¢). Customer prices in each service territory exceed this level by exactly the amount of the stranded cost recovery mechanism (line 9). At these prices, each utility will be motivated to sell up to its capacity limit. Despite the differing levels of the recovery mechanism (line 5), each utility once again retains whatever marginal cost advantages it may have in all three service territories (lines 6-8). Note especially that Utility B's 0.1¢ marginal cost disadvantage is maintained, despite its full stranded cost recovery. In particular, it retains the 0.1¢ cost disadvantage even in its own service territory.

Unlike our previous example, however, there is no efficiency gain from cutting back Utility B's generation in favor of other lower cost sources. At a 2.2¢ wholesale price, Utility B will still be motivated to use its own generation despite its higher marginal generating cost. If the 0.1¢ difference in marginal costs is a true efficiency difference, the extent to which customers could get the benefits of improvements in efficiency by eliminating this inefficiency depends on the assumptions about incentives to mitigate and the mechanics of the regulatory scheme in the transition. The calculation of stranded costs in Table 4 assumed that the 0.1¢ marginal cost disadvantage of Utility B cannot be mitigated. If it were possible for the utility to eliminate the discrepancy by adopting some efficiency measure that reduced its marginal costs to 1.9¢, and regulators wished to account for this mitigation, Utility B's stranded costs in line 5 would be 0.9¢ and the retail price would drop further to 3.1¢.⁴⁷ This example points to the fact that, at least in principal, future expected efficiency gains can be accounted for as mitigation of stranded costs—provided we are confident of their magnitude.

In reality, of course, regulators may have insufficient information as to whether the 0.1¢ difference represents an inefficiency that could be corrected or simply the fact that the proportions of fixed and variable costs may differ between plants. Put another way, it will not be so easy to actually calculate

⁴⁷ If Utility B's high marginal energy costs are tardy and inefficient, permitting an 1.0¢ stranded cost recovery charge will permit Utility B to pass on that inefficiency, in the sense that its customers will pay higher prices than necessary (thus violating objective No. 5). At the 1.0¢ stranded cost fee, Utility B could realize a 0.1¢ benefit by eliminating the inefficiency. However, despite the potential of 0.1¢ higher profits, competitive neutrality of the second degree still holds, despite the erroneous calculation of the true level of stranded costs. Once again, this points to the conclusion that the real issue will be correct calculation of stranded costs, not weak competitive neutrality.

stranded costs once mitigation strategies and uncertainty must be taken into account. Detailed industry scrutiny of mitigation efforts could prove onerous. On the other hand, as we discuss more fully below, the solution to these dilemmas may be to create incentives for mitigation during the transition and to occasionally "true up" or reset the stranded cost recovery during the transition to account for costs that are truly not sunk, thereby ensuring that utility customers share in the unknown future efficiency gains.

APPLICATION OF RESULTS TO ISSUES IN THE CURRENT DEBATE

Functional Equivalence of the Formal Recovery Methods for Competitive Neutrality under Our Assumptions

Our examples to this point have assumed that the stranded cost charge was assessed on entrants, and it therefore led to an increase in the incremental costs of all competitors. To understand why the "odd asymmetry" and "tying" concerns are invalid, we need to reexamine in more detail why it makes sense to treat successful stranded cost recovery as raising incremental costs of all competitors by an equal amount, regardless of the formal collection method. Answering the Court's concern over competition for one formal method of collection thus answers them for all formal methods with the same competitive consequences.

Assuming away differences in the administrative costs of measuring and the legal issues of liability, *etc.*, in these stylized examples, it does not matter whether (1) the incumbent utility collects it directly from departing customers, (2) a third party collects it directly from all competitors or all customers, or (3) the incumbent collects it from entrants, who incorporate it into the incremental cost of service, bill it to customers and forwarded it to incumbents. The imputation principle means that incumbents will impute the stranded cost recovery into the full incremental cost of its own service regardless of whether it is charged to departing customers directly or recovered by charges to entrants. By the same token, customers who remain will pay a stranded cost charge, either explicitly because the mechanism itself is recovered directly from all customers regardless of who the supplier is, or because it becomes an imputed cost of service by the incumbent that determines its choice of whether to supply (*i.e.*, dispatch its own units) or wheel in the third-party power.⁴⁸

⁴⁸ The incentive of customers to leave the system to avoid paying for stranded costs creates the impression that
(continued...)

These examples show the fundamental equivalence of the different ways of thinking about stranded costs. To illustrate, let us return to Table 2. As we have done it here, we could imagine stranded cost recovery to be a 1.5¢ charge by Utility A to all competing suppliers who are left to recover the cost in their rates to customers. As we have seen, Utility A will impute the same 1.5¢ charge to its own service, exactly the same as if a third party had assessed all utilities serving the region (including the incumbent) a 1.5¢ fee and used the proceeds to amortize the stranded cost.

In the FERC's "revenues lost" approach, the 1.5¢ charge is assessed directly against all departing customers and the revenues are forwarded to incumbents. But this leaves Utility B with exactly the same net revenues (2.0¢) from sales to customers in Utility A's service territory as if it had collected the customer price of 3.5¢ and forwarded 1.5¢ to Utility A. Obviously, this indifference also applies when the price of power allows some, but not all, fixed costs to be recovered (Table 4).

The robustness of the various collection methods with regard to competitive neutrality does not mean that other considerations such as transparency and administrative costs might cause one method to be preferred over another. However, our analysis does mean that the conclusions regarding competition on equal terms are invariant to the formal collection methods, as long as the methods are successful in actually recovering the same valid measure of stranded costs.

We have shown that weak competitive neutrality is an extremely robust property of successful transition charges that is independent of (1) the differences in methods for assessing the charges (if there is no legal or economic obstacles to actual recovery for each of the mechanisms), (2) the general market conditions regarding the amount of excess capacity expected, *etc.*, and (3) the precise level of recovery allowed. Only strong neutrality resolves the choice over the level of recovery, but it too remains robust as to method of assessment and general market conditions. Strong neutrality restricts the level to no more and no less than all stranded costs during the transition.⁴⁹

⁴⁸ (...continued)

stranded costs are "created" by departing customers. In reality, stranded costs are created by the discrepancy between the competitive wholesale price and the embedded costs sunk in the prior regulatory regime. These stranded costs were there before the transition, will be there as amortization during the transition and will be there even if no customer leaves the system (see Utility B in Table 3).

⁴⁹ We have not addressed the duration of transition, which is itself potentially controversial both analytically and politically. One possible way to define a relevant horizon is to determine the point in time when it is expected that the present value of future revenue requirements for generation (or other stranded assets) equal the present
(continued...)

The Court's Concerns over Alleged Tying and Competitive Asymmetry

This equivalence of equally effective recovery mechanisms insofar as competitive neutrality permits us to return to the Court's concerns over tying and competitive asymmetry. First, the Court assumed that all fixed costs in perpetuity and not just stranded costs would be recoverable by the mechanism. Apparently, critics who complain that stranded cost recovery artificially gives "an entrenched competitor a paid-off asset with which to compete with rivals" are making the same assumption. As illustrated here, however, strong neutrality requires that the mechanism apply only during the transition and only to recover fixed costs that are indeed stranded. For the period in which the stranded cost recovery mechanism is in effect, all competitors are subject to the same risk of recovery of non-stranded costs on equal terms.

In a formal sense, there is no tying under the "revenues lost" method because the charge is paid only by customers seeking to exit the system. If a third party charging all competitors the same fee does not constitute tying (and it cannot), then the functionally equivalent other methods cannot either. This may answer the tying concerns as a legal matter, but we have claimed that the competitive consequences are invariant to the formal collection method under our assumptions. The simple answer to the tying claim is that we have shown that all suppliers face the same competitive wholesale price for power regardless of the level of the stranded recovery charge. The recovery mechanism therefore cannot foreclose effective competition as long as the wholesale market is competitive.

Contrary to the Court's concern, if the recovery mechanism achieves competitive neutrality, it becomes the exact opposite of a tying arrangement. The entire idea is to "untie" the stranded cost recovery from service provided by the incumbent. Competition on equal terms permits recovery of the legacy of the past regulatory system, regardless of which firm the customer chooses, and permits all firms to compete on the basis of true relative efficiency advantages on a going ahead basis.

With regard to the claim that recovery of stranded costs represents a "deal killer," no "odd asymmetry" exists. Our examples show that any differences in true economic efficiency remain unchanged by the recovery mechanism and all utilities in the same market face the same wholesale

⁴⁹ (...continued)

value of future probable market revenues. From that day forward, a competitive market in generation could be instituted with no remaining stranded costs.

price of power. No asymmetry exists because each utility competes on the basis of its true efficiency in markets beyond its service territory, and recovers no revenues for stranded costs except from its own prior customers. A successful recovery of stranded costs only means that the *retail* prices of power in different regions vary depending on the local level of stranded costs. But these differ by exactly the amount necessary to insure that all investments going forward can *expect* to earn their cost of capital, while all operational efficiency advantages are preserved.

Consequences of Measurement Errors in Recovering Stranded Costs

Strong competitive neutrality thus defines a successful stranded cost recovery. This follows directly from (1) the definition of stranded costs as sunk costs incurred only by incumbents as a result of legacies from the prior regulatory regime, (2) the fact that incumbents will always impute to their own incremental costs any stranded cost recovery successfully assessed on entrants, even if they are not assessed directly on customers, and (3) the fact that any other level of stranded cost recovery undermines (if too low) or overshoots (if too high) the incumbent's ability to expect to earn its cost of capital. Successful assessment of stranded costs on all competitors in the new competitive regime can never create competitive advantages or disadvantages with regard to true efficiency differences going forward if wholesale markets are effectively competitive. If critics of stranded cost recovery mechanisms are right, it can only be because the recovery mechanism in reality is doing something other than what it purports to do. This, in turn, raises questions as to how the mechanism might go astray in accomplishing its objectives.

Our results on the robustness of a successful stranded cost recovery mechanism above foreshadow the results of errors in measuring and recovering stranded costs. Biased mistakes in calculating the correct level of stranded costs will indeed undercut the achievement of strong competitive neutrality, an equal opportunity for all firms to recover costs sunk in the prior regulatory regime and to *expect* to earn a rate of return equal to the cost of capital. But the imputation rule means that even errors in measuring stranded costs will leave true relative efficiency advantages going forward unchanged (as long as the charges can be actually recovered from customers and the mistakes do not threaten the survival of a competitive wholesale market). That is, weak neutrality is achieved even by a mis-estimated stranded cost allowance.

One possible source of an error might arise from claims that the excess costs arise not from legacy of the past regulatory regime but rather from the legacy of past management mistakes. The 0.7¢ of

additional stranded costs in Utility B's service territory (over Utility A's) in Table 3 may be due to poor management, for example. However, there are a large number of other plausible explanations for the difference, such as plant vintage, type of fuel contracts, system load factor, or tax treatment. Given the administrative costs of reviewing past decisions in a retroactive review, the FERC has permitted the recovery of "legitimate and prudent obligations that the utility undertook." As long as this creates standards for the recovery of costs equivalent to a continuation of a regime of fair regulation—the *expectation* of earning the cost of capital—this seems a reasonable course. Recovery of stranded costs should seek to achieve competition on equal terms during the transition, not to assign blame for the cost burden of the prior regulatory regime. However, our examples do illustrate the importance of identifying opportunities for mitigation, creating incentives to pursue them, and assuring the eventual flow-through of these benefits to customers.

Suppose, however, regulators err in setting the stranded asset charge. For example, suppose in Table 3 that regulators establish Utility B's stranded asset charge at 1.4¢ instead of 1.5¢. All full incremental costs of service and prices in Utility B's service territory will be lower by the amount of the 0.1¢ error. The opposite result will occur if regulators erroneously set the fee in Utility C's territory at 0.1¢ instead of zero. Note that these errors could arise from either errors in forecasting future wholesale prices, errors in estimating the future revenue requirement on the incumbent's sunk costs from the prior regulatory environment, or perhaps even errors in forecasting expected usage from a departing customer under the exit fee approach.

If stranded costs are recovered in a competitively neutral way, errors in measuring stranded costs will affect the overall level of rates and the profitability of the incumbents, but not the inherent competitive advantages or disadvantages of firms as measured by true efficiency differences. This strong property of robustness with regard to weak competitive neutrality holds even for any arbitrarily established, yet successfully recovered, stranded access charge. (After all, if weak neutrality hold for both the case where *no* recovery is allowed and where *full* recovery is allowed, it must hold at any in-between level as well.) The incumbent's imputation of the stranded cost charge will cause an effect on the incumbent's full incremental cost of service equal to whatever happens to be charged to its competitors.

However, this robustness with regard to weak competitive neutrality does not mean one is indifferent to the level of the charge. Errors in measuring stranded costs will have competitive consequences as far as recovery of total costs (strong neutrality) are concerned. Underestimates cause prices to be

lower than otherwise and will tend to put a financial squeeze on incumbents. The legacy of the past regulatory regime cannot be properly funded and incumbents might even be bankrupted. Overestimates will have the opposite effect, inflating final prices beyond the level necessary to recover stranded costs and creating unwarranted excess profits for the incumbent.

A major source of possible error arises from failures to account for mitigation. For example, suppose stranded costs for Utility A were calculated as the 1.6¢ difference in total costs in Table 3, rather than the 1.5¢. The 0.1¢ difference in full incremental cost of service in lines 5 and 6 would still be preserved (note that Utility B's imputation of stranded costs to its own service increases by 0.1¢ as well). Customers would not realize the benefits of Utility B's efficiency advantages during the transition as a result of the error.

By the same token, assume that not all of Utility A's 1.5¢ in fixed costs were actually sunk in the prior regulatory regime. If, say, 1.0¢ were sunk in the prior regime, but 0.5¢ could be avoided entirely when it shut down its generating plant, the 1.5¢ stranded cost recovery charge would unnecessarily inflate rates in the transition by the 0.5¢ overestimate of true stranded costs.⁵⁰

To this point, we have assumed that all of the incumbents' investments were incurred in the prior regulatory regime and the entrants' investments were all made in the transition. In reality, incumbents are likely to make additional investments after the transition. If competition on equal terms is going to occur, it is important that new entrants and new investments by incumbents not qualify for stranded cost recovery if all customers go shopping "cold turkey," as we have assumed. Otherwise, the recovery mechanism would be based on who made the investment, not when the investment occurred. However, if not every customer goes shopping on day one, lingering regulatory responsibilities could entail re-stranding of costs during the transition. These, too, might have to be accounted for.

The answer to all this, as the D.C. Circuit put it, is that the measure of stranded costs should be "legitimate, verifiable, and accurately calculated." The FERC stated that the charge was designed

⁵⁰ Some observers claim that considerable savings could be realized by shutting down some of the existing generation, whose operating costs exceed the competitive price of power that would emerge in a competitive market. Any such cost savings are true efficiency gains and not stranded costs from the prior regulatory regime. See Roger W. Sant and Roger F. Naill, "Let's Make Electricity Generation Competitive," *The Electricity Journal*, October 1994, pp. 49-57.

to compensate for the "legitimate and prudent obligation the utility undertook." This argues for doing the best job one can in measurement of stranded costs (subject to possible "true ups," as discussed below), collect them in a competitively neutral way, and let competition take its course.

Possible Exception to the Competitive Neutrality Principle

Our principle that weak competitive neutrality is achieved is highly dependent on our assumption that the stranded cost recovery mechanism is "successful," i.e., that retail prices are high enough to recover the charge. This result might not be achieved, for example, if regulators allowed the incumbent to treat *all* investment costs as sunk regardless of when they were made in the prior regulatory regime and whether they were stranded or not, into the indefinite future, and generation markets were not subject to effective competition. This combination of assumptions could create a "first mover" advantage for the incumbent that would not represent strong competitive neutrality.⁵¹

Indeed, this appears to be the Court's concern in *Cajun* when it questioned the competitive consequences "if a customer can charge a former customer for the fixed cost of its product whether or not the customer wants that product." Similarly, critics of stranded cost recovery complain that "stranded cost recovery artificially gives an entrenched competitor a paid-off asset with which to compete with rivals."

Whether an equally efficient firm can in general incur fixed cost and enter into the market and compete on equal terms against an incumbent employing such a pricing mechanism depends on how the price is established. Consider the example in Table 4 and assume that a new entrant with costs of 2.2¢ has no service territory, but must enter Utility A's service territory and recover its fixed cost via charges to Utility A's customers. Assume that the entrant makes an idiosyncratic investment that permits it only to compete in Utility A's service territory, and that Utility A always sets its stranded cost charge at its fixed cost of 1.5¢ regardless of whether it has stranded costs or not. The entrant's total cost of service becomes $(1.5 + 2.2 =) 3.7¢$ in Utility A's service territory. If Utility A could set its rates to be 3.7¢, then the entrant can compete on equal terms. However, assume that Utility A's

⁵¹ See William B. Tye, "The Pricing of Inputs Sold to Competitors: Response," *Yale Journal on Regulation*, Vol. 11, No. 1 (Winter 1994), pp. 203-224, and William B. Tye and Carlos Lapuerta, "The Economics of Pricing Network Interconnection: Theory and Application to the Market for Telecommunications in New Zealand," forthcoming in *Yale Journal on Regulation*.

rates are set to be 3.4¢.⁵² The entrant cannot enter Utility A's market profitably despite the fact that it is the long-run low cost provider of service.⁵³ More generally, if the entrant has already entered the Utility A market, the 1.5¢ stranded cost charge will prevent it from recovering total costs even though it is the most efficient provider. Such a pricing mechanism will not achieve strong competitive neutrality because it will violate the first three goals above.⁵⁴

To prevent such a "price squeeze," some observers have recommended an "imputation rule" whereby the access charges to competitors must be recovered by the incumbent in its customer rates.⁵⁵ However, such rules against predation are made unnecessary in our examples by the assumption that the stranded cost fee was set fairly by regulators, the generation market was effectively competitive, and the stranded costs are recovered successfully. To the extent these assumptions are not valid, special competitive rules may be necessary to preserve competition in the wholesale market.⁵⁶

Ex Ante Vs. Ex Post Calculation of Stranded Costs

We have assumed up to now that the stranded cost recovery mechanism is established at a fixed level *ex ante* for some period of time (maybe the entire transition period) before any "true up." We also assumed that we knew for certain the true level of stranded costs, eliminating any uncertainty about the appropriate charge. However, there might be a great deal of uncertainty about the level of the

⁵² Such a failure to impute the full stranded costs could arise if the profit maximizing monopolist's price in Utility A's service territory were below the market price of power plus stranded costs. In this event, the monopolist could increase profits with the greater volume of sales at the lower price.

⁵³ Note that the entrant could enter the market if it could still sell into the other service territories at a competitive wholesale price of 2.2¢.

⁵⁴ In the example, Utility A would impute the 1.5¢ into its incremental costs and prices if it could.

⁵⁵ For a general discussion, see Alfred E. Kahn and William E. Taylor, "The Pricing of Inputs Sold to Competitors: A Comment," *The Yale Journal on Regulation*, Vol. 11, No. 4 (Winter 1994), pp. 223-240. In addition, William J. Baumol, Janusz Ordover, and Robert D. Willig, "Parity Pricing and Its Critics: Necessary Condition for Efficiency in Provision of Bottleneck Services to Competitors," forthcoming in the *Yale Journal on Regulation*, propose an automatic flow through mechanism that requires the incumbent to discount all recovery of access fees to entrants by the same measure of any discount to the customers to maintain competitive neutrality.

⁵⁶ Note also that we assumed that the stranded cost recovery was achieved by a one-part rate design with no demand charges. This may not necessarily be the most efficient rate design. If, instead, the recovery is part of a demand charge, the mechanism is clearly competitively neutral as long as the charge is non-bypassable.

necessary charge and a "true up" may be necessary to ensure that customers benefit from true efficiency gains as well as utilities. This raises the question as to whether a possible "true up" would create an unfair competitive advantage to incumbents.⁵⁷

The general rule is that, assuming all else equal, an *ex post* resetting of stranded cost recovery has the same competitive consequences as an accurate *ex ante* mechanism—it will be competitively neutral. Done correctly, both methods tend to have similar consequences for the risks borne by new investments. Risks on old investments may differ depending on the method chosen for the "true up," and this would have to be accounted for in the allowed return on investment in stranded cost during the transition.

To see the competitive neutrality of a fairly applied "true-up" mechanism, let us amend the previous hypotheticals to see what consequences for competition on equal terms emerge. Suppose in Table 3 there is a completely new entrant with no service territory under old regulatory regime, and thus has incurred no sunk costs prior to the transition to deregulation. According to the third goal, any such investments should be accorded no protection against risks of wholesale market conditions in the new competitive environment. As a result of excess capacity, the market price is only 1.9¢, the level that barely permits Utility A to recover its marginal costs without the stranded cost charge. To determine the competitive impact on the efficient entrant, we must consider whether the future price is correctly anticipated and, if not, whether the erroneous forecast is corrected at a later date through a "true up."

Suppose in the first instance that the future market price is correctly forecasted at the time the stranded cost recovery charge is calculated. The stranded cost recovery is now $(3.4 - 1.9) = 1.5$ ¢, since all of Utility A's sunk cost from the prior regime qualifies as a stranded cost. The efficient entrant in this case suffers no competitive disadvantage since it should not enter the market even though it is the lowest total cost competitor. In fact, it will not enter the market regardless of whether or not Utility A recovers stranded cost. Since it has advance knowledge that rates will go to 1.9¢ in the absence of a stranded cost recovery, it is no worse off under recovery than without a stranded cost

⁵⁷ Those who objected to the recovery of stranded costs in *Cajun* complained that buyers and sellers would be reluctant to engage in off-system sales because the uncertainty over future stranded cost recovery would become a "deal killer." See James D. Pembroke, "After *Cajun*, What Next for Stranded Costs?," *The Electricity Journal*, October 1994, pp. 42-48.

recovery.⁵⁸ Since the wholesale market price the entrant faces is the same regardless of whether or not Utility A recovers its stranded cost, the potential entrant will receive the correct incentive not to enter. Put another way, the efficient entrant fully faces the risks of future market conditions, regardless of the stranded cost recovery, but that is exactly what should happen.

Suppose, for example, that regulators had no idea what might happen to prices. Rather than attempt to project the necessary stranded cost charge to account for the expected future market conditions, they took a "wait and see" approach. In this case, the accounting for the price change will be left to the marketplace results. If so, after some period of time, there would be a "true up" and the stranded cost recovery charge would be reset at 1.5¢ to account for the inability to forecast prices. Given our assumptions about how prices are established, this will cause retail prices to equal $(1.9 + 1.5 =) 3.4¢$. Utility A will clearly be made whole because it will now recover total costs at a price of 3.4¢. The entrant, however, will not benefit because its incremental costs simultaneously go up by the 1.5¢ increase in the stranded cost levy. However, its losses due to the wholesale price of 1.9¢ are exactly the same that would have occurred had there been no "true up." Utility C fully bears all risks of price changes in the future. This is exactly the result our third goal for stranded cost recovery calls for. The entrant is going to bear the same risk regardless of whether or not stranded cost recovery is extended to Utility A, and regardless of whether it is set *ex ante* or *ex post*.

However, risks for incumbents will depend on whether a "true-up" mechanism is implemented. For example, consider the more general case in Table 4 and assume that the stranded cost charge for Utility A is set at 0.5¢ based on a 2.2¢ projection of the price for market power. Suppose now that a 0.5¢ decline in market prices was unanticipated and there is no "true up." All utilities will lose 0.5¢ as a result of the 0.5¢ decline in price. As long as the 0.5¢ stranded cost recovery mechanism is in place for Utility A, it (and all utilities) will bear the same risk of market fluctuations and errors in forecasting the magnitude of stranded costs. If, however, Utility A's stranded cost recovery fee is true-up periodically, it will be shielded from additional future market risk after the true up. Either way, the stranded cost recovery mechanism nevertheless remains competitively neutral in the weak sense (full incremental cost of service differences do not change). Note again the robustness of the weak dimension of competitive neutrality with regard to changes in assumptions about stranded cost recovery.

⁵⁸ Note that the entrant has zero net revenues in the world where rates fall to Utility A's incremental costs and there is no stranded cost recovery and remain at zero when the stranded cost recovery is set at 1.5¢. In both cases, the potential entrant is unable to recover its fixed cost of 0.3¢ and will not enter.

Use of *ex post* methods, however, will affect the allocation of risk between the incumbent utility and its ratepayers. These differences would have to be accounted for in the allowed rate of return on investments in stranded costs. The topic goes beyond the subject of this paper, but a few comments are in order.

There are three natural benchmarks useful for assessing the risk and necessary allowed rate of return for the recovery of stranded costs. The first is the necessary allowed rate of return under the prior regulatory regime. To the extent regulators choose a transition scheme for recovery of stranded costs that reproduced the risks the utility would have faced under continued regulation, this would be the appropriate allowed return.

The second benchmark is relevant if the stranded cost recovery mechanism mimicked the risk of a completely new investment. Then the appropriate allowed return would be the new cost of capital under the competitive regime:

Third, and at the other extreme, regulators in theory could design a scheme to eliminate much of the stranded cost recovery risk, although it would be difficult to eliminate it all. In this case, a rate lower than the regulatory allowed rate of return in the prior regulatory regime would be appropriate.

Given the uncertainty surrounding some of the stranded cost estimates,³⁹ there may be no actuarially fair method for setting the *ex ante* stranded cost levy. This would argue for use of an *ex post* mechanism, with perhaps the utility choosing to bear some of the risks of variances between resettlings (with, of course, proper compensation for the risk, just as under traditional regulation). Another alternative is that stranded cost recovery could be treated as part of a performance-based regulation (PBR) system for the utility during the transition.

The proper approach may well differ from one utility to another or from one cost category to another. Where the magnitude of the obligation is reasonably certain, incentives to mitigate are likely maximized and regulatory burden minimized by use of the *ex ante* approach. For example, if there is a clear market-based estimate of stranded costs, it may be preferable to fund this amount only, letting the utility (or some third party) bear the risk of future developments (properly compensated

³⁹ See Thomas Feiler and Christopher Seiple, "Electric Stranded Investment: Not as Much as You Think," *Public Utilities Fortnightly*, January 15, 1995, pp. 10-11.

for the risk, of course). Where there is greater uncertainty and management control is minimal,⁶⁰ particularly about unknown future cost responsibilities such as a hazardous waste cleanup, the *ex post* approach would appear necessary.⁶¹ However, regulators can account fully for the idiosyncratic problems of coming up with methods that create an *ex ante* expectation of earning the cost of capital, knowing that weak competitive neutrality is likely to be robust with regard to any reasonable means of successfully recovering the sunk costs of the prior regime.

Considerations in Choosing among Alternative Mechanisms for Stranded Cost Recovery

To date, the FERC has strongly embraced the "exit fee" approach to electric wholesale stranded costs recovery, with recoverable amounts to be estimated on the basis of "revenues lost." No specific means of calculating these terms have been identified and, absent such details, it is not yet clear how reliable a recovery mechanism this may prove to be. It is possible that the exit fee/revenues lost approach will be more contentious and challenged as less effective than available alternatives. In particular, it may be alleged that exit fees are anticompetitive (as they are imposed precisely at the time that a customer contemplates leaving the system for a specific alternative supplier) and arbitrary (as they could easily differ considerably from customer to customer as a function of date of departure). Moreover, the calculations underlying an estimate of "lost revenues" are by no means simple or completely objective, as there is uncertainty over what volumes and prices the departing customer would have continued to experience as a full requirements customer. Many of these issues will certainly be revisited at the state level. Various industry participants may wish to consider alternatives to exit fees as time goes on. These are discussed in more detail in the Appendices.

⁶⁰ Mitigation incentives present something of a paradox. They are clearly strongest under an *ex ante* approach, but are most needed when there is large uncertainty about the magnitude—which argues for an *ex post* approach. The paradox arises because mitigation itself provides information about what the true level of stranded cost really is.

⁶¹ Many incentive schemes failed when experience proved far different from *ex ante* expectations. See Johannes P. Pfeifenberger and William B. Tye, "Handle with Care: A Primer on Incentive Regulation," *Energy Policy*, Vol. 23, No. 9 (1995), pp. 769-779.

SUMMARY: THE PARADOX OF THE ROBUSTNESS PROPERTY OF COMPETITIVE NEUTRALITY FOR STRANDED COST RECOVERY

Much of the discussion to date of the competitive neutrality of stranded cost recovery has focused on the issue of its effect on the ability of competitors to realize the benefits of true efficiency differences going forward (weak competitive neutrality). But as long as the charge is successfully recovered from customers in a non-discriminatory manner, then virtually any recovery mechanism (even one that gets the wrong number) will satisfy this very weak test as long as wholesale markets remain competitive. Perhaps paradoxically, the fact that a particular mechanism and recovery amount is competitively neutral in this sense tells us little about whether it is desirable or not. For that, we need to determine whether it meets the test of strong neutrality, allowing all competitors an equal opportunity going forward to expect to earn the cost of capital. By the same token, any recovery mechanism that successfully accomplishes neutrality in this more meaningful sense can ordinarily be expected to be competitively neutral in regard to preserving the relative competitive advantages of true efficiency differences going forward. The implication for the debate over stranded cost recovery is clear: the weak competitive neutrality issue should simply be put aside. *Instead we must focus our attention on getting the stranded cost number right.* The real tasks ahead are (1) achieving administratively feasible ways of correctly measuring and recovering stranded costs and (2) achieving effective competition in the wholesale market for power, so that the transition to competition may truly begin on equal terms.

APPENDIX A

HISTORY OF DEREGULATION AND ORIGIN OF STRANDED COSTS IN THE NATURAL GAS PIPELINE INDUSTRY

It sometimes appears that the federal experience in deregulating wellhead gas prices and in unbundling of pipeline transportation services provides a model for electric industry restructuring. In particular, it seems that the important problems of "transition costs" and "stranded costs" are being anticipated by the FERC and by State regulatory commissions which are considering electric retail access. The gas industry experience is indeed instructive, revealing how a protracted and ambiguous restructuring can aggravate the stranded cost problem¹, how the courts can and will become involved if regulation does not create stranded cost recovery mechanisms that pay sufficient regard to the fair needs of investors², and how stranded cost recovery mechanisms can be designed. Curiously, the FERC seems to have heeded the first two lessons closely while essentially ignoring its own experience in the area of stranded cost recovery mechanisms.

Three main segments exist in the natural gas industry: production, transmission, and distribution. Transmission originally consisted of pipelines buying price-controlled gas "at the wellhead" (*i.e.*, from gas producers), transporting it, and reselling it "at the city gate" to gas distribution companies, who supplied it to final customers. Today, the pipelines perform only a transportation function, while their customers (which include distribution companies, large commercial and industrial retail customers, and gas marketers and resellers) buy their own gas at unregulated, market prices from producers. The transmission and distribution segments remain regulated. This appendix focuses on the impact of wellhead price deregulation and pipeline transmission access on stranded costs for the pipeline sector. We begin with a brief recapitulation of the regulatory restructuring process to reveal the parallels and precedents for the current electric situation. Then we describe several of the mechanisms for stranded cost and transition cost recovery that the FERC approved.

¹ The almost decade-long process of moving from FERC Order 380 (1984) through Orders 436, 500, 497, and 636 (1992) created a hybrid market of regulated and competitive prices that customers could use selectively, under a "lower of cost or market" purchasing strategy. This exacerbated the sunk cost recovery problem (for out-of-market gas supply contracts) and encouraged uneconomic bypass.

² FERC Order 500 was the result of the U.S. Court of Appeals, D.C. Circuit, remanding of Order 436, in part on grounds that it had not given pipeline investors a means of recovering stranded costs associated with prudent but expensive supply contracts.

Major Steps in Gas Deregulation

The root of the gas industry's stranded cost problem was *Phillips Petroleum Co. v. Wisconsin*, 347 U.S. 672 (1954), in which the Supreme Court held that the price of natural gas shipped over interstate pipelines could be legally regulated at the wellhead by the Federal Power Commission (FPC). Initially, gas prices were set on a cost of service basis, but this proved to be complicated due to the widely varying characteristics of different supply basins, so the FPC switched to simplifying rules based, for example, on region and type of well. The low prices allowed by the FPC sometimes provided little incentive to develop new gas supplies for sale to interstate pipelines. By the mid-1970s, these prices had not increased enough to keep pace with the per mmbtu value of competing sources of energy, especially oil after the supply disruptions of 1973-4, so gas for interstate sale was in very short supply.³

To remedy the shortage, the Natural Gas Policy Act (NGPA) of 1978 charged a successor to the FPC, the Federal Energy Regulatory Commission (FERC), with administering a complex system for raising the price of newly developed natural gas. The NGPA system kept regulated prices on "old" gas at their previous low levels, but permitted much higher (though still regulated) prices on "new" gas. The intent was to induce new supply while preventing "windfall profits" on gas supplies developed under prior wellhead price controls.

Throughout this time, the actual price the pipelines charged for gas was a volume-weighted average of the wellhead prices on old and new gas combined, so the prices on new gas contracts could be far above the average delivered price without suppressing demand for the gas. Moreover, the NGPA process of repricing began at a time of record energy prices (1979, another oil market disruption) that were widely expected to go even higher in the future. Therefore, the price of new gas could be well above the *current* market price while not being above the expected *future* market price—or so those who designed the NGPA hoped.

Unfortunately, the NGPA price trajectories for new wellhead supplies were based on expectations for high gas demand and high oil prices that never materialized. In actuality, the high energy prices of 1979 and the early 1980s brought forth increased energy efficiency and reduced demand. There

³ The fact that the intrastate market for gas was unregulated resulted in gas supplies being diverted away from the interstate market, exacerbating the shortages in that market.

was also a significant recession of the U.S. economy in 1981-3, and the world price of oil dropped substantially in the mid 1980s. The result was that gas pipelines had signed long-term contracts for new supplies at prices far above what the market soon proved able to support. Moreover, the higher prices for new wellhead supplies induced a great deal of drilling and development activity, creating a supply surplus. A highly seasonal spot gas supply market emerged around 1984 with summer gas prices at roughly half of many pipelines' weighted average costs of gas, and up to four or five times lower than the price of the highest cost contracts in a typical pipeline's portfolio. The so-called "supply bubble" was born.

The out-of-market pipeline supply contracts for new gas almost all included substantial "take-or-pay" guarantees to gas producers: If the pipeline could not take delivery and sell the gas, it would nonetheless pay for the vast majority of it (typically 60-90 percent of annual deliverability). Such take-or-pay clauses had long been a feature of gas supply contracts. Such guarantees survived into the NGPA era for several reasons. One was that the pipelines' business environment had been one of chronic gas shortage, in which they could always sell any gas available. Regulated wellhead prices meant the pipelines could not simply bid more to induce new supply. Instead, they offered non-price inducements to producers, such as high take-or-pay levels, to try to secure additional supplies. Extending these terms when new gas began to be available was natural, especially when prices were expected to continue to rise in the future.

Second, the regulatory mechanism had been set up so pipelines were somewhat indifferent to the price of the gas, at least as long as their market franchise remained intact. The pipelines' "merchant function" consisted of buying the gas at the wellhead and selling it at the city gate to their customers (primarily gas distribution companies) at the pipelines' average actual out-of-pocket cost. The pipelines simply secured gas supplies for customers, without profit to themselves. Their profits consisted of the return on the pipeline assets used to transport the gas, which were only affected by the cost of gas to the extent that high prices threatened volume reductions or customer losses.

Third, many of the pipelines were hedged against the risk that the gas might be unmarketable by the "minimum bill" provisions in their tariffs with distribution companies: If the distribution companies could not sell the gas, they nonetheless were obligated to pay the pipelines' "minimum bill." The minimum bill was the pipelines' downstream version of the take-or-pay charge, which effectively guaranteed the distribution company's share of the pipelines' upstream take-or-pay obligations with producers.

By the early-1980s, the new gas supplies secured at high prices were generating billions of dollars of excess cost. "Business as usual" regulation would have passed these costs through to final customers, for whom the supplies had been secured in the first place, by having producers invoke their take-or-pay clauses with pipelines and pipelines invoke their minimum bill provisions with distribution companies. However, high-priced gas had to compete with low-priced oil, especially for industrial customers with dual-fuel equipment. Moreover, the price run-up created complaints from residential customers and others who lacked the equipment to switch fuels readily. These problems set the stage for an unprecedented series of regulatory orders and court decisions that left all segments of the natural gas industry confused about the rules for most of a decade, and which created the pipelines' stranded cost problem.

The process began on June 1, 1984, when the FERC issued Order No. 380, *Elimination of Variable Costs from Certain Natural Gas Pipeline Minimum Commodity Bill Provisions*. Order 380 eliminated the minimum bill resale provisions between pipelines and distribution companies without relieving the take-or-pay provisions between producers and pipelines. The pipelines (with FERC approval) attempted to minimize their take-or-pay costs by "special marketing programs." These programs gave special discounts on gas (negotiated with producers in exchange for take-or-pay concessions) to customers who might otherwise switch immediately to oil. Since customers without alternative fuel capability could not participate in these arrangements, the courts struck down such programs as unduly discriminatory in 1985. On October 18, 1985, the FERC issued Order No. 436, *Regulation of Natural Gas Pipelines after Partial Wellhead Decontrol*. Order 436 required non-discriminatory transportation services of gas owned by others, so pipelines would be unable to favor their own gas, without any provision for recovery of take-or-pay costs. Together, Order 380 and Order 436 left pipelines facing insolvency-threatening losses from their supposedly risk-free, profit-free gas merchant function.

The regulatory and legal history from this point through the early 1990s is extremely tangled, with FERC orders issued, remanded by the courts, reissued while the remand was appealed, and so on. For example, the FERC attempted to accelerate wellhead price decontrol in 1986 with Order No. 451, only to have the order struck down by the 5th Circuit Court of Appeals in 1989, in a decision that was itself reversed by the Supreme Court in 1991. The Natural Gas Wellhead Decontrol Act of 1989 achieved complete wellhead price decontrol as of January 1, 1993.

The most important threads in this history with regard to stranded costs are Order 436 and its progeny. (Order 436 had five additions or modifications, Orders 436-A through E, in 1985-87.) With minor refinements, each version required pipelines to offer firm and interruptible transportation services in addition to continuing to provide their sales, or "merchant" service. Firm sales' customers were entitled to forego pipeline gas and use interruptible transportation to buy spot gas, which they did extensively during the summer. Order 436 also included schedules for customers to convert their firm sales service gradually to firm transportation and release the pipeline from its residual obligation to serve. Unfortunately for the pipelines, those conversion rights endowed customers with more flexibility than the pipelines generally enjoyed upstream in their supply contracts with producers. These two types of customer flexibilities (IT and firm conversions), coupled with Order 380's cancellation of minimum bills, created the stranded cost (take-or-pay) problem for the pipelines.

Order 436 was partially struck down (remanded to the FERC) in 1987 by the DC Circuit Court of Appeals, in large part because of the inadequacy of these provisions for pipeline take-or-pay losses, and it was replaced by Order No. 500, *Regulation of Natural Gas Pipelines after Partial Wellhead Decontrol*, on August 14, 1987. Order 500 itself had many additions or modifications, sometimes in response to the courts, reaching Order No. 500-I by 1990. The chief feature that distinguished Order 500 from Order 436 was a provision for a sharing of take-or-pay losses between a pipeline and its customers, through unrecovered cost allowances and the creation of Gas Inventory Cost surcharges, or GICs. These were, respectively, the stranded cost recovery and future avoidance mechanism for pipelines during the period preceding the final restructuring in 1992, Order 636 (described below).

Under Order 500, pipelines could attempt to recover their past take-or-pay costs or contract buyout costs in either of two ways: by putting 100 percent of such payments into the Purchased Gas Adjustment Clause (PGAC) as commodity charges (where many such costs would not be collectible, given customers' flexibility), or by writing off between 25 and 50 percent (chosen by the pipeline), putting that same percent into a demand charge, and putting the remaining portion (not more than 50 percent) into the PGAC. This "equitable sharing" arrangement, whereby the pipeline abandoned part of its claim for full recovery, allowed the pipeline a rebuttable presumption of prudence for buying down the out-of-market contracts. Both alternatives, though better than nothing, were

financially inadequate, resulting in a multi-billion dollar unrecovered cost problem for the pipelines, in addition to the out-of-market costs that were absorbed by producers and customers.⁴

Order 500 also created GICs to cover the future supply costs of being obligated to serve while not being assured of each buyer's minimum take. The motivating idea was that pipelines were holding certain gas supplies or supply contracts in reserve or in "inventory" to cover future demand uncertainty, and those carrying costs needed to be included in the allowed costs of service. There were no explicit rules about what rate structure or valuation formula had to be used in designing a GIC; each pipeline proposed its own terms, often in accord with settlement discussions with customers. (More details about GIC design are discussed below.)

The final step (so far) in the transition to deregulated gas pipeline services was Order 636, proposed as the so-called "Mega-NOPR" in 1991 and issued in 1992 to become effective in 1993. (Order No. 636-A, *Order Denying Rehearing in Part, Granting Rehearing in Part, and Clarifying Order No. 636*, August 3, 1992, spells out the details.) The ostensible objective was to achieve "comparability" of service between gas supplied by third parties for pipeline delivery and gas obtained by the pipeline for its firm sales customers. The practical effect of Order 636 was to remove pipelines from the merchant business entirely. As a result, today it is up to pipeline customers to identify and contract for all their own gas supplies, either directly or through marketers and resellers. Order 636 provides for a "straight fixed-variable" rate design, to recover pipelines' fixed costs through fixed charges to firm transportation capacity holders, such as gas distribution companies. In return, such customers can use or resell their pipeline transmission capacity entitlements in the secondary market, subject to a price cap at the SFV rate.⁵

⁴ The exact amount of take-or-pay costs or buyout/buydown costs is not known. Pipeline industry studies by trade associations and the FERC estimated the costs at around \$10-15 billion. But renegotiated contracts were marked to different estimates of what the future market price would be, which may have impaired or enhanced future cost recovery according to how good an estimate was made. Columbia Gas Transmission Co. believed it had adequately restructured its supply contracts by buying them down to around \$3.00/mcf in 1984, but this estimate proved to be so far above the eventual market price that Columbia filed for bankruptcy and used bankruptcy protections to reject its producer contracts. United Gas Pipeline also used bankruptcy to deal with its contractual commitments, and others (especially Transcontinental Energy Company) only narrowly escaped bankruptcy.

⁵ This shift in responsibility for supply procurement and pipeline released capacity management has increased the risks for gas distribution companies, long the safest part of the gas industry. Thus they now have the potential to face stranded costs if they should have to pay for unneeded gas or pipeline capacity.

In regard to new restructuring transition costs and remaining, unamortized stranded costs, there were two issues raised by Order 636. First, the industry continued to have some out-of-market gas contracts that had not been renegotiated, in part because the excess gas supply induced by regulation proved to be much longer lived than most anticipated. More generally, Order 636 completely eliminated the merchant function, hence the need for pipelines to hold gas supply contracts, so all previous supply contracts needed to be cancelled or assigned. The future costs of renegotiating such contracts were deemed "Gas Supply Restructuring" (GSR) costs. Second, the industry faced some new stranded asset costs associated with resources that had been needed for merchant service but were not necessary for transportation only, such as gathering facilities, storage gas inventories, and contracts for transportation capacity on upstream pipelines. Finally, the industry faced new transition costs associated with improved metering, accounting, and information services such as electronic bulletin boards to support and monitor all customers' activities as transporters.

These restructuring costs were to be 100 percent recoverable, though somewhat at risk: 10 percent of the estimated costs were allocated to interruptible transportation services and 90 percent to firm transportation (FT) customers (collected as a demand charge). Once pipelines have collected enough IT revenues to recover the allocated costs, they credit 90 percent of the excess to FT customers and retain 10 percent for their shareholders.

Pipeline Stranded Cost Recovery and Avoidance Mechanisms

Thus we see that the FERC has addressed stranded costs and transitional restructuring costs on at least two occasions for the pipeline industry: First, with take-or-pay buyout/buydown recovery allowances and future gas supply inventory charges (GICs) in 1987 under Order 500, and then for all remaining, but obsolete, merchant service costs and for new-service restructuring costs in 1992 under Order 636.

An interesting feature of pipeline stranded cost recovery mechanisms has been their diversity and flexibility of form and value, relative to the rather strict preference that the FERC has stated to date for the electric industry to utilize exit fees calculated under a "revenues lost" formula. As noted above, the FERC allowed two approaches for recovering past take-or-pay liabilities in Order 500—100 percent recovery through commodity charges, subject to a prudence review, or a partial waiver by the pipeline of recovery claims, a demand charge allowance for the same amount, and the residual collected on a commodity basis with a rebuttable presumption of prudence.

Pipeline GICs were really stranded cost avoidance or prevention charges, rather than recovery mechanisms. They could take an even greater variety of forms, including pre-paid demand charges or ex-post "deficiency charges" to be paid per mcf not taken below the quantities deemed reasonable to have expected given the customers' current firm sales entitlement. They could be based on marginal costs (e.g., the costs of the gas supply contracts at the top of the "dispatch" order for the pipeline's gas procurement, or the costs of a whole portfolio of hypothetical, new gas contracts) or on average costs (the pipeline's weighted average supply cost). They could include costs directly associated with carrying gas reserves (such as expected take-or-pay payments or gas supply price premiums or prepayments to producers for warranting supply) and indirect costs such as extra handling fees for gas purchased for but ultimately not delivered to merchant customers (such as storage injections and holding costs, or the costs of discounting gas below spot market levels to be assured of "dumping" it back onto the market). The target volumes which would trigger customer responsibility for making GIC payments could be set annually or monthly.

Moreover, such costs did not have to be estimated once and for all; GICs were tariffs that were to be re-estimated at periodic intervals (typically three years, corresponding to base rate cases), with true ups as needed and appropriate. By the mid-1980s, the gas industry had a well-developed and highly visible spot market, which was often the reference point for GIC cost estimates, but there was no standard or required reference point used by all, nor were homogeneous standards of supply reliability imposed by the FERC on the industry. Each GIC was designed and approved on a case-by-case basis. Importantly, GICs were not exit fees. They were collected universally, from all firm sales customers and from customers who began as sales customers but chose to convert to firm transportation. In essence, they represented the unbundling of the reliability portion of gas supply costs. For most pipelines, the associated supply inventory carrying costs were largely sunk (i.e. tied to their existing portfolio), but for some these were recurring, prospective costs of maintaining and expanding inventories as well.

The GICs approved by FERC for Texas Eastern Transmission Corporation (TETCo) and Tennessee Gas Pipeline (TGP) demonstrate the flexibility granted to the pipelines in designing these mechanisms (though not all pipelines filed or had their GICs approved). TETCo's deficiency-based GIC consisted of a commodity charge calculated each month at 20 percent of TETCo's weighted average cost of gas. This rate was assessed against customer purchase deficiencies below 60 percent of annual contract demand. TETCo's GIC mechanism did not conform strictly to Order 500 regulations. Nonetheless, the FERC approved the GIC (which was part of a larger settlement)

because it was supported by TETCO's firm sales customers and was not opposed by any of the state utility commissions which had jurisdiction over TETCo's distribution customers.⁶

Tennessee Gas Pipeline initially proposed a market-based GIC as part of a restructuring of its sales and transportation services. Its mechanism consisted of a monthly demand charge per mcf of maximum contractual entitlement and a gas commodity rate equal to the average unit gas price in each month of a hypothetical portfolio of new gas contracts, capped at the average of index prices for gas delivered onshore Louisiana to eight pipelines.⁷ Before FERC ever acted on TGP's initial proposal, TGP proposed a transition GIC (TGIC) as part of a comprehensive settlement two and a half years after the initial filing. This proposal also consisted of a demand rate and a gas rate capped at 102 percent of a market index based on an average of spot prices in three regions for eight pipelines.⁸ FERC eventually approved an amended version of TGP's settlement which shortened the TGIC period and froze the demand rate in return for customers' agreement to maintain firm service elections throughout the TGIC period.⁹

There are perhaps three main lessons from this experience to borrow and apply to the electric industry. First is that stranded costs are so difficult to estimate that flexible, adaptive, and preventive mechanisms for their recovery ought to be allowed. This flexibility can include allowing different means of estimating costs, different means of collecting them, and different means of resetting the allowances. Second, lump-sum, pay-when-you-go approaches (such as the FERC's proposed electric exit fees) are not strictly necessary, nor are they necessarily preferred by customers. Both customers and the utilities may prefer the clarity of a charge like a GIC that is unbundled regardless of customer switching to third-party suppliers. Finally, if electric utilities should choose to bear a

⁶ "FERC Majority Approves Texas Eastern Proposal for Gas Inventory Charge, Despite Failure to Conform to Certain Order No. 500 Guidelines, Due to Strong Support by All Firm Sales Customers Subject to the Charge," *Foster Natural Gas Report*, September 29, 1988, pp. 2-7.

⁷ "Tennessee Proposes Restructuring of Sales and Transportation Services, Including Fixed Demand Charge to Compensate Tennessee for Standing Ready to Supply Gas," *Foster Natural Gas Report*, December 22, 1988, pp. 17-20.

⁸ "Tennessee Submits Comprehensive Settlement Offer to Resolve Take-or-Pay Cost Recovery Issues, Establish Two-Year Interim GIC, Substantially Restructure Services and Enhance Comparability of Sales and Transportation Services," *Foster Natural Gas Report*, July 3, 1991, pp. 1-9.

⁹ "FERC Approves Amended Version of Tennessee's 'Cosmic' Settlement Until Implementation of Order No. 636 Restructuring; Also Approves Related Settlements of Midwestern and East Tennessee," *Foster Natural Gas Report*, June 25, 1992, pp. 8-11.

portion of their restructuring costs, as pipelines did in amortizing their contract buydown costs under Order 500, then the utilities should be granted a rebuttable presumption of prudence in incurring and recovering such costs.

APPENDIX B

STRANDED COSTS IN THE TELECOMMUNICATIONS INDUSTRY

The telecommunications industry is today quite diverse and competitive, with numerous providers of several types of long distance, local, and related voice, data, and image communications services. A bit more than a decade ago, it was an institutionally simpler, more regulated industry, and the transition from then to the present entailed significant restructuring costs, some of which were "stranded" or unrecovered due to bypass of the incumbent providers' systems. Today, many fixed and sunk costs appear at risk of being stranded in the near future, as the local telephone service companies face a competitive threat from the lifting of restrictions on long distance carriers competing in the local, previously franchise-protected markets.

By and large, the telecommunications industry has not had quite as grim a *net* exposure to bypass stranded costs as is now anticipated for the electric industry, though its *gross* exposure was fairly high—estimated by the Federal Communications Commission (FCC) to be roughly four billion dollars per year for the Bell operating companies and GTE (combined) throughout the late 1980s. The net exposure to financial loss has been much lower than this largely because there has been very significant growth in the overall demand for telecommunication services that offset much of the problem of assets being underutilized or profits being inadequate. However, the industry has developed some accounting, pricing, and ratemaking policies that proved useful in reducing the exposure to bypass and the controversy over stranded costs, and these can be borrowed fruitfully by the electric industry.

Background on Telecommunications Restructuring

AT&T was the monopoly provider of long distance and intrastate local services for most of the United States until the early 1980s. In 1982, AT&T agreed to divest its Bell operating companies (the companies providing intrastate service) as part of a settlement of a federal antitrust suit.¹ As a result, seven regional Bell operating companies (RBOCs) were formally spun-off from AT&T in 1984. These seven companies were prohibited from entering the long distance and equipment manufacturing markets and were required to provide "equal access" to and from interexchange carriers (or IXC's, i.e., long distance phone companies). AT&T remained in the long-distance and

¹ This settlement is known as the Modified Final Judgement.

equipment manufacturing businesses (and was allowed to enter the computer business). The 22 regional subsidiaries of the RBOCs, or BOCs such as NYNEX or New England Telephone, were granted near-monopoly franchises for local telephone service, with the exception that the FCC allowed one cellular phone company to enter the market in each metropolitan area. There were also many other, generally much smaller, regulated "local exchange carriers," or LECs, with monopoly franchises comparable to the BOCs. These were companies that had been providing local services before the AT&T breakup but were unaffiliated with AT&T. (All BOCs are LECs but not necessarily vice versa.) Prior to 1984, the bypass and stranded cost problem was primarily a problem for AT&T, whereas after 1984, the problem was to be faced by the LECs.

Although the 1984 divestiture marked the formal beginning of full-scale competition in the long distance market, selective competition (and bypass of AT&T's long distance and local networks) had already started emerging as early as the 1960s. One explanation for the emergence of competition had to do with AT&T's rate structure. This structure consisted of local service rates that were heavily subsidized by long distance service rates. Often, long distance service was priced at a level several times above its incremental or even replacement costs of service, with the excess margins flowing back to reduce local service rates. This cross-subsidy was deemed necessary and appropriate in the interests of achieving "universal service"—the idea that the AT&T network was more valuable the more comprehensively it interconnected all parties in the country.

In 1969, MCI, looking to take advantage of this rate structure, was allowed to offer private point-to-point communications services between St. Louis and Chicago using microwave and satellite technology. The customers for this type of service were high volume long distance users who were providing the most of the cross-subsidies under AT&T's rate structure (for example, companies with offices in more than one city that needed to communicate with each other extensively). With private, point-to-point service, MCI provided these customers with the means to bypass the entire AT&T network (both local and long distance networks) and the associated charges, at least for their intra-corporate communications.

In the 1970s, MCI was further allowed to provide public interexchange services, when it was given access to local telephone networks in other cities. Thus MCI was able to offer long distance services which competed directly with those of AT&T. Unlike the point-to-point services previously offered by MCI, these public interexchange services did not allow for total bypass of the AT&T network because MCI calls would terminate on AT&T's (more specifically, one of the Bell operating

company's) local network. High volume users therefore provided the demand-side impetus for competition in the telephone industry in the same way that large industrial users are currently demanding competition in the electric industry. Similarly, low cost new communications technology (microwave, satellites, fiber optics, digital switches, etc) provided the impetus on the supply side, much like the dramatic cost reductions in gas turbines and combined cycle stations that have stimulated competition in the electric supply business.

MCI expanded its long distance network into the 1980s with a continued focus on high volume users. In addition to microwave and satellite technology, MCI (like other IXC entrants) also aggressively developed a fiber optic network. With the divestiture of AT&T in 1984 and the formal opening of the long distance markets, MCI was well poised to take market share from AT&T (including a piece of the residential market). In 1984, AT&T had a 90 percent share of the long distance telephone market. By 1993, AT&T's share had dropped to 58 percent, with MCI and Sprint picking up 18 percent and 10 percent, respectively, with a few smaller companies and many resellers of AT&T, MCI, or Sprint services splitting the remaining 14 percent.²

After the divestiture, competition problems also started to confront the LECs in the local service markets. The impetus once again was largely pricing: The cross-subsidies of the old AT&T tariff structure were reincarnated in the form of usage-based access charges to the LECs that are still in use today. Long distance calls which originate or terminate on the LEC networks (i.e. those not conducted over private lines) pay an access fee for each minute of use to the LECs on both ends of the call. This fee is substantial—roughly 65 percent of the typical long distance call cost in 1984, now more like 30-40 percent. Because the access charge is usage-based when the associated costs of providing an IXC interconnection are almost entirely fixed, the access charges also are disproportionately burdened on high volume users. Because of this, through the mid- to late-1980s, many of the LECs collected a very significant portion of their revenues from a very small number of large, high traffic customers like American Express or Sears. It was not uncommon for 1 percent of customers to provide as much as 30 percent of total revenues from local services and another 20

² See "Trends in Telephone Service," Federal Communications Commission, February 1995. By 1993 there were roughly 500 resellers with revenues of \$6 billion. Resellers aggregate small customers and then provide service for them under a large-customer tariff service from one of the major IXCs. In effect, they are performing a sort of tariff bypass rather than a physical bypass.

percent of total revenues from long distance access charges. This made such customers very attractive bypass candidates, with correspondingly huge financial risks for the LECs.³

Figure B-1 displays how bypass occurs in the telecommunications industry. Point-to-point, end-to-end communications services allow for complete bypass of the entire telephone network, perhaps through the use of satellites. Thus, complete bypass allows a customer to avoid the LEC network both in the city where the call is originated and in the city where the call is terminated, as well as the IXC long-distance network. In such complete bypass, both the IXC and the LECs forego fixed cost contributions, and they may even have physically stranded assets. Partial bypass occurs when long distance calls still originate or terminate using one of the LEC's networks. Thus, a customer may bypass the LEC network in the city where the call is originated, but may still use both the IXC network and the LEC network in the city where the call is terminated. Competitive Access Providers (CAPs), such as Teleport and MFS Communications, originally entered the telecommunications business by offering these partial bypass services. Specifically, CAPs were allowed to start installing lines to meet the needs of high volume users within major cities. These lines interconnected directly with interexchange carriers, thereby bypassing the access charges of the LEC in the city where the call originated. Initially, only the wires of the LEC were bypassed. More recently, however, the CAPs have been installing their own switching offices, thereby allowing for bypass of the LEC switching office.

³ *Third Report on Bypass of the Public Switched Network*, Common Carrier Bureau, Federal Communications Commission, May 26, 1987.

Figure B-1
Bypass in the Telecommunications Industry

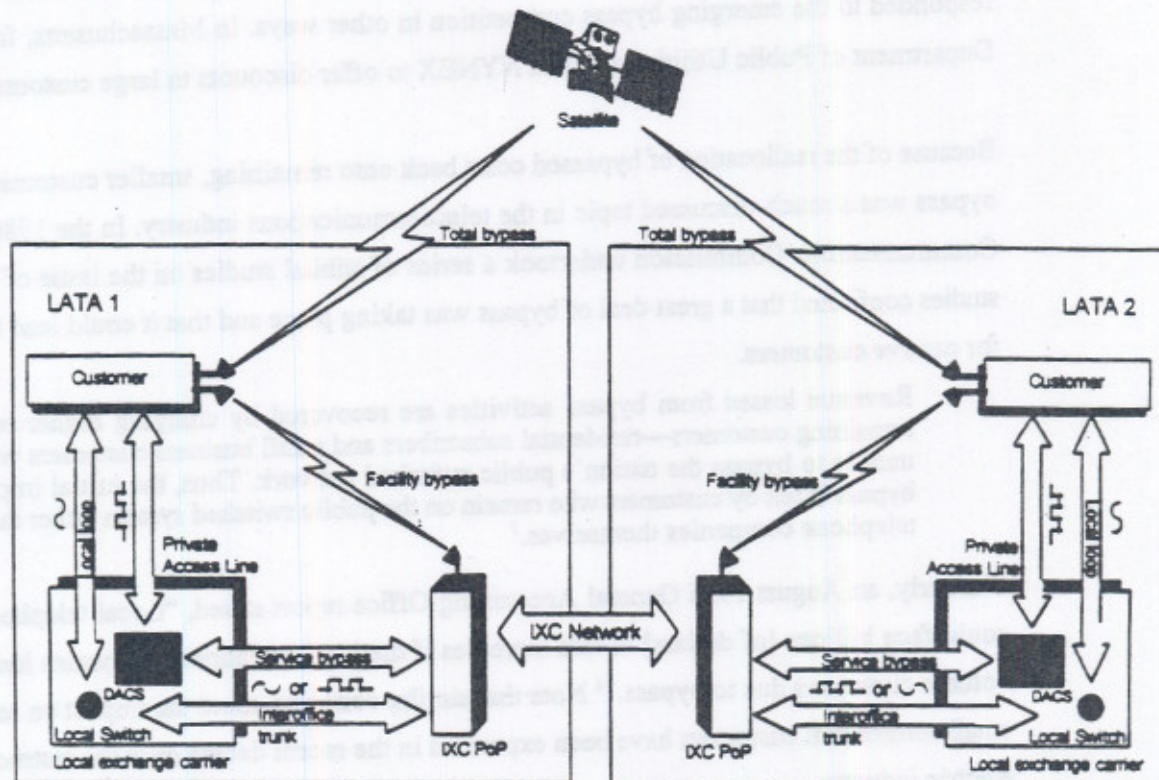


Diagram adopted from *High Technology*, September 1985, p. 25.

Bypass can also be described as "facilities bypass" or "service bypass." Facilities bypass (which may be complete or partial) describes a situation in which the LEC's (and perhaps IXC's) facilities are being bypassed through the use of an alternative facility (such as a microwave or satellite system). A more common situation involves "service bypass," whereby the LECs simply forego the access charges they would have otherwise collected for long distance service accessed over the public switched networks in order to retain the local service. The IXCs are often the biggest facilities bypassers of the LECs, but the LECs often participate in this kind of bypass themselves, by installing and leasing private lines which allow their large customers to connect directly to the IXC networks.⁴ The idea is that it is better to capture the private line revenues from the bypassing customers if you are going to lose their access fees anyway.

⁴ *Monitoring Report* in Docket No. 87-339, Federal Communications Commission, 1987 (excerpted from Third Report on Bypass of the Public Switched Network, Common Carrier Bureau, Federal Communications Commission, May 26, 1987).

Generally the LECs were allowed and able to reassign unrecovered costs of service lost to bypass to other remaining customers, but this was not a universally popular solution. The LECs also responded to the emerging bypass competition in other ways. In Massachusetts, for example, the Department of Public Utilities allowed NYNEX to offer discounts to large customers.

Because of the reallocation of bypassed costs back onto remaining, smaller customers, the issue of bypass was a much-discussed topic in the telecommunications industry. In the 1980s, the Federal Communications Commission undertook a series of annual studies on the issue of bypass. These studies confirmed that a great deal of bypass was taking place and that it could lead to higher rates for captive customers.

Revenue losses from bypass activities are recovered by charging higher rates to remaining customers—residential subscribers and small business customers who are unable to bypass the nation's public switched network. Thus, the initial impact of bypass is felt by customers who remain on the public switched system rather than the telephone companies themselves.⁵

Similarly, an August 1986 General Accounting Office report stated, "Local telephone customers could face billions [of dollars] in rate increases if the local telephone companies lose their large-volume customers due to bypass."⁶ Note that similar concerns about the impact on residential and small commercial customers have been expressed in the recent debate over the restructuring of the electric industry.

It is difficult to quantify the amount of bypass that has occurred in the telephone industry. Perhaps the main reason for this is that bypassers were performing a competitive transaction that was entirely legal and they were under no obligation to report their activities. Nonetheless, local telephone companies attempted to monitor the amount of bypass taking place on their systems, and they submitted bypass reports to the FCC in which they estimated total losses due to bypass. In 1992, the last year that the FCC reported bypass statistics in its *Monitoring Report*, the RBOCs (and GTE) estimated that total losses due to bypass in 1990 were 131.5 billion switched minutes of use or \$4.5 billion in revenue terms, roughly 5 percent of 1992 RBOC revenues.⁷ Of this, the vast majority was due to foregone IXC access fees. (Bypass attributable solely to CAPs appears to be small. Total

⁵ *Ibid.*

⁶ *Ibid.*

⁷ See Chapter 6 of *Monitoring Report*, Federal Communications Commission, 1992.

revenues of competitive access providers were only \$191 million in 1993, a tiny fraction of the \$95 billion in revenues earned by local exchange carriers. Revenues from intrastate or interstate access were \$96 million for the CAPs and \$31 billion for local exchange carriers.⁸ Nonetheless, the CAPs are growing rapidly and positioning themselves for future competition in the local exchange markets.⁹)

Competition is now poised to intensify much further in both the long distance and local exchange markets. Federal legislation recently passed will allow the RBOCs to enter the market for long distance services served by the interexchange carriers, and vice versa. In the local exchange markets, the legislation will expose RBOCs to new competition from cable companies. Competition from CAPs is likely to increase and providers of wireless services and electric utilities may also be future competitors.

Long distance volume growth has been significant since divestiture, with interstate switched access minutes growing from 167 billion in 1985 to 402 billion in 1994, or roughly 10 percent per year.¹⁰ Volume growth in local services has also been quite large. As discussed further below, this rapid growth largely explains why the issue of stranded costs has not been as controversial an issue in the telecommunications industry as it appears to be becoming in the electric industry.

Stranded Cost Magnitudes and Recovery Mechanisms in the Phone Industry

Evidence of a stranded cost problem in the telecommunications industry is revealed in the regulatory strategy of several RBOCs in the late 1980s and early 1990s, and in the large write-offs taken by all of the RBOCs in the last few years. In the 1984-1992 period, several of the RBOCs were able to obtain regulatory authorizations, from both the FCC as well as state regulators, for accelerated depreciation rates to more accurately reflect asset obsolescence. In particular, existing copper cable

⁸ See "Trends in Telephone Service."

⁹ MFS Communications' revenues more than doubled from \$109 million in 1992 to \$287 million in 1994. Furthermore, MFS increased its fiber system route miles from 200 to 2,387 between 1989 and 1994. The CAPs as a whole have increased fiber system route miles from 673 to 9,304 over that time period. See "Fiber Deployment Update End of Year 1994," Federal Communications Commission, July 1995.

¹⁰ See "Trends in Telephone Service" and Monitoring Report in Docket No. 87-339, Federal Communications Commission, May 1995. Switched access minutes represent minutes transmitted by long distance carriers that also use the distribution networks of local phone companies.

networks were still functional for basic voice services, but not adequate for the new high-volume data and image transfers that required broad band-width fibre optic cable. Relatedly, analog switches could not support the enhanced service offerings (such as 800-line messages) that required sophisticated processing. Thus the depreciation rate on such assets was stepped up, and the assets themselves were retired somewhat earlier than had been expected at their installation. Some of these depreciation accelerations were taken not only for more accurate financial reporting purposes, but also to increase capital recovery through increased revenue requirements. For example, Southwestern Bell Corporation reported in 1985:

Depreciation and amortization expense increased significantly in 1985 due to an increase in the amount of property, plant and equipment and a more accelerated rate of depreciation authorized for the Telephone Company by the FCC. This increased level of depreciation has also been authorized in the determination of revenue requirements in the state jurisdictions in which the Telephone Company operates. Although the provision for depreciation has increased, capital recovery of the Telephone Company is still not consistent with the actual consumption of telephone plant. During 1986, the Telephone Company will seek approval from the FCC to depreciate its plant at a faster rate in order to recover costs over a period more consistent with actual consumption of the plant.¹¹

The table below summarizes increases in depreciation expense due to accelerated depreciation rates for a few of the RBOCs.

¹¹ Southwestern Bell Corporation 1985 Annual Report.

INCREASES IN DEPRECIATION EXPENSE DUE TO ACCELERATED DEPRECIATION RATES (\$MILLIONS)		
Year	Bell Atlantic	NYNEX
1985		\$127
1986	\$331	\$33
1987	\$137	\$156
1988		
1989		\$93
1990		\$36
1991	\$43	\$266
1992	\$150	\$160
1993		\$66

Note: Includes amortization of depreciation reserve deficiencies.

Source: Company Annual Reports

In general, faster depreciation may well be warranted in anticipation of increased competition under restructuring. Cost of service regulation typically amortizes capital equipment over its estimated useful engineering life, while competition may render some equipment outmoded and economically obsolete well before it becomes non-functional. Thus economic depreciation lives may be shorter than engineering lives, a distinction brought to the light at restructuring of regulated industries. Accelerated write-offs (with increased revenue allowances prior to restructuring) are a good means of repositioning the industry for competition.

This strategy of accelerating plant depreciation is now being considered by some electric companies to mitigate their exposure to stranded generation.¹² The argument goes that certain generation assets now face premature obsolescence, while transmission and distribution may have a longer life than previously reflected in accounts. Reassigning past depreciation from transmission and distribution to generation, and then decreasing the rate of recovery on to-go transmission and distribution

¹² For instance, Public Service Electric & Gas recently proposed a transfer of roughly \$200 mm of depreciation reserve from transmission and distribution (deemed to be over-depreciated) to generation (deemed to be under depreciated), and to also alter the rates of depreciation on the net remaining plant of both types in the same direction.

depreciation reduces the risk of unrecoverable (stranded) costs once competitive access begins. (In this situation, the adjustment is revenue-neutral but not risk-neutral.)

Further evidence of the telecommunication stranded cost problem can be seen in unrecovered write-offs taken by all of the RBOCs in the past two years. The table below summarizes these write-offs:

WRITE-OFFS TAKEN BY RBOCs AS A RESULT OF DISCONTINUING THE USE OF SFAS 71				
Company	Date of Write-Off	After-tax Charge (\$Billions)	Pre-Charge Book Value Equity (\$Billions)	Post-Charge Book Value Equity (\$Billions)
US West	Third Quarter 1993	\$3.15	\$8.3	\$5.9
Bell Atlantic	Third Quarter 1994	\$2.30	\$8.2	\$6.1
Ameritech	Fourth Quarter 1994	\$2.25	\$7.8	\$6.1
BellSouth	Second Quarter 1995	\$2.70	\$14.4	\$12.5*
NYNEX	Second Quarter 1995	\$2.92	\$8.6	\$6.1*
Pacific Telesis	Third Quarter 1995	\$3.30	\$5.2	\$2.1*
SBC Communications	Third Quarter 1995	\$2.80	\$8.4	\$6.4*

*Based on Value Line Estimates

Source: Value Line

These write-offs are the result of the RBOCs discontinuing the use of regulatory accounting under SFAS 71 and further shortening the depreciable life of telephone plant, including copper and fiber cable, digital switches and circuits, and analog switches. Again, they reflect the RBOCs significant investments in technologies that have become economically obsolete before they become functionally obsolete. Some of the technological improvements in the telecommunications industry have an analogy in the electric industry, e.g., where new generation technology allows for higher performance generating plants that can be built and operated at a lower cost than even the to-go costs of some older, sunk capacity.

The telecommunications write-offs represent a one-time "catch-up" which is necessary when a company shortens the depreciable lives of assets due to a faster rate of obsolescence. By and large,

this more recent shortening of asset lives was done for financial reporting purposes only. The change did not affect accounting for regulatory purposes. That is, these write-offs did not appear in the regulatory books as rate base reductions, nor were these 1990s' write-offs designed to increase capital recovery through increased revenue requirements.

The obvious question then is why are the RBOCs taking these uncompensated write-offs? The main reason seems to be simply that the RBOCs are predominantly no longer under rate of return regulation, as discussed further below. The RBOCs believe that "competition, market conditions and the development of broadband technology, more than prices established by regulators, will determine the future revenues . . ."¹³ Thus, abandoning the traditional accounting rules (which tend to overstate asset lives in order to reduce rates under cost-of-service regulation) gives a more accurate matching of revenues and expenses for financial reporting reasons. More importantly, it serves to focus the company's management more on market-based pricing and less on the outdated view that more capital invested automatically means more profits.

Of course, write-offs on financial statements are only a recognition that there is a stranded cost problem and in no way should be taken as mitigation of the problem, much less a solution. The point is that the industry has been able to mitigate the stranded cost problem *despite* the write-offs.

Although such financial statement evidence seems to reveal that stranded costs have been an issue, the term "stranded costs" (used extensively in the current debate over deregulation of the electric sector) has not been used in the telephone industry. In the local exchange markets, as facilities of RBOCs have been bypassed as a result of entry by CAPs, the phrase "lost contribution" has been used (referring to contribution to fixed assets). Nonetheless, both phrases allude to a situation in which competitive or market rates are less than those that were or would be allowed under revenue requirements (i.e. traditional cost of service) ratemaking.

The RBOCs have of course been anxious to offset and/or discourage the revenue losses from bypass using a stranded cost recovery mechanism, though again they have not referred to it as such. The primary mechanism used by the RBOCs has been the access fee. Thus, when NYNEX, for example, loses a high volume customer in downtown Boston to MFS Communications, NYNEX recovers a portion of the lost revenues by charging an access fee for any call originated by the high volume

¹³ US West 1993 Annual Report.

customer that terminates over NYNEX facilities. The access fee consists of the incremental cost of using the NYNEX facilities plus a contribution to fixed costs (equal to the contribution that would have been received had a NYNEX customer originated the call). However, there is no attribution of foregone "revenues lost" when setting the access fee. Rather, access charges are set to recover a significant portion of an RBOC's fixed costs from all customers. In effect, this assures that the customer will make a contribution regardless of carrier.

Using the phone industry as a model for the electric industry would suggest the use of an access or "wires" charge for customers opting to purchase power from a source other than the utility that originally supplied the power (such as an independent power producer or another utility). The access charge would be in the form of either a transmission surcharge or a distribution surcharge (or both). This type of charge has been suggested as a stranded cost recovery mechanism by the New York Public Service Commission staff in its recently announced restructuring proposal. One valid criticism of the access fee approach in the phone industry is that because it is collected as a variable charge (i.e. charged per minute of use), it has the effect of suppressing usage for price-sensitive customers, when in fact no costs are avoided. The electric industry need not imitate this feature of telecommunications pricing. A demand-charge access fee would be more efficient and more collectible.

As indicated in the introduction to this appendix, the issue of stranded costs in the telecommunications industry has not seen nearly the controversy that it portends in the electric industry. The main reason is a fundamental difference between these two industries: The telecommunications industry is experiencing rapid growth while the electric industry is comparatively stagnant. Thus, the LECs are not concerned about small market share gains by CAPs because the LECs are achieving high revenue growth regardless of bypass, simply because demand for telecommunications services is growing. Thus when, e.g., NYNEX loses a customer to a CAP, there is not necessarily any physical stranding of wires previously assigned to the departed customer. The reason is that a new customer may move into the same building (or a building next door) and NYNEX will use the abandoned wires for the new customer. Furthermore, in the telecommunications industry there is no asset that is quite analogous to generating plants in the electric industry. (Switches are perhaps closest, but they are really integral to transmission control.) This means there is no "stage" of telecommunications production that is peculiarly at risk of being physically stranded (unlike the case with electric generating plants). Nonetheless, even with no physical stranding, assets used for telecommunications services can be stranded financially.

In contrast to their telecommunications counterparts, electric utilities do not have the luxury of rapid market growth, so they are unlikely to be able to grow their way out of a stranded cost problem. In particular, the electric industry does not yet have a complementary growth industry to spur its own growth, such as the high growth computer and infomedia industries that have spurred much of the telecommunications boom.

Another key difference between the two industries is that the telecommunications industry is now predominantly under price-cap regulation rather than traditional cost-of-service (i.e. profit) regulation. The FCC allowed AT&T to switch to price regulation in 1989, and several state utility commissions have allowed the RBOCs to switch to price-cap regulation in recent years. Price-cap regulation and the growth in the demand for telecommunications services have contributed to the financial health of the local exchange carriers, partly mitigating what would otherwise be a contentious stranded cost situation. As indicated above, this price-cap regulation has decoupled rates from costs enough that the BOCs felt comfortable taking large write-offs with no adjustments to allowed revenues.

Finally, there is an even more basic reason for the financial health of the LECs and the corresponding lack of concern over the issue of stranded costs. By and large, LECs still have strong near-monopoly status in the local markets they serve. In 1994, local exchange carriers received 40 percent of their revenue (\$40 billion) from local exchange service, with a large portion of the balance collected through access charges from interexchange carriers for originating and terminating long distance calls. In 1994, local exchange carriers received approximately one-third of their revenue (\$31 billion) from these access charges to interexchange carriers.¹⁴ To date, these local monopoly franchises have been secure enough to make overall revenue collection not too risky. But the issue of stranded costs could become more controversial in the telephone industry when competition becomes more widespread. If cable companies or the interexchange carriers become significant competitors in the local exchange markets, or if state regulatory commissions order access fees (both those charged to CAPs and to interexchange carriers) to be based on incremental costs without including a contribution to fixed costs, then the RBOCs will face a significant stranded cost problem. These prospects are not necessarily remote.

¹⁴ See "Trends in Telephone Service."

The "Universal Service Obligation" (USO) in telecommunications markets around the world illustrates a problem structurally similar to that of stranded costs in the U.S. electric utility industry. The USO arises because telecommunications regulators have long sought to promote widespread telephone subscriptions by cross-subsidizing service to residences and rural areas. If incumbents, but not entrants, were obligated to preserve the cross-subsidy, there would be an artificial incentive for customers, especially large industrials, to bypass the incumbent's system and choose to be served by new entrants. These in turn might succeed only because of the lack of competitive neutrality of the cross-subsidy mechanism¹⁵ creates opportunities for "cream skimming."¹⁶

Government authorities in New Zealand¹⁷ recently proposed to deal with the alleged financial consequences of New Zealand's version of the "Universal Service Obligation," the "Kiwi Share Obligation" (KSO), in a competitively neutral manner. They proposed to bifurcate this issue so that any resolution of this problem is done in a "competitively neutral" way that does not impede pro-competitive objectives of interconnection policy:

In the case of telecommunications, it may not be possible to choose the interconnection pricing rule in such a way as to achieve both the goal of economic efficiency and the goal of efficient handling of the cost of a social obligation (such as the Kiwi Share). Therefore, *these two goals are separated*. The question of the economically efficient access pricing rule in the absence of the social obligation is considered first, followed by the question of the efficient method of handling the social obligation itself. [Footnote omitted.] [Emphasis added.] (pp. 7-8)

* * *

A method of handling social obligations should, primarily, seek to promote economic efficiency. In this context economic efficiency is promoted by estimating and allocating the costs of the obligation. In particular, this will involve *allocating the*

¹⁵ Integrated retail suppliers of electricity in the United States could, of course, find themselves facing similar permanent asymmetries from "lifeline" rates, integrated revenue planning, etc., unless these programs were funded in a competitively neutral way.

¹⁶ As a sample, see Alfred E. Kahn, "A Free Ticket to Rich Telecom Markets," *The Wall Street Journal*, November 10, 1995, which is essentially an argument about asymmetric risks faced by incumbents and entrants.

¹⁷ The Ministry of Commerce and the Treasury of New Zealand, *Regulation of Access to Vertically-Integrated Natural Monopolies* (Wellington, New Zealand: August 1995).

costs of the obligation in such a way that no firm is given a competitive advantage or disadvantage. [Emphasis added.] (p. 9)

Much of the New Zealand report addresses issues of access pricing that, according to the bifurcation concept, do not concern us here. The important point is that stranded costs are just one category of costs that should be recovered in a competitively neutral way. Also, we should look to a broad range of experience to determine how revenue neutrality can be accomplished.

The notion of bifurcation implies that any legacy of regulation such as the USO should first be funded in a competitively neutral way. Then the pricing of access to bottleneck facilities (or terms of mutual interconnection) can be accomplished by whatever pricing mechanisms that are appropriate to the particular transition to competition desired. According to the bifurcation concept, pricing of access to markets newly opened to competition involves three steps:

1. Develop a verifiable estimate of the magnitude of the required funding for stranded costs;¹⁸
2. Limit the recovery of stranded costs to only that level required to achieve competitive neutrality; and
3. Develop a pro-competitive access policy independent of the competitively neutral recovery mechanism for stranded costs.

The United Kingdom's OFTEL has also proposed creative mechanisms for dealing with the Universal Service Obligation in that country.¹⁹ The proposal involves quantifying the amount of burden, if any, and funding it through a separate account to which all telecommunications services contribute periodically on a non-discriminatory basis. The account cannot be tapped for unrelated purposes, cannot be funded exclusively by one network provider, and can be accessed equally by any competitor that provides services deemed to be burdensome.

¹⁸ Note that this estimate could, at least in theory, be done on an *ex ante* or *ex post* approach. See discussion below.

¹⁹ "A Framework for Effective Competition," *Consultative Document*, issued by the Director General of Telecommunication, Office of Telecommunications (December 1994).

SUMMARY OF STRANDED COST RECOVERY LESSONS FOR ELECTRICS

As noted, the telecommunications industry is not a perfect analog for the electric industry, largely because of its extremely strong growth. However, the telecommunications industry has had a significant bypass problem which causes "lost contributions" or stranded costs, and they have used a few mechanisms that could be very attractive to electric utilities:

- *Accelerated depreciation of at-risk assets:* These are copper cables and analog switches for telecommunications, primarily generation for utilities. A swap of depreciation between transmission and generation could achieve this without any rate increases.
- *Access charges:* Somewhat like GICs used in the gas pipeline industry, the telecommunication industry has addressed its transition costs with a recovery mechanism that is applied globally, to all customers rather than with a customer-specific exit fee. Access fees may be significantly simpler administratively than the exit fee approach, especially at the retail level. Unlike the telecommunication industry, the electric industry could seek to make its access charges non-bypassable and non-distorting, *i.e.*, demand charges not usage (per kWh) charges.
- *Price-cap regulation:* A shift to price-cap regulation was justified in the telecommunication industry because of its high growth and rapidly emerging competition in all aspects of supply. The electric industry is not quite so naturally poised, but there is a potentially valuable role for incentive regulation of some kind during restructuring: It will prove both difficult and controversial to forecast expected stranded costs, net of reasonable mitigation. An incentive scheme could allow "light-handed" regulation of the stranded cost recovery mechanism itself, *e.g.*, by allowing revenue-requirement mitigating cost reductions to be shared between ratepayers and shareholders. This would give utility managers a stronger, unambiguous incentive to find such opportunities, and customers assurance that they are participating in such savings without onerous regulatory reviews.