

After-the-Fact Regulatory Review: Balancing Competing Concerns

Eric Blank†

Stephen Pomerance††

In their article, Blackmon and Zeckhauser (B&Z) describe the problems associated with fragile regulatory commitments and their effect on utility investment.¹ When utilities invest in capital-intensive plants which have long lead-times and little alternative use, these investments become sunk: utilities will leave them in place as long as recovery of their relatively low marginal operating costs is possible. Under certain conditions, this provides pro-consumer regulators with the opportunity to appropriate the benefits associated with the utility's investment for consumers.²

Despite the apparent gain for consumers, B&Z show that regulatory appropriation produces a number of costs. Because investors know that regulators can engage in this opportunistic behavior, they will require a higher rate of return to compensate them for their increased risk. For relatively small and short lead-time utility investments, where the likelihood of regulatory appropriation is negligible,³ the appropriation problem may add some small amount to the utility's financing costs.

For other investments, however, B&Z demonstrate that the risk of regulatory appropriation creates greater problems. At some point, because the likelihood of regulatory appropriation becomes too high, the utility and its investors will be unwilling to provide financing for new projects even though they would produce substantial benefits for consumers. This is an important point and B&Z develop a useful game-theoretic framework to demonstrate it. Furthermore, their analysis helps to explain a number of recent trends in electric utility behavior⁴—increased reliance on smaller plants, a greater willingness to accept

†Staff Attorney, The Land and Water Fund of the Rockies (a regional environmental law center serving the Rocky Mountain states). B.A., Haverford College; M.Sc., Economics, London School of Economics; J.D., Yale Law School. Mr. Blank was formerly an economic consultant working on electric utility issues.

††Co-Director, Land and Water Fund Energy Project. B.A., Harvard College; M.A., Mathematics, University of Colorado; M.S., Engineering and Energy Planning, Stanford University. Mr. Pomerance has been involved with utility regulatory issues in Colorado for the last eight years.

1. Glenn Blackmon & Richard Zeckhauser, *Fragile Commitments and the Regulatory Process*, 9 YALE J. ON REG. 73 (1992).

2. The most obvious opportunity for regulators to appropriate the benefits of utility investment is when an excess supply is available and no new capacity needs to be built. There are a number of methods whereby regulators can appropriate utility investments: they can find prior utility investment to be "imprudent" or, alternatively, regulators can keep utility prices and profits below what they would otherwise be. *See id.* at 77-78.

3. As a general matter, consumers and regulators are not concerned about small rate increases. *See id.* at 93-98.

4. Although B&Z's analysis could perhaps apply to all utilities—gas, telephone, transportation, and electric—the problem of regulatory appropriation seems to occur most frequently with electric utilities. Similarly, the trends discussed in their article seem most relevant to electric utilities. Accordingly, this

formal resource planning processes, and a push towards obtaining pre-expenditure approval of cost-recovery mechanisms—all of which can help reduce the potential for regulatory appropriation.

To limit the problems associated with appropriation, B&Z discuss a number of potential regulatory fixes such as guaranteeing full cost recovery on utilities' investments, responsive regulation, appointing pro-industry regulators, and early regulatory involvement in utility resource selection processes. Although B&Z do not recommend a specific approach, all of their suggested solutions share a common theme: they all limit the after-the-fact discretion of the regulator to review prior utility investment. B&Z thus raise a potentially important problem and suggest several ways of resolving it.

Nevertheless, in a number of situations, there may be equally strong countervailing reasons why regulators would want to retain their after-the-fact authority to review utility investment decisions.⁵ This authority is a powerful tool for allocating both the costs and risks of utility investments between consumers and stockholders. As B&Z argue throughout their piece, even the potential to impose costs or risks on the utility after-the-fact can significantly influence its initial investment decisions.

The central difference between this Comment and B&Z hinges on our respective beliefs about how regulators are likely to exercise their authority. To reach their conclusions, B&Z essentially argue that regulators will shortsightedly use after-the-fact regulatory review so as to temporarily benefit a narrow constituency at the expense of overall social welfare. In contrast, this comment suggests that regulators can use this review to positively influence utility behavior.

To see how regulators can use this authority beneficially, it is important to realize that the existing regulatory structure in most states is seriously flawed. For example, many states have developed cost-recovery mechanisms for utilities in an ad hoc manner. As a result, the most profitable investment strategy for many utilities often may not be the one that will produce the least-cost mix of resources from the consumer's perspective.⁶ This is particularly true in regard

comment focuses exclusively on that sector.

5. B&Z appear to recognize this point when they state that the most efficient regulatory approach may involve "less than perfect commitment." Blackmon & Zeckhauser, *supra* note 1, at 103.

6. Colorado provides a good example of a regulatory system with an ad hoc set of cost recovery mechanisms. Purchased power expenses are passed through an Electric Cost Adjustment clause, while energy efficiency expenditures are recovered through a separate Demand-Side Management Cost Adjustment clause. See Stephen M. Pomerance, Testimony before Colorado Pub. Util. Comm'n, No. 91A-480EG, at 7-15 (1991). Investment in utility-owned plant is recovered in a more traditional manner, in new rate cases. Finally, plant conversions and mergers are handled on a case-by-case basis. See, e.g., Application for the Public Service Co. of Colorado before Colorado Pub. Util. Comm'n, No. 91A-281E, at 20-23 (1991) (seeking authorization of the repowering of the Fort St. Vrain Nuclear Generating Station). Only under the most unlikely of circumstances would these cost-recovery mechanisms provide appropriate incentives for utilities to pursue the least-cost mix of resources.

to investments in energy efficiency. Utilities generally find it more profitable to acquire new generating capacity even though investments in energy efficiency may be less expensive or less risky.⁷

By eliminating after-the-fact regulatory review, the net effect of many of B&Z's proposals may be to place the excess costs associated with more expensive or risky utility resource choices entirely on consumers. Combined with the ad hoc or even perverse nature of the financial incentives, utilities may be encouraged to invest in needlessly expensive or risky projects. From the utilities' perspective, there is little to be lost if a project later costs more than is necessary. Cost recovery has been guaranteed and utility profits have been maximized.

In contrast, if regulators are able to review utility investments after-the-fact, then some share of the excess costs may be placed on the utility. The utility, knowing it will face such review, may be less likely to invest in risky or wasteful projects. Hence, any solution to the appropriation problem raised by B&Z which limits after-the-fact regulatory review should at least be sensitive to the concerns arising because of rational utility responses to perverse financial incentives.

This countervailing argument in support of after-the-fact regulatory review does not invalidate the appropriation problem *per se*; rather, it merely suggests limits on the types of solutions that ought to be used to deal with the appropriation problem. Moreover, the appropriation and perverse incentive problems are only two of many breakdowns in the regulatory system. For example, the current regulatory structure embodies average rather than marginal cost pricing, franchised monopolies, an obligation for utilities to serve all customers, politically motivated decisionmakers, and a complex system of federal and state regulation. As such, it diverges from a market system in any number of important ways. Although this Comment focuses primarily on only one of these divergences, perverse utility incentives, it is important to recognize that these other breakdowns exist and that they may also limit the solutions available to address the B&Z appropriation problem.⁸

Part I of this Comment develops the arguments in favor of preserving after-the-fact regulatory review in some detail using the analytical framework developed by B&Z. Part II briefly examines some historical evidence to provide a context for understanding the relative importance of both the appropriation

7. See *infra* notes 17-20 and accompanying text.

8. For example, one reason to retain after-the-fact regulatory review is to deal with utility actions which were negligent or imprudent. In competitive markets, a business which imprudently spends more than is necessary will not survive long. However, in the regulated utility sector, imprudent expenditures can sometimes be passed on to consumers. After-the-fact regulatory review is generally the forum in which these types of problems are addressed.

and perverse incentive problems. Part III outlines some solutions which might help to reconcile these two potentially competing concerns.

I. Coping with Perverse Utility Incentives: The Value of After-the-Fact Regulatory Review

To demonstrate the value of after-the-fact regulatory review, B&Z's analysis is revised to more accurately reflect the actual investment choices available to utilities and the financial impacts of these choices on both consumers and investors. Where possible, the analysis is tailored to reflect actual utility experience.

A. *Revising the Game*

This Section alters a number of the assumptions that B&Z use in their "Regulatory Game with Uncertainty" presented in Part II of their article. The specific changes are discussed below.

First, in the B&Z Regulatory Game with Uncertainty three different regulatory pricing strategies are considered: marginal cost pricing, average cost pricing, and pricing so as to maximize profits. In contrast, only average cost pricing is examined here because it is the approach that the majority of state regulators employ.⁹ This change, intended to simplify the analysis and not to critique B&Z,¹⁰ is captured in Figure 1—a simplified version of the B&Z Regulatory Game. Additional changes to the B&Z analysis, discussed below, are summarized in Figure 2, which is labelled the "Revised Regulatory Game".

9. See, e.g., Public Service Co. of Colorado, Testimony before Colorado Pub. Util. Comm'n, No. 91S-091EG (1991) (setting a revenue requirement which exactly equals total costs: in essence, average cost pricing).

10. The alternative pricing strategies B&Z examine are a sensible way of modelling various types of regulatory appropriation. By removing the marginal cost pricing variation, the appropriation problem has, in effect, been assumed away. This is done to simplify the exposition of the perverse incentive concerns and does not in any way suggest that the appropriation problem does not exist.

Balancing Competing Concerns

Figure 1

SIMPLIFIED REGULATORY GAME WITH UNCERTAINTY

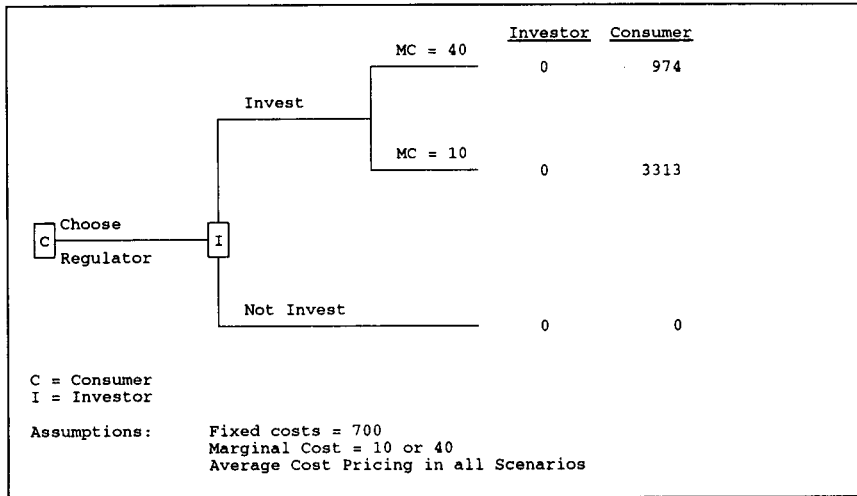
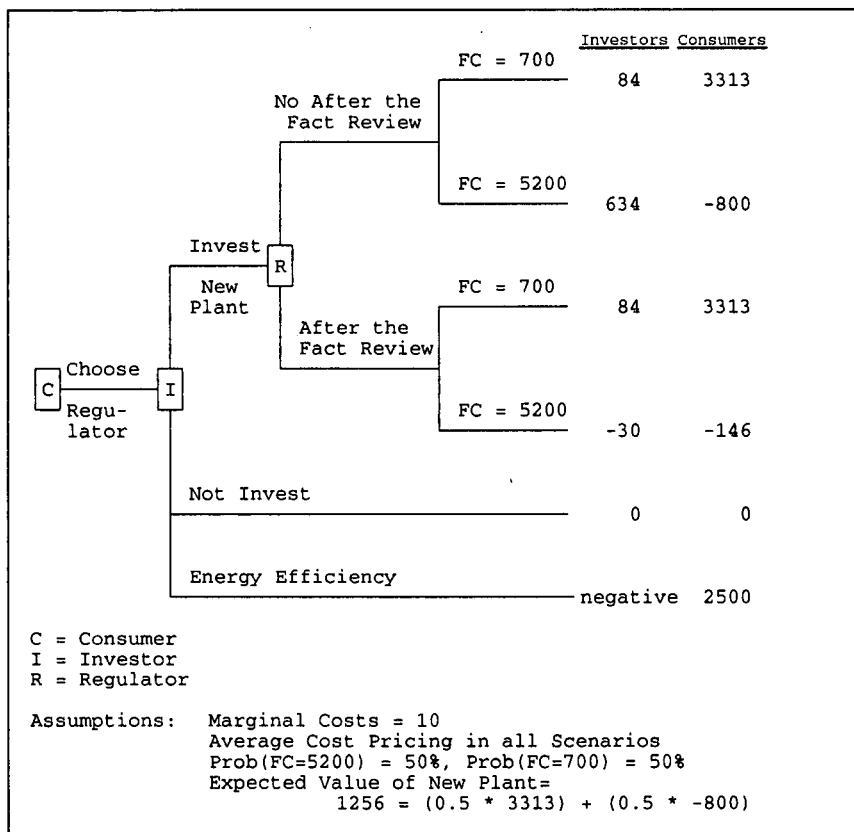


Figure 2

REVISED REGULATORY GAME



A second change in the Revised Regulatory Game is the addition of a separate investment category called "new plant". This category would include utility expenditures to build new generation capacity or to purchase pre-existing capacity from neighboring utilities. Unlike B&Z's broadly defined category of "investment,"¹¹ this change is designed to focus attention on those larger utility investment decisions which are most likely to be influenced by after-the-

11. In the B&Z Regulatory Games utility investment seems to include, among other things, employee training, distribution line improvements, the purchase of a new corporate headquarters, etc.

fact regulatory review.¹² Moreover, many utilities are likely to be facing these types of resource planning decisions in the near future.¹³

As a third change, the Revised Regulatory Game explicitly allows for the possibility that a utility investment in new plant may be uneconomic.¹⁴ This change is sensible; in the past, not all utility investment has proven to be beneficial.¹⁵ This possibility is modelled by assuming that the fixed costs associated with utility investment in new plant could be either 700 (as in the B&Z game) or 5200 (which would make the project very uneconomic). The difference between these two outcomes is likely to be dependent on factors outside the utility's control such as fuel prices, interest rates, or demand growth. Furthermore, at the time the investment is made all parties are assumed to know that there is a 50% probability that either outcome could be realized.

As a fourth change, the Revised Regulatory Game shown in Figure 2 adds another investment opportunity called energy efficiency. For many utilities energy efficiency appears to be the major alternative to continued investment in new plant.¹⁶ Consistent with our understanding of the currently available evidence, energy efficiency is assumed to be less costly (on an expected value basis),¹⁷ less risky,¹⁸ and less harmful to the environment¹⁹ than investments in new plant. As a general matter, this view of energy efficiency may help to explain why several utilities have invested so heavily in it,²⁰ once the perverse incentives problems have been eliminated.

12. See *supra* note 3.

13. See, e.g., PUBLIC SERVICE COMPANY OF COLORADO, ELECTRIC DEMAND AND SUPPLY PLAN 95-96 (Dec. 1990) (projecting that purchased power and plant conversions will provide a significant alternative for meeting future demand growth).

14. This change in assumption is important because after-the-fact regulatory review can be used to allocate the costs of utility investments which, retrospectively, turn out to be a mistake. Such investments generally appear to be economic when originally conceived. However, as circumstances change over time, these types of risky projects can become uneconomic. The utility's initial decision to invest in these types of risky projects may well depend on whether regulators have the authority to review the projects after completion.

15. See *infra* notes 27-34 and accompanying text.

16. See, e.g., PUBLIC SERVICE COMPANY OF COLORADO, *supra* note 13, at 95-96 (showing significant amounts of energy efficiency in their resource plan).

17. See, e.g., Arnold P. Fickett, Clark W. Gellings, & Amory B. Lovins, *Efficient Use of Electricity*, SCIENTIFIC AMERICAN, Sept. 1990, at 65 (conservatively estimating that is technically feasible to cost-effectively reduce national energy use by 30 percent through efficiency gains). There are a number of market barriers which explain why this potential has not yet been fully realized. *Id.* at 68-74.

18. The benefits of energy efficiency in reducing the risks associated with utility planning appear to be considerable. See Eric Hirst, *Flexibility Benefits of Demand-Side Programs in Electric Utility Planning*, 11 ENERGY J. 151 (1990).

19. See generally PACE UNIVERSITY CENTER FOR ENVIRONMENTAL LEGAL STUDIES, ENVIRONMENTAL COSTS OF ELECTRICITY (1990).

20. See, e.g., NEW ENGLAND ELECTRIC, CONSERVATION AND LOAD MANAGEMENT ANNUAL REPORT 130 (May 1990) (showing planned expenditures of over \$600 million by 1999); CALIFORNIA ENERGY COMMISSION, ELECTRICITY 1990 REPORT 4-20 (Oct. 1990) (estimating that utility conservation activities will have reduced demand by over 10,000 MW by the year 2000).

Nevertheless, this does not mean that a current decision to invest in energy efficiency will always turn out, in the future, to be the least-cost path. For example, if the fixed costs of new plant are 700 (and consumer surplus 3313), then society is better off with new plant. However, if the fixed costs of new plant turn out to be 5200 (and consumer welfare negative 800), then energy efficiency is more attractive. Since the probability of either fixed cost number occurring is assumed to be 50%, then the expected consumer welfare from new plant is roughly 1250,²¹ meaning that, on an expected value basis, energy efficiency is substantially more attractive.

Fifth, in B&Z's average cost pricing scenarios the utility is guaranteed recovery of all its prudently incurred costs. This is captured by a string of zeroes in the investor column for all options in the Simplified Game shown in Figure 1 above. Because of this, the utility is theoretically indifferent as to the ultimate outcome between no investment and whatever costs are ultimately associated with investment: in all cases economic profits are zero.

In practice, however, these zeroes may mean very different things. From an accounting perspective, the utility might prefer to invest in new plant because equity holders will receive a fairly substantial return on their investment.²² In the no-investment scenario, however, stockholders can only invest in the next most attractive opportunity which may produce lower or more risky returns. To reflect this stockholder preference, the Revised Regulatory Game gives investors a 12% rate of return on investments in new plant.

In contrast, investments in energy efficiency tend to be particularly unattractive to utilities and their investors due to an anomaly in the existing regulatory structure: the overwhelming majority of utilities have their revenues linked to electricity sales.²³ As a result, every additional unit of electricity that is sold adds to a utility's revenues; conversely, every unit of electricity saved through efficiency improvements reduces revenues and profits.²⁴ Thus, utilities face

21. $(0.50 * 3313) + (0.50 * -800) = 1256$.

22. These returns can be as high as 12-15%. *See, e.g.*, Colorado PUC Order, No. C91-918, (July 17, 1991), at 3 in Exhibit B (fixing the rate of return between 12.5 and 13.5 percent). The real return is likely to be even higher if B&Z's proposals are adopted as they would reduce the risks associated with investments in new plant (by credibly guaranteeing that investors would be fully reimbursed by consumers after the plant was built). This could result in a positive risk-adjusted economic profit. Also, if the utility has an informational advantage, then economic profits may be greater than zero.

23. *See generally* DAVID MOSKOVITZ, PROFITS AND PROGRESS THROUGH LEAST-COST PLANNING (Nat'l Assoc. of Reg. Util. Comm'rs, 1989). To address this problem, several states such as Washington and Maine have altered their regulatory structures. *See, e.g.*, Washington Utils. & Transp. Comm'n v. Puget Sound Power & Light Co., Nos. UE-901183-T & UE-901184-P at 5-11, 28-32 (Wash. Utils. & Transp. Comm'n, Apr. 1, 1991) (Third Supplemental Order Approving a Periodic Rate Adjustment Mechanism and Related Accounting).

24. In Colorado, additional sales produce revenues of about 6 cents/kilowatt hour at current rates. Given that excess capacity currently exists, short-term marginal generating costs are roughly 2 cents/kilowatt hour. Thus, the utility makes about 4 cents/kilowatt hour for every unit sold and loses an equivalent amount for every unit saved. *See Pomerance, supra* note 6, at 8-9.

a strong financial incentive to ignore energy efficiency opportunities. This effect is modelled by a negative return for investments in energy efficiency.

Finally, after-the-fact regulatory review is assumed to shift to investors some of the costs associated with utility investments which, when viewed retrospectively, turn out to be a mistake. This change is reflected in the Revised Game by assuming that investors lose 30 when the fixed costs of new plant are 5200.

B. *Implications of the Revised Regulatory Game*

With no after-the-fact regulatory review, a profit-maximizing utility will almost always invest in new plant. Investors receive a return of at least 84 and perhaps as much as 624 if fixed costs turn out to be high. Most utilities will make this decision even though energy efficiency is substantially cheaper than new plant from the consumer's perspective. On an expected value basis, energy efficiency offers consumers benefits which are almost double those of new plant—2500 versus 1256. However, from the utility's perspective, investments in energy efficiency produce a negative return for equity holders.

Moreover, with no after-the-fact regulatory review, the utility's preferred outcome is to have fixed costs equal to 5200. The worst situation for the consumers thus turns out to be the best for the utility because it produces a return to equity holders of 624. As a result, at least one of B&Z's suggestions for handling the appropriation problem, appointing pro-industry regulators, can significantly exacerbate the concerns associated with the existing incentive structure.

With after-the-fact regulatory review, in contrast, it is unclear what the utility's preferred choice will be. The situation presented in the Revised Game might encourage the utility to advocate for changes to the regulatory structure so as to obtain sufficient incentives to support energy efficiency investments. In fact, this has already occurred in a number of states.²⁵ Even without these other changes to the regulatory structure, after-the-fact regulatory review at least forces the utility to bear some of the risk associated with investments in risky projects that might retrospectively turn out to be mistakes. Thus, the penalty/reward structure that after-the-fact review imposes on the utility is closer to the costs/benefits that consumers experience.

25. See, e.g., *Washington Utils. & Transp. Comm'n v. Puget Sound Power & Light*, at 5-6 (summarizing position of a Washington utility advocating for decoupling electricity sales from revenues). Utilities in other states have also been supportive of regulatory changes which provide incentives to promote energy efficiency.

II. Putting the Revised Regulatory Game in Context

Over time, a number of utilities will be faced with a choice between building new capacity, purchasing existing capacity from other utilities, or encouraging energy efficiency. As argued above, eliminating after-the-fact regulatory review can significantly affect the balance that is struck between these resource choices to the detriment of energy efficiency. The following discussion tries to shed some light on the likely consequences.

It is possible that future investments in new plant may prove to be beneficial. During the 1950s and 1960s, economies of scale in generation, stable interest rates, and declining fuel costs all helped to make utility investments in large new plants extremely economical.²⁶ If similar conditions arise in the 1990s, then B&Z's concerns about the appropriations problem may well overshadow the issues raised in this Comment. The relative importance of options like energy efficiency would be reduced.

However, given recent historical experience, it seems just as likely that future investments in new plant may prove uneconomical. During the 1970s and early 1980s, rising interest rates²⁷ and stricter environmental regulations²⁸ dramatically increased the capital costs of building new power plants, while skyrocketing energy prices made the plants more expensive to operate.²⁹ At the same time, declining demand growth³⁰ and the greater ability of customers to produce their own electricity³¹ significantly reduced the benefits of utility investment in new plants.

Because of these broad changes, utilities were forced to cancel 115 nuclear units in various stages of construction between 1972 and 1985, creating over \$20 billion in losses.³² Over the same period, approximately 75 coal-fired power plants were also abandoned at a cost running into the tens of billions of dollars.³³ Other power plants, which were completed, often cost far more

26. See generally Charles Stalon & Reinier Lock, *State-Federal Tensions in the Economic Regulation of Energy*, 7 YALE J. ON REG. 427, 445-46 (1990) (describing events during this period).

27. Moody's Aaa corporate bond rates averaged 4.35% during the first half of the 1960s, increased to 5.67% during the second half of the 1960s, to 8.29% in the 1970s, and to 12.93% in the first half of the 1980s. ECONOMIC REPORT TO THE PRESIDENT 324 (1987).

28. See generally U.S. DEP'T OF ENERGY, NATIONAL ENERGY STRATEGY 144-70 (1991) (discussing changing environmental regulations).

29. See *id.* at A-8. (showing movements in oil prices).

30. See, e.g., PUBLIC SERVICE COMPANY OF COLORADO, *supra* note 13, at 18 (comparing yearly demand forecasts and showing enormous overestimation in early years of 1980s).

31. See Public Utility Regulatory Policies Act of 1978, Tit. II, Pub. L. No. 95-617, 92 Stat. 3117 (1978) (codified at 16 U.S.C. § 824 (1982)) (creating a regulatory framework which encourages third party power production).

32. Ralph Cavanagh, *Responsible Power Marketing in an Increasingly Competitive Era*, 5 YALE J. ON REG. 331, 335 n.15 (1988).

33. *Id.*

to build than their power was worth on the open market. Estimates of losses associated with these plants also run into the tens of billions of dollars.³⁴

Thus, there seems to be considerable tension between the appropriation problem and the concerns raised by rational utility responses to perverse incentive structures. In some circumstances, limiting after-the-fact review will produce benefits because the impact associated with relying more heavily on new plant will be minimal. In many other situations, however, eliminating this review could impose quite large costs and risks on consumers. The following section briefly suggests some ways of reconciling this tension.

III. Reconciling the Tension Between the Appropriations Problem and Perverse Incentive Concerns

Despite the tension between the appropriation and perverse incentive problems, some reform measures may exist which are at least sensitive to both concerns. One approach would be to limit after-the-fact regulatory review to situations where incentives are likely to be perverse and where large and highly risky utility investments are involved. In fact, this is the approach adopted by a number of jurisdictions where less risky utility expenditures are guaranteed cost recovery before the expense is incurred. For example, many states have fuel and short-term purchased power cost adjustment clauses which allow for easy recovery of these relatively risk-free expenditures without stringent after-the-fact regulatory review; yet, in these same jurisdictions, investments in new plant can only come into the rate base after they are completed and reviewed by regulators.³⁵ This type of dual recovery mechanism has the potential to address both the appropriation and perverse incentive concerns.

Alternatively, well-conceived resource planning processes which allow for early regulatory involvement in utility planning decisions also may address both concerns. Although regulatory discretion after-the-fact may be limited, the perverse incentive concerns could be addressed at the time the resource is selected by requiring the utility to justify carefully its expenditure. For example, in the Revised Regulatory Game presented above, regulators could set up a process which required the utility to examine the costs associated with varying levels of investment in energy efficiency. This process could help obviate the

34. See Richard J. Pierce, Jr., *The Regulatory Treatment of Mistakes in Retrospect: Canceled Plants and Excess Capacity*, 132 U. PA. L. REV. 497, 499 (1984).

35. This is the case in Colorado where new construction expenses are rate-based while purchased power has its own separate mechanism which allows for immediate cost recovery. See generally G. Schmitz, Testimony before Colorado Pub. Util. Comm'n, No. 91S-091EG, at 25-52 (1991) (describing the cost-recovery mechanism for fuel and purchased power expenses). However, this approach may also create its own incentive problems. *Id.*

need for subsequent review, thereby helping to avoid both the appropriation and perverse incentive problems.³⁶

In contrast, some of the other approaches that B&Z suggest to address the appropriations problem are less useful. For example, appointing pro-industry regulators may well ensure that little appropriation occurs. However, this type of regulator may encourage the utility to participate in risky or uneconomic projects that maximize utility profits at consumer expense. Similarly, mechanisms which guarantee utilities full cost recovery, through either average cost pricing or responsive regulation over time, may also encourage risky and needlessly expensive utility investments.

Conclusion

This Comment argues that any solution to the appropriations problem which limits after-the-fact regulatory review must be sensitive to a variety of incentive concerns, among others. Although these potentially competing concerns can be reconciled, doing so requires careful identification and understanding of the situations where they both arise.

36. Nevertheless, there may be limits to what can be accomplished through resource planning processes in a number of states. First, many utilities have informational advantages over the other parties. As a result, they may be able to present the evidence so that the most profitable resource choice appears to be the cheapest. Second, state regulators may have trouble obtaining jurisdiction over multi-state utilities. Finally, some states may not have the resources or the legal authority to implement an adequate rule.